Chapter 1
The Importance of Practicing Foundational Insights in Enterprise Governance and Enterprise Engineering

1.1 Introduction

1.1.1 Organizing and Enterprise Design

Different Aspects of Organizing

Our accompanying publication discussed foundational insights for enterprises, our generic term for social entities of purposeful human endeavor, such as businesses, companies, firms, corporations, organizations, and (governmental) institutions. The current publication focuses on practicing these insights within the realm of enterprise governance, dealing with enterprise change, and enterprise engineering, dealing with enterprise design. Both aspects are highly interrelated since change is largely effectuated through design. In practicing the foundational insights, the employee-centric theory of organizing will be specifically applied (Hoogervorst 2017, 2018).

As said, a key point about enterprises is that they aim to be purposeful—directed to accomplishing something. Aside from the (moral) nature of an enterprise endeavor, any purpose necessitates an arrangement of activities. Since the second law of thermodynamics predicts an increasing disorder (entropy) as the natural outcome of doing nothing, the successful arrangement of the purposeful activities does not come spontaneously or incidentally. In the case of enterprises, the sensible opposite to doing nothing, which results in the inevitable development of disorder, is *organizing*—the harmonious ordering and arrangement of activities and means in view of the enterprise purpose(s). Organizing not only concerns coordination and cooperation but also production activities, like organizing a dinner also includes preparing (producing) the meal. Organizing leads to *organization*, a concept that identifies the state of being organized. Note that the term 'organization' is also used to identify the entity being organized. Following common practice, we will use this term occasionally instead of 'enterprise' to follow the terminology of the

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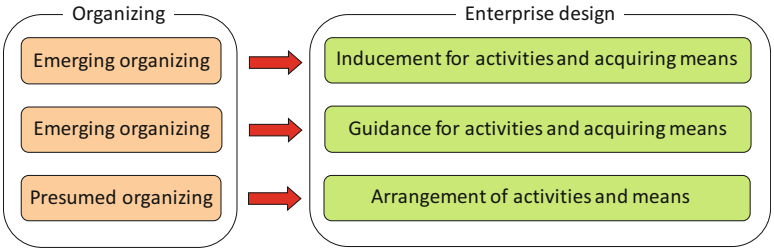

Fig. 1.1 Facets of organizing and enterprise design

organization literature. In these cases, the terms 'enterprise' and 'organization' are thus used interchangeably.

We have shown that organizing cannot be conceived as the onetime arrangement of activities and means representing the definite organized state that covers current and future enterprise operation: a necessary and sufficient outline of organizational roles and tasks, rules and regulations, processes, the associated information supply, means, and so on (Hoogervorst 2018). Rather, organizing must be interpreted in a dynamic sense as continuously evolving activities and states since organizing has largely an emerging nature. Because of the emerging aspect, organizing is not synonymous with enterprise design but critically depends on it. For understanding this criticality, three facets of organizing can be identified which are associated with three facets of enterprise design shown in Fig. 1.1 and further outlined below.

Presumed Organizing

Given the purposeful endeavor of an enterprise, activities and means should be arranged that express the predefined form of organization: the presumed way of working. Such arrangement of activities and means takes the form of the structural functionalist foundation of an enterprise and expresses much of the viewpoints of traditional organization theories that are summarized in the next chapter, including a critical reflection on the exclusive use of the structural functionalist perspective. Nonetheless, the importance of the structural functionalist foundation must be stressed. Indeed, the reliable delivery of enterprise products and services requires some sort of formal, predefined organizational arrangements on which this delivery (also) depends. We fail to see how, for example, the production of material goods or the provisioning of transport, educational, health care, utility, or governmental products and services—on which individuals and society critically depend—can take place reliably if left totally to incidental, emerging processes whose outcome is unpredictable. Recall that the growth of disorder (entropy) is the natural tendency. Hence, enterprises should have a basic level of presumed order provided by predefined organization in view of establishing a baseline reliability in delivering products and services. As indicated previously, it seems highly naïve to expect this basic level of organization to develop spontaneously. But, as the next chapter will clarify, the danger of the structural functionalist perspective lies in the mechanization of enterprises and the instrumentalization of employees. This danger can only be avoided by acknowledging the important notion of emerging organizing. At the

same time, this necessary facet of organizing can only be adequately exercised if a proper structural functionalist foundation is in place. It is like driving a car: emerging traffic phenomena must be addressed by emerging 'organizing' (car handling) of the driver which can only be properly done if the driver is supported by an adequate structural functionalist foundation of car and road infrastructure and systems.

Emerging Organizing

The foundational insights presented in our accompanying publication and summarized in the next chapter clarify that the predefined form of organization cannot completely and comprehensively capture the actual momentary, complex, dynamic, and emergent nature of enterprise reality (Hoogervorst 2018). A crucial facet of organizing therefore concerns those emerging organizing activities that are guided by enterprise design, such as through predefined operational rules that prescribe, propose, or direct how to address certain emergent contingencies. Examples are procedures for repairing technical systems, addressing environmental incidents, or remedying certain operational disturbances, such as flight diversions due to weather. All too often, the guidance provides merely an initial orientation for action because new unforeseen phenomena appear that need to be interpreted and addressed. Such developments point to a third facet of organizing. We consider this facet of crucial importance since for a large part, it is impossible to define in advance the precise nature of future enterprise activities and employee (or management) behavior since these activities and behavior have to respond to external and internal operational contingencies emerging out of dynamics, complexity, and the associated uncertainty. Aforementioned impossibility also follows from ambiguity, lack of clarity, and dynamics associated with the predefined organizational roles and activities themselves due to interpretations and expectations concerning what the roles and activities are all about in light of the experienced contingencies. Unpredictable patterns of organizing activities and behavior must develop to address the operational contingencies following from unforeseen, emerging phenomena concerning, for example, customers, suppliers, business partners, stakeholders, employees, machines, equipment, spare parts, material, information systems, work instructions, utilities, offices, buildings, conflicts, or weather, to name but a few sources of variety. So, a large part of the emerging organizing activities have to be defined at the very moment the emerging operational contingencies manifest themselves, simply because the nature of the emerging phenomena *cannot* be foreseen.

Specifically important for understanding previous viewpoints are a number of organization theories that will be briefly summarized in the next chapter. This summary will clarify the necessity to consider employees as the principal source of organizing. This facet of organizing is thus of utmost importance: emerging organizing induced by certain conditions created by enterprise design. These conditions are defined by the employee-centric theory of organization. Precisely, these conditions must be a topic of enterprise design and an integral aspect of the enterprise engineering design theories, methodology, and methods. Only in this way the danger, mentioned above, of creating merely a mechanistic structural

functionalist form of organizing can be avoided. Unfortunately, as will become clear, the dominant influence of traditional theories of organization ignores the importance of emerging organizing.

The Engineering Focus: Enterprise Design

Since the required level of organization does not develop spontaneously, creating order through organizing necessitates deliberate, intentional actions. These actions define *how* the organization (the state of being organized) must look like. Enterprises are organized complexities, a concept we will summarize in Sect. 2.3.9. Such complexities rank high on the nine-level scale of complexities defined by Boulding (1956). Creating the organized state is thus no simple matter since enterprises have numerous mutually related facets of which the social aspects are the most difficult ones. Enterprise design should thus cover all the mutually related enterprise facets. Design is not concerned with how things *are* but how things should *become*. Economist, psychologist, sociologist, and Nobel laureate Herbert Simon has stated that "everyone designs who devises courses of action aimed at changing existing conditions into preferred ones" (1969, p. 55). This is the essence of engineering: "The engineer is concerned with how things ought to be—*ought* to be, that is, in order to *attain goals*, and to *function*. Hence, a science of the artificial will be closely akin to a science of engineering" (op. cit., p. 5)[1]. Intentionally creating the conditions for all facets of organizing is identified as *enterprise design*. The theories, methodology, and methods for enterprise design are collectively identified as *enterprise engineering*. On the one hand design concerns understanding the intentions that are to be operationalized (*what*), and on the other hand design concerns figuring out the way to do it (*how*). Design is therefore the creative hinge point between intentions and their realization, as Fig. 1.2 symbolically expresses for the design of a car.

As Winograd and Flores put it, design concerns "the interaction between understanding and creation" (1987, p. 3). Such understanding does not only concern the structural functionalist way of organizing but must, as outlined, include the critical notion of emerging organizing such that the continuously evolving character of organizing is effectively enabled. It is this latter type of organizing that is most

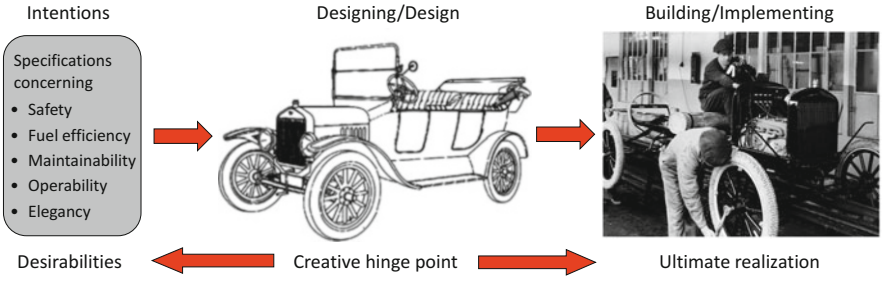

Fig. 1.2 Design as the creative hinge point between intentions and realization

[1]For all quotes in this book, italics are in the original text.

difficult to capture in formal design approaches. Yet, it is precisely here that the foundational social sciences should be practiced. The discipline of enterprise engineering should thus be viewed broadly from this perspective.

Enterprises as Designed Social Entities

Various viewpoints about what an enterprise *is* are presented in the literature (cf. Sect. 1.1.4*)[2]. Four characteristics are commonly mentioned. Enterprises are (1) social entities, (2) purposeful and goal directed, (3) intentionally (re)designed systems of activity, and (4) linked to the external environment. Section 1.3 outlines what the principal categories of activity in an enterprise are. Note that these characteristics concur with the perspectives outlined previously. The fact that enterprises are designed social entities has far-reaching implications for enterprise engineering since the foundational insights of the social and organization sciences must thus be an integral, or even primary, aspect of the enterprise design science. Merely addressing technology-based infrastructural issues is evidently necessary but insufficient.

Design as the Basis for Creating Enterprise Unity and Integration

Intentionally creating the conditions for all facets of organizing was identified above as enterprise design. As we will further discuss below, not any form of organizing suffices. On the contrary, organizing must be such that an enterprise operates as a unified and integrated whole. The notion of 'unity' expresses the condition or state of oneness. For social entities, this notion is commonly used to convey social stability and endurance: different groups within a social 'unity' live harmoniously together. Hence, the social entity does not dissolve and continues to exist. With the notion of 'integration,' the state of oneness is intensified: it expresses mutually coherent and consistent connections or relationships between entities that make up a whole. By 'integration,' we mean the process or instance (hence outcome) of combining aspects or elements of a larger whole such that these aspects or elements exist and cooperate seamlessly. For example, the term 'vertical integration' expresses the process or instance of combining various enterprise aspects pertinent to a product or service, like sales, production, and distribution, into one operational capability. In case of a social entity, integration also means the creation of shared norms, values, and purposes. When summarizing the various theories of society in the next chapter, we will discuss the societal functions and likewise argue the importance of functional integration for the proper functioning of society as a whole. Similarly, for a network, such as an airline network, there must be network unity but also functional integration. So, the term 'unity and integration' expresses the state of oneness whereby the aspects or elements of the oneness are mutually coherent and consistent. Below, we will further argue that creating unity and integration implies *designing*.

Enterprise reality shows that the condition of unity and integration is often violated with unfortunate consequences (cf. Sect. 1.2.4*). Hence, there are conflicts

[2]An asterisk (*) identifies a reference in *Foundations of Enterprise Governance and Enterprise Engineering* (Hoogervorst 2018).

or mismatches between enterprise aspects and between these aspects and the enterprise purpose. Since enterprise performance critically depends on unity and integration, this theme is stressed in the literature under various labels, such as 'organizational alignment' or 'concinnity.' The 'congruence theorem' expresses the fundamental truth supported by much empirical evidence: enterprises will operate more effectively, and perform better, the higher the degree of unity and integration—the coherence and consistency of the various enterprise aspects (op. cit).

Enterprise Engineering: Uncomfortable Connotations?

The importance of enterprise design was emphasized above. For some however, the term 'design' in the context of enterprises has uncomfortable connotations since it is associated with mechanistic approaches to enterprises: arranging them as if they are machines. Sometimes, the label 'social engineering' is used to identify the mechanistic view on organization and management (Tsoukas 1994). This view equates management with control and expresses the conviction that by using certain 'controls,' management can steer the enterprise (top-down) in the desired fashion. The enterprise is thereby assumed to be an objective and designed entity, external to management, that like a machine, merely needs to be controlled. Although design might lead to machine-like forms of organization, that is not inevitable. So, in defense of enterprise design, we submit that the three facets of organizing discussed above will not materialize if left totally to incidental processes of which the outcome is unpredictable. Recall that the growth of disorder (entropy) is the natural tendency. Enterprises are characterized by a certain level of order provided by the three facets of organization which critically depend on design. Hence, creating conditions for proper organizing necessitates deliberate, intentional actions. These actions define *how* organization must proceed. We refer to these actions as *design*.

In summary, we appreciate the mentioned uncomfortable connotations with 'social engineering' and agree that the mechanistic view on enterprises is untenable and have strongly criticized this viewpoint (Hoogervorst 2018). Fundamentally different perspectives were presented that, among other things, acknowledge the nonplanned, nonmechanistic, emerging character of many enterprise developments (op. cit.). Chapter 3 will corroborate this viewpoint in the context of enterprise change. Coping with and addressing emerging phenomena is essential for enterprise strategic and operational success, as well as for the ability to innovate and change. All these capabilities depend on specific enterprise conditions, as we will show when defining these conditions within the realm of enterprise engineering. Again, these conditions must thus be created intentionally: they must be *designed*. Contrary to the uncomfortable mechanistic connotation, such enterprise design enables future, yet unknown, enterprise change and adaptation. Such design is the very basis for an adequate enterprise governance competence.

1.1.2 *The Fundamental Maxim and the Theory of Organization*

The Preferred Way of Organizing and Design

Acknowledging that organizing—the intentional creation of the organized state (organization)—critically depends on design inevitably leads to the question as to how the design must look like. In the course of outlining the discipline of enterprise engineering, we will formally and methodically deal with this question. For now, the following is noteworthy. First, it is impossible to device an algorithmic procedure—a causal set of operations and steps with an inherent, deterministic result—to proceed from a given enterprise purpose to an associated enterprise design, as Sect. 2.2.7 will outline. We will further elaborate on this fundamental insight in Chap. 3. As a consequence of this insight, there are inherent degrees of freedom concerning the concrete nature of enterprise design. A given enterprise purpose can lead to various designs. Figure 1.3 expresses this freedom graphically. The curved lines represent the design process and aim to express its nonalgorithmic nature.

Second, the possible forms of design are not equally effective nor desirable. As further reiterated in the next chapter, not any design is adequate, such as those ignoring emerging organizing. Various practices advanced in business or management literature can be seriously criticized. The next chapter will further summarize in what way the often-used forms of organizing are flagrantly inadequate if not damaging. Lack of understanding and quackery turn out to have severe consequences. Indeed, a crisis in enterprise performance is apparent and "much of this crisis can be traced back to organizational pathologies and ultimately to deficiencies in our thinking about what organizations should be, and how to conceive of them" (Schwaninger 2009, p. 1). Hence, a proper theory of organization is crucial. It is

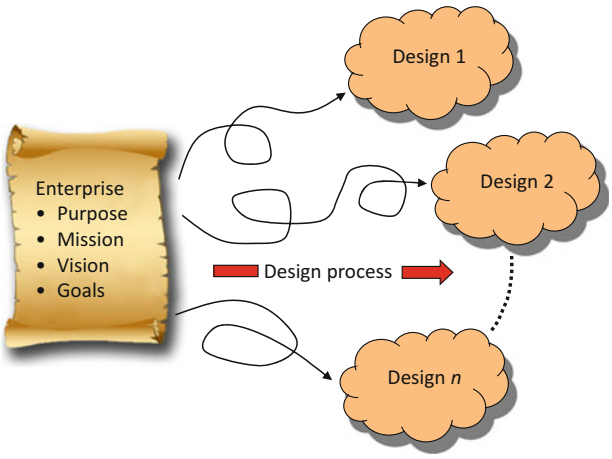

Fig. 1.3 Design freedom

important therefore to recall the fundamental maxim of Burrell and Morgan on which our accompanying publication is based (1992, p. 1):

> All theories of organization are based upon a philosophy of science and a theory of society.

When summarizing philosophical viewpoints and the various social and organization theories in the next chapter, the validity of this maxim will be clearly proven. Together with the philosophy of science and the theories of society, the organization theories form an important part of the foundational insights. Specifically foundational for enterprise design is the *employee-centric theory of organization* that we have strongly emphasized and corroborated (Hoogervorst 2017, 2018). Core reasons for advancing this theory are summarized in the next chapter. For now, it is important to note that it is this theory of organization on which the capacity for emerging organization, as well as the capacity for successful enterprise change and adaptation, is based. Hence, it is this theory that provides the foundational insights for the desired forms of enterprise design.

Closing the Chasm: Applying Foundational Insights

It seems evident that without a proper theory of organization, enterprise design is futile. For effectively addressing the organized complexity of enterprises and their associated performance problems in a practical way, design must therefore be firmly based on an appropriate theory of organization rooted in the foundational sciences. As psychologist Kurt Lewin said, "there's nothing so practical as a good theory" (In: Thomas 2003, p. 74). Conversely, as we have shown in Chap. 4*, "nothing is as dangerous as a bad theory" (Ghoshal 2005, p. 86). Recall that design is the creative hinge point between intentions and realization. Thus, the foundational insights, specifically those of the employee-centric theory of organizing, must be applied to enterprise design. As indicated before, also Herbert Simon had a drive to infuse the social sciences with the same rigor that made the natural sciences so successful. Key to establishing this rigor is the notion of design (Simon 1969). Hence, the theories, methodology, and methods of enterprise engineering must be capable of addressing and operationalizing the foundational insights concerning the employee-centric theory of organization. In doing so, the unproductive chasm between the social and organization sciences on the one hand and the engineering sciences on the other hand can be bridged. The need to bridge this chasm was already identified early in the former century: "and one of the problems of our time is to bridge the widening mental gulf between those educated and trained solely in the humanities and those whose minds are shaped by a life devoted to that machine technology on which all are increasingly dependent for the material basis of existence" (Urwick 1947, p. 10). Bridging the chasm is what this publication aims to accomplish.

1.1.3 Outlining Further Introductory Observations

Given the significance of organizing, the central purpose of this introductory chapter is to argue the importance of understanding and designing enterprises and to introduce the main topics we discuss in subsequent chapters. Our further introductory observations proceed as follows. We will start by sketching the character and trends of the modern enterprise context, as expressed by major developments concerning technology, information, business, and organization. A number of paradigm shifts are identified that typify these developments and point to the need for fundamentally different ways of organizing. Next, two core enterprise competences are introduced of which one is concerned with enterprise change and adaptation. This latter competence, identified as *enterprise governance*, is thus the competence that carries out the process of enterprise design and applies the *enterprise engineering* design science. The nature of this process is further detailed in Chap. 3 and illustrated in the following chapters.

We mentioned that the various facets of organizing become a reality through enterprise design, which is the core activity within enterprise governance. As a further introductory observation, several fundamental reasons will be given for the importance of holistic, enterprise-wide design. The first reason is the apparent widespread inability of enterprises to utilize information technology (IT) successfully. As our discussion will show, a case in point is the persistent problem of 'business and IT alignment.' The inadequacy of the traditional approach to solve this problem, which primarily focuses on IT and IT governance, will be discussed. This forms the basis for an essentially different perspective. Besides IT governance, the theme of corporate governance is briefly summarized. Central in this theme is the notion of 'compliance': the adherence to rules, regulations, and proper internal control for safeguarding the financial interests of shareholders. We will show that effectively addressing compliance requirements needs an enterprise-wide focus, which presents the second reason for holistic, enterprise-wide design. The third reason lies in the fact that design is the basis for enterprise operational and strategic performance. Finally, an enterprise-wide design focus is essential for overcoming theoretical fragmentation in addressing enterprise issues and avoiding the traditional myopia about organizing that reduces attention to merely processes and their machine-like characteristics and thereby virtually excludes the notion of an enterprise as a social entity.

Given the central notion of design, we will introduce the concept of 'design science' and will position enterprise engineering as the design science for enterprises. The close relationship between a sound design science and the associated foundational sciences is outlined, which likewise hold for the enterprise design science. As indicated, enterprise design is the core activity within enterprise governance. Since, as will become clear, solving the issue of 'business and IT alignment' necessitates a focus on the design of the enterprise as a whole, IT governance must therefore not be treated as a separate topic but as an integral part of enterprise governance. Likewise, the issue of 'compliance' can only be addressed properly

through enterprise-wide design. Similarly therefore, corporate governance should not be treated in isolation but as an integral aspect of enterprise governance. Next to the close relationship between enterprise governance and enterprise engineering, we will thus also stress the close relationships between the three governance themes, such that attention to enterprise governance suffices: necessary and sufficient for governing enterprise change and adaptation. Finally, the contents of the next chapters will be outlined.

1.2 The Modern Enterprise and Its Context: Trends and Characteristics

1.2.1 The Context

Four characteristics of enterprises were mentioned in Sect. 1.1.1. They are (1) social entities, (2) purposeful and goal directed, (3) intentionally (re)designed systems of activity, and (4) linked to the external environment. This section will illustrate that the trends and characteristics of the modern enterprise context profoundly impact the nature of all four enterprise characteristics. Moreover, the four characteristics are more or less mutually related. For example, other ways of organizing (redesign) might require different types of employees which will change the nature of the social entity. Conversely, a different social nature might entail redesign because of the required different ways of organizing. Likewise, changing relationships with the external environment necessitate other ways of organizing, while other ways of organizing might change the nature of those relationships. Also a changing purpose is likely to affect ways of organizing. In all these cases, (re)design plays a central role. We will further argue this central role by sketching the trends and characteristics of the modern enterprise context pertinent to four perspectives: (1) technology developments, (2) the informatization of enterprises, (3) the business context as the description of the external environment, and (4) organizing, the new ways of getting into the organized state. As the sketch will show, thoroughly understanding enterprises and the ability to properly design them is crucial in order to adequately address the developments outlined.

1.2.2 Technology Developments

Adoption Rate

By 'technology' is understood the totality of knowledge, methods, physical means, and materials for realizing and utilizing technical systems. The influence of technology on human individuals and society is considerable and often of primary significance for the manner in which society is arranged and can be characterized (cf. Sect. 2.4.2*). Technology is one of the three major societal change drivers (cf. Sects.

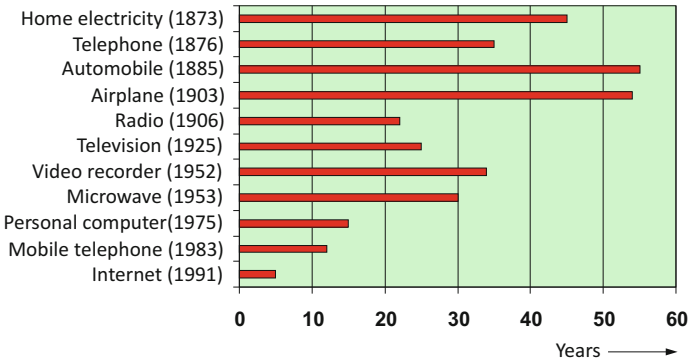

Fig. 1.4 Reduced technology distribution time

3.7.2* and 3.7.5*). An evident example is the revolutionary influence of information technology on the informatization of work. A more recent revolutionary influence is discussed below.

From a historic perspective, the rate of technology adoption in society seems to increase. Put another way, the time it takes for technology to reach broad utilization among people reduces. Based on data from the American Census Bureau, Fig. 1.4 shows the time it took for different technologies to reach at least 25% of the American population (Cox and Alm 1996; DiVanna 1997). The telephone took 35 years, while for the personal computer (PC), only 15 years elapsed to reach that level. For the Internet, the period is 5 years. Within a few years, the Internet has reached a utilization density for which the telephone network needed 100 years. Others have compiled comparable figures (Wooldridge 2011).

IT Dynamics: Computers and Transmission

Information technology (IT) can be understood as the totality of knowledge, methods, physical means, and materials for gathering, handling, processing, storing, and accessing data. One might observe that only then can 'information' be referred to if data has meaning (value) for an individual. In fact, a better term would be 'data technology.' In view of the communication aspect, the ICT label is often used. One might consider communication technology as the technology for transmitting messages electronically. The term 'messages' must be interpreted broadly and denotes anything that can be transported through telegraph, telephone, radio, or television. Due to the digitization of both data and messages, the difference between both technologies becomes virtually nil. This is not only the case for transmission itself—no distinction in the digital manifestation of speech, images, or data—but much communication equipment also has computational capacities. In fact, communication technology can be viewed as a specific facet of information technology. We will therefore refer simply to IT rather than ICT.

Information technology is evidently a prime example of revolutionary developments. Progress in IT has been labeled 'revolutionary,' since this progress has affected the arrangement of society fundamentally and will continue to do

so. Rightly, one refers to the 'digital revolution' (Negroponte 1995). From a historic perspective, IT progress shows enormous dynamics stimulated to a considerable extent by the development of computers (Hyman 1982; Bird 1994; Davis 2000). Developments directly prior to, during, and immediately after the Second World War led to the first wave of computers and turned out to be the prelude to the digital revolution and Toffler's third wave: the transformation from the agricultural and the industrial towards the *informational* era (Toffler 1980). Already back in the 1960s, MIT scientist Joseph Licklider foresaw the enormous progress of computer capacity by stating that the capacity would double every 2 years (Licklider 1965). As an illustration of the enormous progress, the following example might suffice. The ENIAC computer became operational in 1946 and contained 18,000 vacuum tubes and 1500 relays, weighed 27 tons, and consumed 160 kW of power. Given the multitude of parts and their reliability, the ENIAC computer was initially only available for about half of the time. In 1971, the total ENIAC computing capacity was realized on a single microchip (Moore 1997). A similar dynamic can be noticed in the area of communication (Kennedy 1977; Keen and Cummings 1994). For decades the transmission capacity has tripled every year.

IT Dynamics: Information Infrastructure and the Internet of Things

During the second half of the former century, various engineers and engineering institutions conducted research into data transmission technology. Together, these mutually stimulating developments led to the possibility for remotely located computers to efficiently and reliably exchange data. Eventually, these developments created the worldwide system of interconnected networks and computers known as the Internet: a massive communication (data transmission) infrastructure. Based on the enormous communication capabilities, other developments in the early 1990s enabled users to search for and retrieve data stored on computers (databases) in the network. This 'worldwide web' of databases—seen as locations with information—changed the Internet from a massive global communication infrastructure into a massive global multimedia database. Growth turned out to be enormous: in less than a decade, at the end of the 1990s, a new www-address was created every few seconds (Downes and Mui 1998).

The digital revolution has led to all sorts of Internet access devices which can often be operated wirelessly and are mobile ('always connected'), with a high level of mutual interoperability, varying from personal computers, laptops, tablets and (mobile) telephones, smart phones, to televisions. In the early stages of Internet development, it was primarily IT equipment (including personal computers) that was connected. Such equipment currently makes up only a fraction of the devices connected to the Internet. Many devices and appliances have microcomputers (embedded 'chips') giving devices intelligence and communication capabilities which are further fuelled by computer capacity progress. Miniaturization of microchips enables the incorporation of 'intelligence' in virtually anything, such as packages identifying their location. All kinds of devices, appliances, or 'things' with internal intelligence, varying from elevators, vending machines, energy meters, to parcels, are connected to the Internet to transmit data about their status, whereby

the Internet becomes the 'Internet of things.' It is expected that eventually almost all household equipment will have an Internet connection (Dornan 2001). A washing machine can thus download applicable programs. Hence, miniaturization, combined with the possibility of providing minuscule microchips with energy, means that in the near future, many material objects will have intelligence and can communicate. One refers to 'ubiquitous computing,' or 'pervasive computing,' which turns the environment into 'ambient intelligence' (Aarts and Encarnação 2006). Network communication already consists for more than 90% of communication between 'stuff' that is not specifically computer-related. Ever-increasing mobile communication capacity and the convergence of a variety of (social) media have created an 'always on,' or 'real-time,' society. The Internet is the all-embracing communication medium: between people, between people and devices, and between devices mutually. It is this distributed, partly mobile, intelligence that gives the Internet its enormous potential (Louis 2001). Digitizing information and communication enables extensive integration of previously distinct media. Convergence of data presentation, automation, and telecommunication thus enables convergence on the informational level: information that had to be treated separately can now be presented (through multimedia) in a unified manner. This real-time integration offers inconceivable opportunities for coordination, cooperation, and collaboration between individuals.

The impact of these developments, further discussed below, can hardly be overstated. Note that these developments emerged in unforeseen ways and with no overarching central authority in control.

IT Dynamics: Blockchain Technology

A fairly recent example of IT dynamics is the emergence of the so-called 'blockchain technology,' which was developed for the open-source, distributed digital cryptocurrency called 'bitcoin' (Crosby et al. 2015; Franco 2015; Tapscott and Tapscott 2016). Essentially, the term blockchain refers to an Internet-based distributed database that contains time-ordered data about transactions which took place between participants using the blockchain. Transactions can be seen as atomic changes in the 'state' of an enterprise, for example, changes in financials, documents, contracts, assets, services rendered, or goods produced. Data that enters or is stored in the blockchain can never be erased. Hence, a blockchain contains data about every single transaction ever made by participants. More generally, the blockchain initiative concerns the creation of a peer-to-peer economy where amounts of value are exchanged through transactions without a trusted third party. Multiple amounts of value can be envisioned, such as money, property, energy, etc. This peer-to-peer economy is an Internet-based, distributed digital ledger which contains all the transactions and their associated data. The associated software runs on computers of the participants, called 'nodes.' Underlying is the concept of *distributed consensus*: all participants (nodes) in the network have a full copy of the digital ledger and must agree with the periodic updates and hence must agree that the transactional events happened in accordance with the associated data, thereby sanctioning the storage of irrefutable records in a distributed digital ledger.

Transactions in the blockchain are thus always consistent since the verified transactional updates are logically consistent with the ones already stored. So, it is impossible to spend money twice or resell a product already sold. The process of reaching distributed consensus is carried out without compromising privacy and anonymity. These are core characteristics of the blockchain technology. Without going into the complicated details, the ledger is periodically updated with chunks (blocks) of new transactions that took place and are verified to be trustworthy. The digital ledger is thus a chain of blocks (hence the name) with trustworthy, chronologically ordered transactions.

When anyone, possibly anonymously, can participate in a blockchain network, the blockchain is identified as 'public.' Also the term 'permissionless' is used. The bitcoin network is based on such public blockchain. When some form of access control is effectuated, the blockchain is labeled as 'permissioned': not anyone can join. A specific form of a permissioned blockchain is a private blockchain where only known members or customers of the private organizations are participants in the blockchain.

There are two types of network nodes: (1) passive nodes whereby participants only use the blockchain technology and (2) active nodes whereby participants are contributing efforts to creating new blocks of verified and confirmed transactions (Franco 2015). Participants of the active nodes in a public blockchain are called 'miners.' The process of verifying and creating a new chunk (block) of yet unconfirmed transactions is both innovative and mind-boggling. Verification and conformation of transactions—hence their trustworthiness—is based on (1) mathematical (cryptographical) algorithms, (2) the history of already identified trustworthy transactions, and (3) the condition that a majority of the nodes in the network must concurrently agree. On the average, the blockchain is updated every 10 min. Hence, this is the average time to create and verify a new block of transactions. In case of permissioned blockchains, the process of verifying and creating new trustworthy blocks of transactions can be different (but not necessarily less complicated) because access control enables to establish the nature of the trustworthiness of participants. This is particularly the case for private blockchains.

Technology Dynamics: Uncertainty

Technology-driven dynamics can be appreciated not only based on the shrinking time it takes for widespread utilization but can also be appreciated from the unpredictability of technology developments and their impact. Uncertainty plays a key role. Generally, uncertainty is the consequence of lack of knowledge, or the inevitable effect of the inherent character of the developments themselves (Wilde 2000). We have outlined that the latter aspect plays an all-determining role in technological, societal, and enterprise developments (cf. Chap. 3*). As the story goes, at the start of the last century, the director of the American Patent Office proposed closing the office since everything that could be invented was already invented. The proposal appeared premature: more than half of all American patents were issued after 1960 (Cox and Alm 1996). Predicting or assessing technology advancements with reasonable accuracy is impossible. Indeed, 'predicting' the

invention of the wheel or the transistor would mean that one *already* knows what the wheel or the transistor is all about. Using these inventions could thus start directly. Obviously, "we do not know what we will know" (Taleb 2010, p. 173). The following examples illustrate this truth. After the invention of the telegraph, the Boston Post wrote in 1865 that "Well-informed people know it is impossible to transmit voice over wires. Even if it were, it would be of no practical use" (In: Bekkers and Smits 1997, p. 5). In 1943, the president of IBM estimated a worldwide market for about five computers. Not much later (1949), the *Popular Mechanics* magazine stated that future computers probably would not weigh more than 1.5 tons and would contain less than 1000 vacuum tubes, which in itself would be a considerable improvement compared to the ENIAC computer operating at that time, weighing about 27 tons and using 18,000 vacuum tubes. As mentioned above, in 1971 the complete computational power of the ENIAC computer was realized on one integrated circuit (IC) with negligible weight (Moore 1997).

From roughly the 1980s, the digital revolution progressed at such a pace and had such an internal dynamism that the outcome appeared, even more than in the past, hardly predictable. Note that the inability to foresee these and other technology developments, even approximately, also appeared to hold for those involved with these developments. Even at the end of the 1970s, the president of Digital Equipment saw no reason why people would want a computer in their home. Around the same time frame, someone presented the idea to Gordon Moore, one of the founders of the Intel company, for what was basically the personal computer, to sell it in the home market. Other uses than housewives storing recipes on it were not envisaged. As Gordon Moore recalls, "I personally didn't see anything useful in it, so we never gave it another thought" (Moore 1997). Some years later, the president and founder of Microsoft thought that 640 Kb of storage capacity would be enough for people who might after all want a home computer (Aarts 2005). One might appreciate the enormous progress of IT, realizing that these statements were all made in the more recent history. In 1971, Intel developed the first microprocessor which, as mentioned previously, had the same computational power as the massive ENIAC computer developed 25 years earlier. By 1980, the microprocessor had found its way into more than 2000 product designs. At that time, IBM selected the Intel microprocessor for its first personal computer. With hindsight, the same (understandable) inability to foresee the future played its role: "while we knew the IBM product was significant, we had no idea how that single decision would change Intel and the industry" (Moore 1997). The dynamics of IT are thus unpredictable in their effects: certain predicted effects did not occur, or occurred less prominently than expected, while unpredicted effects, such as the enormous growth of text messages, emerged (Seeley Brown and Duguid 2000). Predictions about the impact of technology on society were no better. In 1929, NBC radio's president predicted that radio would be the perfect means for establishing the "ideal democracy" (Wilde 2000, p. 69). Electricity was also viewed as wielding broad influence. According Marshall McLuhan, electricity would "liberate us from city noise, war and violence, and enable us to regain contact with nature" (op. cit., p. 52). As one of the founders of the Intel microprocessor corporation observes, "as has always been the case with new technology, the

most important and revolutionary uses are the ones we can't yet foresee" (Moore 1997). Recent history shows such IT dynamics that neither the direction nor the possibilities and opportunities of the IT developments could be comprehended even remotely adequately.

The inability to predict the impact of technological developments with any practical accuracy has to do with the following factors (Wilde 2000, pp.73–75):

- Every technology, alongside its designers' defined intentional use, also has a potential use that is very hard to foresee a priori.
- A successful technology will be followed by barely predictable new functionalities.
- Innovative success depends on complementary innovations that enable the utilization of the initial innovation.
- A technology's success depends on many other conditions, such as economic, social, political, and demographic factors.
- The existing conceptual reference framework implies that the impact of technology innovations and their subsequent systems cannot be understood and fully comprehended.
- It is unclear whether, and to what extent, new technologies and their associated new ways of working will replace existing technologies and ways of working.

The uncertainty sketched above is one of the reasons why the ability of enterprises to change and adapt is crucial. Moreover, when new technology emerges, the issue here is not only technology as such but concerns the meaning and possibilities of new technology for one's own enterprise and the successful integration of technology within the whole enterprise context. As we will argue extensively, successful integration necessitates enterprise-wide design whereby technology is an integral aspect. The inherent nature of technological, societal, and enterprise dynamics and their associated uncertainty necessitate fundamentally different perspectives on strategy development and organizing. Important insights will be summarized in the next chapter.

1.2.3 Informatization

Growth of Data

Progress in information technology has enabled the creation of massive amounts of data associated with, for example, the worldwide web of information, the Internet of things (ubiquitous computing, ambient intelligence), social media, and communication networks, as well as associated with enterprise customer and operational processes. As more and more enterprises experience, these areas become increasingly intertwined, such as the sharing of customer experiences through social media. Not surprisingly, the amount of data grows exponentially. The term 'big data' has been coined to characterize the enormous data volume. It is believed that analysis of this volume would yield valuable information for (1) real-time enterprise operational

control; (2) predicting, such as consumer behavior; (3) pattern recognition, for example, between events; and (4) discovery of new phenomena. For some, the exponential growth of digital data is the new industrial revolution which will transform social and working life (Mayer-Schönberger and Cukier 2013). For enterprises, the data revolution is believed to hold many promises: (1) better strategies, decisions, and answers, (2) more innovation and higher productivity, and (3) increased competitiveness would supposedly be the results of exploring and exploiting 'big data' (Bloem et al. 2013). Uncertainty associated with technology developments, as identified above, is likewise associated with the nature and impact of the data revolution. Nonetheless, based on the impact that is already manifest, a considerable impact seems plausible. As Zuboff observes, work is no longer merely automated but 'informated' (1989). Increasingly, work becomes synonymous with 'knowledge work' (Drucker 1992, 1993). The management of physical assets—a typical characteristic of the era of the industrial revolution—shifts towards the management of 'intellectual assets.' As Drucker states: "the function of the organization is to make knowledge productive" (Drucker 1993, p. 49).

Need for Information Integration

Arguably, for making information (data) productive, it must not be fragmented but integrated and shared. This is a nontrivial issue, specifically since most data is generated in events that are distant in space and time. For example, a parts warranty condition negotiated by legal staff must be known to maintenance staff who replace parts. Making information and knowledge productive thus critically depends on unity and integration: the enterprise must be directed to "the integration of knowledge into a common task" (Drucker 1992). Creating and sharing knowledge is viewed as crucial for gaining competitive advantage (Nonaka and Takeuchi 1995).

As we have shown, one can also refer to knowledge at the level of the enterprise itself (cf. Sect. 4.3.5*). According to Argyris and Schön, enterprises can be viewed as cognitive entities which learn and develop knowledge (1978). Shared knowledge defines the enterprise 'mental map' that determines enterprise behavior as a reaction to, and anticipation of, environmental changes. So, enterprise learning concerns the increased capacity to effectively address the dynamics an enterprise is experiencing (Kim 1993). Enterprise learning must be a core competence and is both a manifestation and a prerequisite for change (Prahalad and Hamel 1990). Rightly, enterprises that cannot learn cannot change (Schein 1993). Precisely this insight is the basis for arguing that strategy development must be considered as a learning process. Core arguments are presented in the next two chapters. Obviously, widespread informatization and information integration aid significantly in enterprise learning.

The informatization of enterprises is also manifest in the relationships of enterprises with customers. Traditionally, these relationships were merely transaction-oriented: the exchange of products or services for some monetary reward. Since informatization has resulted in enormous amounts of data about customers, the relationship with customers can be extended beyond that of a singular transaction if data is effectively exploited. Rather than a short-term transaction orientation, attention can shift towards a long-term relational orientation. It is argued that the

information-intensive enterprise and society enables a shift from the 'transaction economy' towards the 'support economy,' with its focus on supporting customers, civilians, patients, etc., based on the relationships that support-giving enterprises have built (Zuboff and Maxmin 2003).

1.2.4 Business Context

We will use the term 'business' to denote the enterprise function—delivery of products and services to customers—or, more generally, to denote the relationships of the enterprise with its stakeholders. The term 'business' thus also refers to the overall purpose and goal of an enterprise. We have sketched the social developments that led to the industrial revolution and the development of enterprises as we know them today (cf. Sect. 3.7.2*). The industrial revolution turned out to be an enormous technological and subsequently socioeconomic and cultural transformation. At the outset, the development of machines fuelled the industrial revolution, later further propelled by transport capabilities offered by the railways. In the more recent history, we witnessed another wave of technology revolution mainly due to revolutionary developments in information technology sketched above.

Fundamental Changes

The industrial revolution can be viewed as the transformation that also led to organizational forms that are currently still primarily manifest. Core aspects of enterprises—and their theory development—find their origin here. For a long time, factory-oriented production was directed towards delivering standard products and services. This type of production was associated with mass demand, whereby customers—also because of prevailing economic conditions—appeared to be satisfied with supplier-defined products or services. Markets were relatively static, so mass demand could be answered through mass production and its associated ways of organizing. Attention went first and foremost to economically optimal ways of production, whereby the end-user of the products or services received virtually no attention. Understandably, enterprises therefore tended to be inward-looking.

An increase in wealth led to increased demand for more product variety. As a result, the market became less static since larger product variety implied more demand dynamics. Technological progress, specifically concerning IT, enabled customizing products to individual requirements of customers. Gradually, a shift from standard mass production towards individualized (customized) production and from a static market towards a dynamic market became manifest, as depicted schematically in Fig. 1.5.

With the shift shown in Fig. 1.5, a great number of fundamental changes are associated concerning the manner of business conduct and the way enterprises are organized. More and more, ways of organizing that focus on mass production can be considered as an anachronism. Changes are fundamental since they imply essentially different perspectives on enterprises, their customers, employees, and suppliers. The

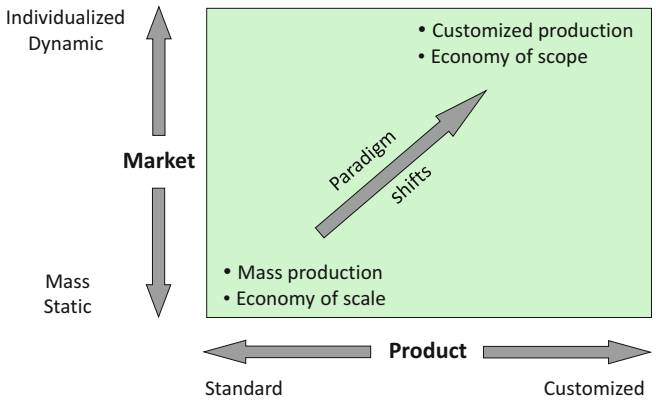

Fig. 1.5 Shifts in market and product character

changes, which we will sum up in a later paragraph, can rightly be identified as paradigm shifts.

Social Media

Section 1.2.2 described the Internet as the massive worldwide communication infrastructure comprising a worldwide web of databases, seen as locations of information. This infrastructure or network has enabled the emergence of so-called *social media*, like Facebook, Twitter, Instagram, YouTube, LinkedIn, etc. Traditional communication media, such as radio, newspapers, television, and magazines predominantly act as one-way communication channels, whereby the receiver consumes content rather than creates it. Social media, however, have enabled individual human beings to create and distribute content through the Internet (Zarella 2010). Social media are thus a collection of Internet-based communication means allowing individuals to create, distribute, and share content of various kinds, and interact pertinent to that content. Depending on the kind of content and its purpose, different types of social media can be identified, such as news sites, media sharing media, content sharing networks, blogs, etc.

Enterprises are using and exploring social media on a large scale for marketing and operational activities. More specifically, social media are used for customer relationship management, public relations, reputation and brand management, organizing customer feedback, advertising, customer support, recruitment, logistics, etc. (Singla and Durga 2015). An important driver for using social media is to gain and maintain competitive advantage. Whether that can be achieved remains a topic for debate (Smith and Vardiabasis 2010). Nonetheless, ignoring social media can be rather dangerous. Negative customer experiences with products or services are easily distributed on a worldwide scale not seldom with dramatic consequences for the producers of the products or services (Powell 2009; Zarella 2010). In this sense, social media enable a transfer of power from producers to customers and have thus changed the relationships of enterprises with customers (Capozzi and Rucci 2013).

Like any other technology, the successful utilization of social media within an enterprise context necessitates that social media are not treated as a separate 'gadget' but as an integral part of the way the enterprise is organized (Chui et al. 2013). Put differently, social media must be treated within the scope of enterprise-wide design as a means of organizing to be fully integrated with other means. Strategic learning about how to effectively use social media is key, contrary to the traditional top-down strategic planning outlook (op. cit.). Chapter 3 will argue this point further. Given the very nature of social media, the notion of emerging organizing discussed in Sect. 1.1.1 plays an essential role since enterprise must address the emerging content of social media in real time.

The Platform Revolution

Information technology developments created dramatic social, business, and organizational influences. More recent developments in this area are likely to create even more dramatic and disruptive influences. Many of these developments can be identified with the label *platform revolution*. The notion of 'platform' is conceived in various ways. For example, a platform is seen as "a new business model that uses technology to connect people, organizations, and resources in an interactive ecosystem in which amazing amounts of value can be created and exchanged" (Parker et al. 2016, p. 3). Also a platform is considered as an infrastructure: "a platform is fundamentally an infrastructure designed to facilitate interactions among producers and consumers of value" (op. cit., p. 134). Yet, as a basic definition, "a platform is a business based on enabling value-creating interactions between external producers and consumers" (op. cit., p. 5). In this case, a platform is conceived as an enterprise. Multiple examples of such enterprises can be given. Well-known are Airbnb facilitating hospitality services and Uber facilitating transportation services.

Based on these reflections, we define a *platform-enterprise* as an enterprise that uses a (information) technology-based platform infrastructure to facilitate value-creating interactions between external producers and consumers. Platform-enterprises thus facilitate matches between consumers with certain needs or purposes on the one hand and producers with resources that can fulfill those needs or purposes on the other hand. Put differently, platforms facilitate the exchange of goods, services, or other forms of 'social currency.' Hence, "the platform concept is fundamentally simple: create a place where producers and consumers can come together in interactions that create value for both parties" (Parker et al. 2016, p. 60). We might observe that such a place has existed for long in traditional forms, such as food markets and stock markets. However, the revolutionary aspect of platform-enterprises lies in the nature of the production they enable, while they do not own the production resources that create the value for consumers: Airbnb does not own the private homes that are offered for hospitality, while Uber does not own the private cars for producing the transportation services. Value is created by the community of platform users and mainly *outside* the boundaries of the platform-enterprise, with little or no control over the resources used. Further, the nature of a platform-enterprise allows it to quickly scale since the bulk of resources are owned by the external producers. As with traditional enterprises, success of a platform-enterprise

depends on various factors that are difficult to predict. Frictionless entry of consumers and producers to the community of platform-enterprise users is evidently a key condition for success. Further, speed, reach, convenience, and efficiency are important factors (op. cit.). Again, all these conditions make (strategic) success of a platform-enterprise an uncertain, emerging phenomenon. Moreover, "it is inevitable that participants will use the platform in ways you never anticipated or planned" (op. cit., p. 58).

Note that the platform idea has been practiced earlier, for example, in the form of employment agencies that mediated between employees and employers. Also these historic 'platform-enterprises' did not own the production 'resources.' So, the revolutionary nature of the idea has more to do with the domain of application than with its novelty. Nonetheless, the fundamentally different character of platform-enterprises challenges traditional concepts about enterprises and organizing, specifically regarding the ownership of production resources. Traditional metrics about the effectiveness of organizing and the performance of enterprises, such as productivity and efficiency, seem inadequate. For platform-enterprises, the number of sustainable, repetitive interactions is of key concern. Hence, the most important 'asset' of a platform-enterprise is formed by "the active producers and consumers who are participating in a large volume of successful interactions" (op. cit., p. 188). Likewise, traditional viewpoints about creating strategic success—such as Porter's model of five strategic forces or the resource-based view on enterprises—lose relevance. These traditional measures are often defensive and protective, for example, by creating barriers to competitive action or securing the relative exclusivity of certain resources. These measures are no longer effective. Ultimately, the relationships with the platform-enterprise users form the lasting source of competitive value: "control of relationships becomes more important than control of resources" (op. cit., p. 228). Information technology also plays an important role in establishing effective control of relationships.

Platform-enterprises are disruptive in many ways, not only in thinking about organizations and organizing but also in upsetting traditional business domains. Notable examples are Airbnb upsetting the traditional hotel or lodging business and Uber upsetting the traditional taxi business. Traditional forms of governmental regulation should thus be reconsidered. Also platform-enterprises must establish effective governance for enabling the development of adequate community relationships and for addressing emerging unwanted negative effects of platform-enterprise utilization, for example, by improper use of the production resources by certain consumers.

Conditional for platform-enterprise success is (1) coherence and consistency for ensuring seamless entry to the platform-enterprise community either as a consumer or producer and for ensuring seamless interactions between consumers and producers, (2) trusted relationships between consumers and producers mutually and with the platform-enterprise, and (3) fairness in creating value or wealth for the community of users (op. cit.).

The Worldwide Digital Ledger

As described above, the blockchain technology and its associated operational protocols become a highly trustworthy peer-to-peer system for digital transactions of some value. Like the Internet is the open platform for exchange of information, the blockchain technology is considered the open platform for exchange of value (Franco 2015). Multiple blockchains can thus be envisioned, depending on the nature of the value that is exchanged. The Internet of things is thereby complemented with the 'ledger of things' (Tapscott and Tapscott 2016). Because a blockchain contains all the historic (verified) transactions, corrupting the system is virtually impossible. Attempts to conduct fraudulent behavior will thus be immediately discovered and exposed since it would require rewriting the blockchain's history. The blockchain thereby becomes the shared single source of truth. Put differently, the Internet of everything becomes "the Ledger of Everything" (op. cit., p. 7). Consensus about the trustworthiness of transactions transforms *distributed consensus* into *distributed trust* (ibid.). An article in The Economist of October 2015 spoke of 'the trust machine' when discussing the blockchain developments. Various forms of intelligence can be embedded in the blockchain technology, such as rules that ensure that the transactional amount can only be used for a predefined purpose. Examples are 'smart contracts' whereby contractual terms are automatically observed and executed (contractual compliance) and 'smart property' whereby ownership and usage of property (money, house, car, phone, etc.) is controlled (Crosby et al. 2015). An important aspect is that "smart contracts are math-based contracts, as opposed to law-based contracts" (Franco 2015, p. 9). These contracts contain the logic to effectuate or execute them under specified conditions, without the need to invoke human interpretation and intervention. Obviously, such approach virtually eliminates the improper use of resources.

Various financial institutions have adopted the blockchain technology for their own private utilization under the name 'distributed ledger technology.' Understandably, the public blockchain networks pose various threats to the traditional institutions since a remarkable aspect of these peer-to-peer transactional networks is that they operate without any central control: "no central authority controls it, everybody knows what's happening, and it remembers forever" (Tapscott and Tapscott 2016, p. 20). Moreover, the traditional institutions are often distrusted, whereas for the network, "trust is intrinsic, not extrinsic" (op. cit., p. 30). So, "rather than trusting big companies and governments to verify people's identities and vouch for their reputations, we can trust the network. *For the first time ever, we have a platform that ensures trust in transactions and much recorded information, no matter how the other party acts*" (op. cit., p. 33). Not only are traditional institutions distrusted, but much of the offerings provided through the Internet are also distrusted because of the misuse of personal data or other malicious conduct. A recent report considers the blockchain technology as a means to restore trust and 'save the future of the Internet of things': it is a "technology breakthrough that has fundamentally changed our notions of centralized authority, the blockchain is a universal digital ledger that functions at the heart of decentralized financial systems such as Bitcoin, and increasingly, many other decentralized systems" (IBM 2015, p. 10). Understandably

therefore, the blockchain developments are likely to be disruptive for various businesses, such as finance, legal, insurance, health, notary, or auditing businesses. But also other sectors might be affected. Imagine a peer-to-peer network for energy production and distribution whereby the blockchain technology regulates the transactions between producers and consumers and smart contracts control the mutual gain. This is one example whereby "the blockchain enables us to identify smart devices with relevant core information and program them to act under defined circumstances" (Tapscott and Tapscott 2016, p. 152).

In the case of platform-enterprises discussed above, the traditional notions about enterprises and organizing were questioned, but the blockchain developments question these notions even deeper in the sense that one might wonder whether in this case an enterprise exists in the common understanding of the notion of 'enterprise.' This question is all the more relevant since the blockchain technology can even be disruptive for platform-enterprises since this technology eliminates the need for a platform-enterprise and enables transactional exchange between consumers and producers directly. Some speak of "distributed autonomous enterprises where intelligent software takes over the management and organization of resources and capabilities, perhaps displacing corporations" (op. cit., p. 22). It is stated that "as opposed to traditional organizations, where humans make all the decisions, in the ultimate distributed organization much of the day-to-day decision making can be programmed into clever code" (op. cit., p. 126). A future is portrayed where devices "Are empowered to autonomously execute digital contracts such as agreements, payments and barters with peer devices by searching for their own software updates, verifying trustworthiness with peers, and paying for and exchanging resources and services. This allows them to function as self-maintaining, self-servicing devices. The power to autonomously trade with other devices opens up whole new business model opportunities: each device in the network can function as a self-contained business, sharing capabilities and resources such as compute cycles, bandwidth and power at very low transaction costs with other devices. Besides the creation of new businesses that tap the unused capacity of billions of devices, the blockchain also facilitates new markets for service and consumables associated with those devices" (IBM 2015, p. 12).

For some, this is the future: employees, business partners, and suppliers are working under smart contracts: 'managed' by algorithms and performance metrics embedded in the blockchain technology. All these developments might be interpreted as the dawn of a new era of enterprise mechanization. "Welcome to tomorrow's distributed enterprises (DAE), powered by blockchain technology and cryptocurrencies, where autonomous agents can self-aggregate into radically new models of the enterprise" (Tapscott and Tapscott 2016, p. 127). As a prominent business magazine observes, "the technology could turn a company into a seamless network of coordinated freelancers" (Coy and Kharif 2016, p. 1). Whether these developments are to be welcomed might be debated. Indeed, "a no-excuses, stiff-consequences contract that's permanently embedded in software is appealing to some people and appalling to others" (op. cit., p. 2).

New Ways of Business Conduct

Globalization, deregulation, and the removal of trade barriers have changed the character of doing business dramatically. Successful entrepreneurs can come from anywhere in the world and compete globally. Open markets and increased competition on a worldwide scale (in principle) have increased business dynamics significantly. Technological developments play a dominant role in business domain changes. Information technology is an evident example. Informatization, discussed above, as well as the Internet have changed the business domain considerably within a few decades (Wooldridge 2011). Telecommunications capabilities are turning virtually every market into an electronic market where information is exchanged instantaneously and whereby transactions are initiated and completed with a minimum of human intervention. Due to the blockchain technology and the digital ledger, these transactions have become reliable and trustworthy, whereby smart contracts enable the precise execution of intentions. Integration of technologies can be witnessed, enabling content, storage, networks, business applications, and consumer devices to operate in an integrated manner. Media convergence, such as between consumer electronics, television, publishing, (mobile) telecommunications, and computers, will create novel forms of value. New types of business conduct and ways of organizing have been introduced under the 'e-label,' such as 'e-business' or 'e-government.' Networks of interacting and collaborating customers, employees, business partners, and suppliers—with new communication, interaction, and distribution channels—are manifestations of this new enterprise context. The 'business ecosystem' label has been coined to identify "an economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world" (Moore 1996, p. 26). Examples abound: ordering and purchasing through 'the web' have revolutionized business fundamentally and have shifted activities that were traditionally handled by enterprises to private persons, ranging from home-printing of tickets, organizing transportation, to arranging 'bed and breakfast.' Platform-enterprises have taken these developments to the next level: arranging transactions between consumers and producers without owning the means of production.

Diffusion of Traditional Boundaries

In this new enterprise context, the traditional intermediaries such as brokers and dealers can be easily disintermediated by direct contact between consumers and producers, as the platform-enterprises exemplify. But new intermediators are created, such as websites for comparing products or services. Also the distinction between customer and producer or between product and service becomes less prominent. Through interactive dialog with the producer, a customer can determine the type of product and service. Other than mass production for anonymous customers, the product or service is delivered for a specific customer. As such, the logic of production is reversed: the customer does not come into play at the end of the production process but determines the execution of the production process right from the start (Negroponte 1995). Hence, as depicted earlier in Fig. 1.5, the situation typical of the industrial revolution is reversed: mass production, based on mass

demand, will shift increasingly towards individual production based on individual demand. Rightly, "the information revolution is blowing established business models to pieces" (Wooldridge 2011, p. 172). In a similar vein, the distinction between physical products and services vanishes. Technology enables complementing physical products with associated services. Well-known are various services that are offered in conjunction with using a car. The enterprise might thereby shift its focus from producing cars towards delivering mobility services.

Technological developments will lead increasingly to the diffusion of business boundaries. A freight carrier might, for example, grow into a producer of logistic services who controls the total end-to-end chain. Within any business domain, the use of loyalty cards for customers can lead to offering financial services associated with the loyalty card. Diffusion of business boundaries is fuelled further since information technology, as mentioned previously, makes it relatively easy to add complementary services to the primary product. So the sales of airline tickets can be combined (possibly through business partnerships) with services pertinent to finance, insurance, car rental, or hotel reservations. One might even consider home security or animal care while owners are absent. As Moore observes: "a business ecosystem does not respect traditional industry boundaries" (1996, p. 28). Finally, the Internet and multiple (mobile) access media have obliterated geographic and time limits. Businesses operate globally and continuously. Access—independent of time and place—is gained through various media and functionalities. Customers expect good quality products and service, and bad experiences are easily shared through social media and almost instantly globally known.

Increased Dynamics and Extendedness

The foregoing sketch shows significantly increased business dynamics. Additional developments increase dynamics further: globalization, deregulation, and the removal of trade barriers have stimulated enterprises to develop new products and services. The number of new products has tripled since 1980 (Cox and Alm 1996). The shorter lifecycle of products and services can also be mentioned. Renewal thus occurs more frequently. For example, at the end of the 1970s the life-cycle of electronic consumer products lay between 3 and 6 years. Ten years later this had already been reduced to 1 year (Haaf et al. 2002). More variations of the same product also reached the market. Roughly over the same period, it was not only the product life-cycle which reduced significantly, but the number of electronic product variations increased tenfold (op. cit.). Enormous product variations of essentially the same product resulted from more enterprises offering similar types of product but also arose from enterprises offering more product variations. Such enormous variation can be noticed in virtually all areas: from electronic equipment and cars to toothpaste (Cox and Alm 1996). Not surprisingly, research among 500 top executives showed that they identified the dynamics in their business domain as high to very high (Prahalad and Krishnan 2002). The speed of change also seems to increase. Longer periods of stability are becoming an illusion. As Zuboff and Maxmin state, "flexibility and agility have replaced long-term planning" (2003, p. 119).

Next to increased dynamics, the increased 'extendedness' is also a typical characteristic of the modern business context. Globalization, the networks of business partners and suppliers, and the offering of complementary services (with the associated diffusion of business boundaries), all these aspects point to a significantly increased extendedness of end-to-end customer and operational processes. Evidently, this 'whole' must operate in a unified and integrated manner since local disturbances are not contained locally but affect the whole chain and network.

The somewhat intuitively used term 'globalization' might be interpreted as one of the vague buzz words of modern management used to defend drastic measures in view of 'global competition.' Some products and services indeed compete on a global scale, but if the term 'globalization' is to mean the gradual progression towards global products and services produced in identical ways by globally operating enterprises irrespective of local differences, then such globalization rarely took take place (Wooldridge 2011). Actual practices of multinational enterprises show that they generally are forced to acknowledge local market conditions, culture, workforce characteristics, customer preferences, and governmental regulations (op. cit.). But globalization does mean that the developments mentioned earlier enable enterprises to operate globally. Given the necessity to recognize local or regional conditions, the key challenge is to exploit global presence while simultaneously acting locally. Hence, the key challenge is integrating the global and local enterprise aspects.

Transcending Economics: Purpose and Social Responsibility

For some, the goal of conducting a business is 'to make money.' Enterprises are thus only considered in economic terms. In fact, an influential viewpoint summarized in Sect. 2.4.1 holds that the reason an enterprise exists at all is that it can carry out activities at less costs than 'the market' can. Outsourcing activities is thus warranted when this condition is no longer satisfied. Also the very existence of an enterprise is thus defined in purely economic terms, a viewpoint we have outlined and criticized when discussing the ideological foundation for enterprise governance and enterprise engineering (Hoogervorst 2018). Writings about corporate governance manifest these economic opinions in all their negative ramifications, as our brief resume in Sect. 1.4.2 will show. Two developments can be mentioned that aim to counteract the mere economic focus of enterprises and are identified under the labels (1) the purpose economy and (2) corporate social responsibility.

The label 'purpose economy' denotes a perspective about enterprise conduct whereby products and services are provided that positively impact individuals and society by serving real needs. Hence, "the purpose economy is about more than just profits; it's about creating meaningful impact in the service of people and the planet" (Hurst 2014, p. 205). The notion of 'people' refers to customers, employees, and stakeholders affected by enterprise conduct. Purpose thus translates to "personal purpose, social purpose, and societal purpose" (op. cit., p. 23). Our resume about the ideological foundation outlines that the notion of 'purpose' is strongly associated with meaningful work, employee-centric organizing, and management as leadership.

Closely related to the previous perspective is the perspective of 'corporate social responsibility' (CSR). The term 'responsibility' refers to a moral obligation or duty and being accountable for actions undertaken. Commonly, the label 'corporate social responsibility' intends to mean an attitude about business conduct and can be defined as "a commitment to improve community well-being through discretionary business practices and contributions of corporate resources" (Kotler and Lee 2005, p. 3). The term 'community well-being' includes human aspects (employees, customers, stakeholders), as well as societal issues. Further, the 'discretionary business practices' identify voluntary actions, not ones enforced by law or other means. Comparably, the European Commission defines CSR as follows: "CSR is a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with stakeholders on a voluntary basis" (EC 2002, p. 5).

CSR—also expressed by the labels 'people, profit, planet' or 'inclusive economy'—aims to balance economic considerations with social and societal considerations. A wide range of topics can be classified under the CSR label. Typical topics are sustainability, reusability of material, reusing waste, energy conservation, pollution reduction, honesty in business conduct, socially responsible investing, adequate working conditions, etc.

Various reasons are mentioned for adopting CSR, either based on genuine interests in improving personal, social, or societal conditions or based on defensive reasons, such as concerning the enterprise reputation or to divert attention away from less favorable business practices (D'Amato et al. 2009). In case of genuine interests, it is important to understand that CSR must not be an 'add-on' to the common business practices but must be an integral part of how enterprises are arranged and operate (EC 2002). Hence, CSR must be one of the concerns in enterprise-wide design.

Juridicalization

As stated above, the purpose of an enterprise is often considered only in economic terms. Such perspective on conducting business and the existence of enterprises is associated with a focus on legal contracts that specify the relationships between relevant parties in view of economic terms. Relationships within the enterprises are thereby also of a contractual nature, specifically concerning the employer-employee relationship. Employee contracts must be such that they make employee behavior consistent with their assumed economic self-interest and thereby reduce the cost of employee performance monitoring and evaluation (Rosen 1991). Overall, the enterprise must be "properly viewed as a 'nexus' of contracts" (Demsetz 1991, p. 169). Contracts are considered the vehicle to provide certainty about required behavior and the availability of resources. We have seriously questioned this assumption and argued that it is precisely the contractual perspective that supports a mechanistic and deterministic mindset that blocks and ignores valuable insights about the inability to 'specify' the future contractually (cf. Chap. 4*). This inability fuels disagreements and disputes that must be settled. Hence, a focus on contracts is the manifestation of juridicalization and is inevitably associated with legal action. The language of contracts is thus associated with conflicts and litigation and is essentially based on

distrust (Pfeffer 1994). Building trust, loyalty, motivation, and dedication in view of a socially and morally justifiable purpose are alien ideas, as is the conviction about loyal, motivated, and dedicated employees as a source of competitive advantage (op. cit.). Increased juridicalization of business conduct is thus a lamentable trend. Not competence, trust, joint effort, and common purpose but formal contracts define activities. Juridicalization took momentum during the 1980s when the theme of corporate governance became popular.

Arguably, juridicalization of (business) relationships is inversely related to trust and feelings of confidence and will ultimately corrupt and destroy the spirit of genuine cooperation. Minimalistic behavior, as a self-fulfilling prophecy, is often evoked, merely asserting to satisfy contractual requirements. Obviously, such behavior fuels the drive towards more juridicalization. But, as mentioned above, most times contractual requirements can never be complete and comprehensive. Grounds for increased litigation are thus built-in. In the chapter about the ideological foundation, we have discussed that increased juridicalization is not conducive to business and societal prosperity (cf. Chap. 4*). Trust is the vital fabric of healthy business and society (Fukuyama 1996).

1.2.5 Organizing

New Collaborative Relationships

As indicated before, enterprises are social entities with human actors engaging in purposeful activities. Certain action relationships, expressed by coordination and cooperation, exist between human actors that manifest organizing. As can be readily understood, the developments outlined previously have a major impact on the nature of activities within and between enterprises, as well as between enterprises and their customers, business partners, suppliers, and stakeholders. The impact is enormous because the action relationships between human actors are increasingly (also) *informational* ones. As we have mentioned, work becomes 'informated' (Zuboff 1989). More and more, work becomes 'knowledge work,' whereby an essential aspect of organizing is "to make knowledge productive" (Drucker 1993, p. 49). Changes are fundamental and enable coordination and cooperation independent of time and place, not only between actors within an enterprise but likewise between actors of different enterprises. Networks of collaborating enterprises ('extended enterprise') have emerged, such as the airline networks. Enterprise service centers (like call centers) can operate from another part of the world than the location of the enterprise itself or the recipients of the service. Comparable observations can be made pertinent to the coordination and cooperation between enterprises and customers, or between customers mutually, such as within consumer and user groups. Thus, technological networks with all their informational capabilities make networks of relationships possible on an almost unimaginable scale. It is precisely these networks of relationships which enable fast and seamless interaction and stimulate collaboration and creativity (Moss Kanter 2001). The enormous scale of

coordination and cooperation enabled by IT has led to new research disciplines, such as 'computer-supported cooperative working,' that develop possibilities of IT in this area further (Bannon 1998). It is this impact on coordinative, cooperative, and collaborative relationships that gives IT its revolutionary character.

New Ways of Organizing

Understandably, new ways of business conduct are likely to impact the different facets of organizing: new ways of working. Hence, these new ways of business conduct also imply that a new enterprise design must be established. E-business services and customization of products and services are a case in point. Offering (customizable) products and services to customers through a web portal requires that the internal (back-office) processes have been adjusted (redesigned) such that integrated process execution is safeguarded. Further, collaboration with business partners and suppliers likewise requires extensive processual and informational integration, which entail significant implications for the different facets of organizing. Various computer-supported information systems will aid the processual and informational integration. Numerous collaborative and distributed tasks must be integrated, whereby coordination, distributed decision-making, and knowledge sharing are facilitated (Bannon 1998).

Cooperative work patterns with local autonomy, supported by information systems, can help considerably in avoiding rigidity and inertia associated with traditional, formal, and hierarchical structures. Centralized data and knowledge can be used within decentralized authorities and responsibilities. Centralization and decentralization are thus not necessarily mutually exclusive: local operational units have the freedom to act within the boundaries of centrally defined directions, norms, and values. New ways of organizing are likely to reduce the importance of the traditional organizational structures: hierarchies and conventional central management become less relevant for networks of teams and individuals connected virtually and directed towards the cooperative execution of an end-to-end process. These new ways of organizing require a fundamentally different view on employment (Hoogervorst et al. 2002). Such view critically depends on ideas and beliefs about what an enterprise is. We have discussed these issues in the chapter about ideological viewpoints on organizing and argued the necessity to adopt the employee-centric theory of organization, as will be summarized in the next chapter.

The Danger of Losing Social Cohesion and Organizational Competences

Our previous reflections show that, enabled by the revolutionary developments of information technology, the nature of work has dramatically changed. Whereas physical collaboration to accomplish an organizational task necessitated also joint physical presence of the people collaborating, an increasing volume of work that requires only informational collaboration also increasingly eliminates the need for physical presence. Such type of collaboration enables synchronous and asynchronous tasks to be conducted from various locations. One might observe that the (partial) shift from physical organizations to virtual organizations also initiated a shift from large scale organizational employment towards individualized, flexible employment relationships between individuals and an enterprise. Arguably, the

virtualization of work leads to a fundamentally different relationship between employees and their employer. Closely related to the previous point is the fact that globalization has enabled enterprises to obtain, through outside market transactions, products and services that were originally produced internally or would have been produced internally. Under the assumption of economic advantage, enterprises outsourced erstwhile internal activities to outside parties or do not consider these activities as internal activities in the first place. Such outside parties might be other enterprises but also individuals having flexible contracts with enterprises but not formally employed by them. Both these trends, the virtualization and (out)sourcing of organizational tasks have serious consequences. Two of these consequences are sketched.

Section 1.1.1 identified an enterprise as a social entity. Characteristic for such entity is that members, in our case enterprise members, socially interact through communication. As we have thoroughly discussed and briefly summarize in the next chapter, such intersubjective social interaction is the basis for social order, consensus, cohesion, and solidarity. Social order is based on intersubjective consensus among human beings about their social reality, which result from rational communication. Within enterprises, social order, consensus, cohesion, and solidarity is created by cooperating human beings. This forms the basis for team spirit and creates a sense of belonging, which might be considered the essence of the social nature of human beings. When human beings cooperate only virtually, social cohesion is lost and it becomes difficult to create such sense of belonging (Wooldridge 2011). Hence, it becomes difficult to create employee loyalty and commitment. Further, through social interaction, social reality is defined. Put differently, through social interaction, the shared meaning of the organizational world is socially defined. However, the virtualization of enterprises has dramatically changed the nature of social interaction. As our summary of organization theories in Sect. 2.3.14 clarifies, this change implies the disappearance of the ability to create the shared 'intersubjective objectivity' because face-to-face communication is lost due to information technology utilization, since employees 'behind screens' are not likely to develop intersubjective objectivity through shared sensemaking.

Comparable with the previous trend is the trend to use external parties for carrying out certain organizational tasks. This trend entails the danger of losing essential organizational competences. In the next section, we will formally introduce an organizational competence as a capacity formed by the unified and integrated whole of skills, knowledge, culture, and means for adequately performing an organizational activity. Various competences can be identified, such as the competence to carry out aircraft maintenance, grow tomatoes, perform railway transportation, or conduct a financial administration. By using external sources for carrying out organizational tasks, an internal competence is not created or an existing one is lost. An internal competence and commitment to a common purpose is replaced by a collection of contracts. This connects nicely with the increased juridicalization of business conduct mentioned before. Rather than relationships based on the focus on a common purpose, the contractual relationships tend to induce a focus on the

contractual specifics only. All too often, such focus leads to goal replacement whereby contractual goals are pursued at the expense of the overall purpose.

An important part of the unified and integrated nature of an organizational competence is the social cohesion of the employees who have the knowledge and skills. The loss of social cohesion mentioned above thus additionally contributes to the loss of a competence. Serious forms of inadequate enterprise performance are associated with the loss of essential competences. An example is an airline that contracted all major functions through outside supply and could not create or maintain the necessary competence to run an airline, in the end leading to dramatic consequences (Phillips and McKenna 1996).

1.2.6 The Need for Understanding and Designing Enterprises Summarized

Thoroughly understanding and adequately designing enterprises was argued based on the previously sketched technology, information, business, and organizational developments. The sketch can be summarized as:

- Revolutionary technology developments create enormous business and organizational dynamics that necessitate (1) new ways of business conduct in a 'business ecology' over a far greater extendedness and (2) new ways of organizing with collaborative relationships characterized by increased informatization. These new ways of organizing critically depend on enterprise design.
- Increased extendedness of business conduct with multiple actors, such as customers, employees, business partners, suppliers, and government agencies—all with multiple access channels and interfaces. Together with the increased informatization associated with these actors and their collaborative processes, massive interdependencies are created and thereby also the daunting task to seamlessly integrate all these aspects for ensuring adequate enterprise performance.
- Diffusion of boundaries between (1) products and services and between (2) organizational events created by social actors and events created by technology-based intelligence (Internet of things, smart devices, ambient intelligence, autonomous transactions, smart contracts, etc.). This diffusion necessitates effective integration of product and service delivery, as well as integration of the multifaceted technology functionalities into business, organizational, and informational processes. Such integration is conditional for making information productive and is the key to adequate enterprise performance.
- In a disruptive way, information technology-based platforms facilitate large-scale transactions between individual consumers and individual producers. The Internet as the open platform for information exchange is transformed into an open platform for value exchange, whereby the trust-based nature of the blockchain technology complements the 'Internet of things' (smart devices) with the 'Ledger

of things' (trusted transactions, smart contracts, etc.). Distributed autonomous enterprises are envisioned whereby intelligent software arranges all or a considerable part of organizing. Based on the digital ledger technology, all kinds of operational decisions are expected to be taken by autonomous (software-based) agents. Avoiding the possible new dawn of enterprise mechanization necessitates specific forms of enterprise design based on ideological convictions.

In view of the enterprise purpose and mission, the developments briefly summarized above need to be addressed effectively for successful enterprise performance and enterprise continuation over time. In addition to the previous points, we observe the following developments:

- Legislation is passed that requires transparency, coherence, and consistency concerning (financial) data, such that responsibilities concerning the enterprise's financial state of affairs can be effectuated (compliance). These requirements are based on corporate governance considerations which are summarized in Sect. 1.4.2. All these aspects must be an integral part of enterprise-wide design.
- Virtualization of activities and the use of outside parties to carry out certain organizational tasks might threaten enterprise social cohesion and the build-up of essential organizational competences. Fully understanding enterprises is conditional for designing enterprises such that loss of essential organizational competences is avoided.
- Under the labels 'purpose economy' and 'corporate social responsibility,' enterprise conduct is promoted that—in their genuine form—aims to counteract the detrimental effects of economism and aims to realize positive personal, social, and societal impact. These goals can only be successfully pursued if they are operationalized as an integral part of enterprise design.

For successfully addressing the topics briefly summarized above, successful enterprise change is an evident necessity. As stressed before, such change does not occur spontaneously but needs to be intentionally created, that is, needs to be intentionally *designed*. Clearly, successful design can only be accomplished if that what is to be designed is fully understood. Quackery is not beneficial, also not for enterprises. Practicing the foundational insights is thus vital for enterprise operational and strategic success.

1.2.7 Paradigm Shifts

In his analysis about scientific progress, Thomas Kuhn introduced the notion of 'paradigm shift' (1962). A paradigm is viewed as a conceptual model: a way of observing, investigating, and explaining phenomena. The inability to address phenomena adequately within an existing paradigm might lead eventually to a paradigm shift: the adoption of a new model of thinking with essentially different concepts that are able to address the subject of investigation better. In case of enterprises, this

Table 1.1 Important paradigm shifts faced by enterprises

	Traditional		Modern
Customers	Anonymous	→	Individually known
	Mass marketing	→	One-to-one marketing
	Product focus	→	Relationship focus
	End of production	→	Begin of production
	Not involved in production	→	Involved in production
	Little power	→	Increased power
Competitors	Same domain	→	Different domains
Business relationships	Transaction-based	→	Relationship-based, support
Business	Singular	→	Ecology, network
	Internal integration	→	End-to-end integration
Partners	Same domain	→	Different domains
Business boundaries	Clear and fixed	→	Diffuse and dynamic
Enterprise boundaries	Fixed, local	→	Dynamic, extended
Products and services	Mass, standard	→	Individual, customized
	Distinct	→	Integrated
Work	Place-, time-depended	→	Anywhere, anytime
	Automated	→	Informated
Assets	Financial, physical	→	Intellectual
Market	Mass, static, regulated	→	Individual, dynamic, open
Way of organizing	Rigid	→	Adaptive
	Modest integration	→	Massive integration
Enterprise context	Stable, orderly	→	Dynamic, uncertain
Enterprise development	Planned	→	Emerging
Employees	Costs	→	Asset
	Labor	→	Knowledge
	Management dependent	→	Empowered
Employee employment	Transaction focus	→	Commitment focus
Management	Control	→	Support

means a "radical reconceptualization about the nature of business and the nature of the organization" (Laudon and Laudon 1998, p. 393). Others speak of "creative destruction," seen as "the process of adopting new ideas and abandoning the corresponding older ones" (Nolan and Croson 1995, p. 17). The developments briefly sketched above necessitate various paradigm shifts in the way enterprises must be conceptualized. Important paradigm shifts are shown in Table 1.1.

The paradigm shifts present characteristics of, in our terms, 'traditional' and 'modern' perspectives on enterprises and organizing. The nature and full magnitude of the paradigm shifts will become fully clear through summarizing the foundational insights in the next chapter. This summary will reveal whether current mainstream organization theories and practices indeed reflect the modern perspectives on enterprises. With respect to the last three paradigm shifts mentioned in Table 1.1, we admit that they involve ideological convictions not shared by all enterprises.

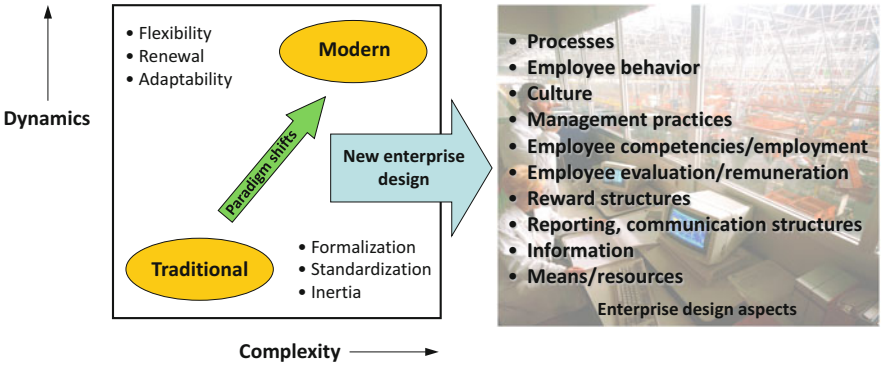

Fig. 1.6 Paradigm shifts and the necessary shift to new ways of organizing

We have defended these convictions when presenting the ideological foundation for enterprise development (Hoogervorst 2018). The next chapter will summarize these convictions.

Based on the sketch of the developments in the areas of technology, business, information, and organization, considerable changes have been portrayed with respect to the relationships of the enterprise with its environment, as well as concerning the internal ways of organizing. It seems safe to say that the modern internal and external enterprise context manifest increasing dynamics and complexity. New organizational forms are thus associated with the paradigm shifts mentioned. As indicated and will be further discussed below, these new ways of organizing will not develop spontaneously but must be intentionally created. Put differently, the new ways of organizing must be intentionally *designed*. A fundamentally new enterprise design, involving many areas, is thus associated with the paradigm shifts. Figure 1.6 symbolically indicates this shift and identifies a few enterprise aspects that must be addressed through enterprise design. Chapter 4 will present the theories, methodology, and methods for enterprise design, further illustrated in Chap. 5.

1.3 Two Core Enterprise Competences

1.3.1 The Notion of Enterprise Competence

A competence can generally be seen as the capability or the ability to adequately perform an activity, such as the competence to play a musical instrument or to drive a car. In case of enterprises, Prahalad and Hamel consider an organizational competence as a unified and integrated whole of knowledge, skills, and technology (1990). Technology comes in various forms, ranging from information systems, machines, and equipment to utilities and infrastructure. Since next to technology also various rules and regulations will play an important role for carrying out activities, such as

concerning safety or treating customers, we substitute 'technology' for 'means' in conceptualizing an enterprise competence. Moreover, as we have shown, the norms, values, and convictions in an enterprise—collectively identified as the enterprise culture—have a significant influence on enterprise performance and hence affect the competence to perform enterprise activities (Hoogervorst 2018). Key aspects of culture are summarized in Sect. 2.3.4. So, we define an enterprise competence as:

- *Enterprise competence* The organizing capability formed by the unified and integrated whole of skills, knowledge, culture, and means for adequately performing an enterprise activity.

Key words in the previous definition are 'unified' and 'integrated,' which were introduced in Sect. 1.1.1. Unity and integration point to a coherent and consistent level of organizing, whereby all facets of organizing discussed in Sect. 1.1.1 play a role. An enterprise competence thus rests on adequate enterprise design. Recall that organizing involves coordination and cooperation but also production activities, such as serving a customer, preparing a report, taking a decision, or assembling a device.

As mentioned enterprises aim to fulfill or address certain (perceived) wants and needs of societal members or society at large by delivering products and/or services. Numerous enterprise activities have to be executed for adequately delivering products and services as well as for defining the nature of these activities in the future. All these activities can be categorized into two fundamental types which refer to two fundamental enterprise competences: the operational and governance competence.

1.3.2 Operational Competence

The activities that, at a certain moment in time, directly or indirectly concern, or are associated with, the delivery of products and services are identified as *operational* activities ('*running* the mill'). More generally stated, operational activities have to do with maintaining the current relationships of the enterprise with its environment and the internal primary and support activities for doing that. Delivering products and services to customers is evidently a main part of these relationships, but maintaining operational relationships with business partners, suppliers, and various operational stakeholders are also part of the operational activities because these relationships become a reality in actual operation. With reference to the definition of an enterprise competence given above, the operational competence is defined as:

- *Operational competence* Enterprise competence for adequately maintaining operational relationships with stakeholders, specifically with customers in view of the adequate delivery of products and services.

1.3.3 Governance Competence

It is highly likely that the nature of operational activities will change over time for external or internal strategic reasons, for example, driven by the developments sketched in the previous section. Also changing customer behavior, new products and service offerings, or market and regulatory developments will affect operational activities. Hence, enterprise are forced to adapt, that is, change the current operational ways of working. Stated otherwise, enterprises need to change the ways of organizing. Changing the nature of operational activities involves the second category of activities, which we will identify as *governance* activities ('*changing* the mill'). Governance activities thus concern changing the current nature of operational activities (ways of organizing) into the future nature of operational activities (the future ways of organizing). So, we define:

- *Governance competence* Enterprise competence for adequately inciting and accomplishing enterprise change.

Chapter 3 will further elaborate on enterprise governance and the nature of enterprise change.

1.3.4 Competence Process and Outcome

Both core enterprise competences have two characterizing aspects: (1) the result or outcome and (2) the process that produces the outcome. We will identify the processual aspect of the operational competence as *operational organizing*: the momentary operational activities for establishing the organized state and carrying out operational tasks. As said, the operational competence concerns the daily operation of delivering products and services ('running the mill'). Products and services are thus the principal outcome of the operational competence. But, as mentioned above, the operational competence generally concerns the operational relationships with stakeholders. Adequate stakeholder relationships are thus an outcome of operational organizing and hence of the operational competence. Understandably, the operational competence must be sustained: it must be prolonged, kept going, and maintained. This is the domain of operational management ('keep the mill running').

As said, enterprise governance concerns enterprise change ('changing the mill'). We identify the processual aspect of the governance competence as *governance behavior*: the manifestation of activities from the incipient and inchoate nature of an idea for change until its ultimate realization. Section 1.1.1 outlined that design is the creative hinge point between ideas or intentions and their realization. Hence, the outcome of the governance competence is twofold: a (re)design reflecting the future way of organizing and the implementation of the (re)design. Examples of the design

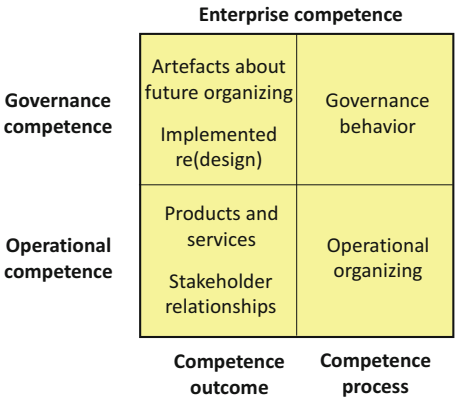

Fig. 1.7 Fundamental enterprise competences

outcome are artifacts like description about desired norms and values, employee and management behavior characteristics, process models, information object descriptions, work instructions, operational rules and regulations, production means, job profiles, reporting structures, remuneration and assessment criteria, (IT) system designs, infrastructural designs (offices, utilities, etc.), and so on. Collectively, the artifacts express the conceptual realization of the new way of organizing. Enterprise design is thus a core facet of enterprise governance. Put differently, the competence to practice the enterprise engineering design science is a core facet of the enterprise governance competence. As will become clear in Chaps. 4 and 5, through enterprise design, important aspects of enterprise governance are effectuated. Understandably, also the governance competence must be sustained since enterprise change and adaptation is a continuous process.

Contrary to the common perspective, Chap. 3 will clarify that the two core competences are highly interrelated. This will further clarify the inadequacy of the dysfunctional approach to strategy development and subsequent operationalization. Our previous reflections are summarized in Fig. 1.7. The overall enterprise competence can thus be conceived as the combination and integration of the operational competence and the governance competence.

1.3.5 Governance Versus Management

Our summary of the foundational insights in the next chapter reveals the highly management-biased perspective of many traditional organization theories. Supposedly, operational performance and successful change all depend on (executive) management involvement. Not surprisingly therefore, both competences introduced above are closely associated with enterprise (executive) management. Unlike our definition of a competence, (executive) management is considered instrumental in effectuating both competences. This view on management is the basic tenet of mainstream organization practices. Moreover, both competences are virtually

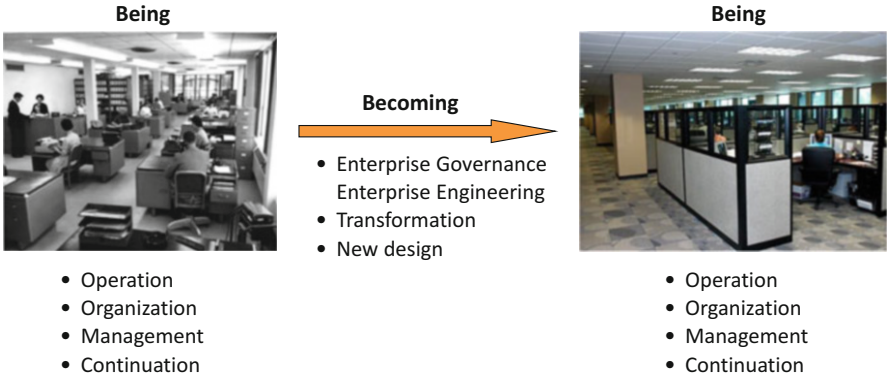

Fig. 1.8 Governance versus management

always considered separately, whereby enterprise governance is viewed as an executive management prerogative. We will submit a fundamentally different perspective in Chap. 3 by arguing that both competences are highly interrelated and that the adequacy of both competences primarily depends on employee involvement in view of the inherent nature of change.

It is important to reiterate some of our observations to emphasize once more the distinction between governance and management. The term 'governance' stems from the Latin word *gubernáre* (in turn borrowed from the Greek language), meaning to control or steer, in the original meaning, the steering of a ship. Governance can thus be associated with guiding and giving direction. It is important to distinguish governance from management. The latter term has its origin in the Latin word *manus* (hand). Both terms are relevant within the enterprise context. To distinguish management from governance activities, we will view the notion of 'management' in an operational, executing sense and use the term 'governance' in the context of enterprise change. Put another way, governance concerns developments that lead to a new (or partly new) enterprise. Figure 1.8 schematically illustrates the distinction.

On the left-hand side of Fig. 1.8, an administrative office is depicted, which is managed in an operational sense, focused on the continuation of the office in all its aspects. Hence, this concerns the office its 'being.' The office on the right-hand side carries out the same basic tasks but in a different manner using other means. Put differently, the new office expresses a different form of organizing and hence has a different *design*. Again, in the new situation there is operational organizing and management focused on office continuation. Governance has to do with the transformation of the original office into the new office. In other words, governance has to do with 'becoming.' Chapter 3 will further clarify how the notion of governance within an enterprise context must be conceived and operationalized. An important aspect of such operationalization concerns enterprise engineering: the theories, methodology, and methods that create the new office design. In short, enterprise

governance is the competence concerning initiating and successfully realizing enterprise change. More formally, we define enterprise governance as:

- *Enterprise governance* The enterprise competence (unified and integrated whole of skills, knowledge, culture, and means) for continuously inciting enterprise adaptive and reshaping initiatives and their unified and integrated operationalization through enterprise (re)design and subsequent implementation.

1.4 The Need for Holistic, Enterprise-wide Design

1.4.1 Curing the Lingering Problem of Business and IT Alignment

Inadequacy of IT Governance

The enormous and revolutionary influence of information technology (IT) on society, enterprises, and human individuals has been briefly outlined before. In an attempt to productively utilize these revolutionary developments, the notion of IT governance emerged in the 1980s. Numerous publications about IT governance emerged. Typical in these publications is their common focus on management and structural aspects of IT governance (cf. Sect. 1.4.1*). Controlling the developments of IT is strongly associated with (executive) management responsibilities and their assumed decision-making prerogative. Decision-making centers around enterprise (IT) objectives and their implications for IT investments, their prioritization and budgets (cf. Sect. 1.4.3*). Cost reduction often appears a primary concern. Associated with this perspective is an accountability structure of performance and compliance monitoring pertinent to the direction and objectives that were agreed. The focus on decision-making also led to much debate about the proper organizational structure for optimum control of IT investments, such as a central, decentral, or hybrid structure. Within the management- and structure-oriented perspectives on IT governance, failing IT initiatives are considered the consequence of inadequate structural arrangements, management involvement, and direction.

Management and structural measures are relatively simple to take. Rather remarkable therefore is the tenacity with which the IT governance theme is addressed in the literature and at conferences. This should warn that the approach to governing IT, briefly summarized above, is apparently problematic. Not much improvement in using IT productively and innovatively appears to have been made since many IT strategic initiatives fail (cf. Sect. 1.2.4*). Therefore, the call for proper IT governance continues to be high, driven by advocates of IT governance who argue its importance by pointing to the significant challenges for successful IT deployment caused by the problematic relationship between IT investments and enterprise performance, the low success rate of IT initiatives, high IT costs, and long delivery time on IT developments. Despite the obvious questionable results, proper IT

governance is still often defined in structural and managerial terms. We will criticize this mechanistic approach as rather ineffective in Sect. 3.2.10 after discussing the characteristics of enterprise change.

A fundamentally different perspective on governance is introduced in Chap. 3. Given the theme of this section and anticipating our discussions in Chap. 4, we will argue below that effectively utilizing the possibilities offered by IT is first and foremost an aspect of enterprise-wide design and not an issue that primarily concerns the structure and decision-making processes of IT governance. Moreover, the analysis will make clear that IT governance is of limited value without embodiment within enterprise governance.

Trying to Solve the Business and IT Alignment Issue

An important theme within the IT governance discourse is 'business and IT alignment.' Within this discourse, the term 'business' denotes that part of the enterprise which uses the IT services. The term 'alignment' refers to a state of perfect fit between the possibilities of IT and the enterprise context where these possibilities are to be made productive. As mentioned, the perspectives on IT governance summarized previously fail in bringing about business and IT alignment since the problem of misalignment lingers on, as is the discourse about IT governance.

In trying to solve the business and IT alignment issue, many proponents of IT governance emphasize that the performance of IT (or specifically IT systems) must be judged by how well IT adds 'value' to the enterprise. It is about ensuring optimum return—defined mostly in financial terms—on the portfolio of IT investments and ensuring that IT investments 'perform' according to the strategic (IT) plan, thus judging IT performance by enterprise (financial) performance. Evaluating IT performance in terms of enterprise results is curious for several reasons (cf. Sect. 1.4.2*), curious because a clear linkage between IT investments and enterprise performance is inherently problematic. Many, often diffuse, interdependencies and influencing factors determine enterprise performance and blur the linkage. Further, there is considerable evidence showing that much of the alleged IT underperformance results from inadequate use of IT. Inefficient and ineffective business processes were merely automated, which did not enhance enterprise performance and often only increased costs. Enterprise departmental silos and lack of business and IT collaboration continued the IT mess. Finally, evaluating the performance of an IT system in terms of enterprise performance criteria is fundamentally wrong. A system can only be evaluated based on criteria that are inherent to the system. For IT systems, such criteria are, for example, mean time between failures, mean time to repair, availability of specified system functions, and so on. Customer satisfaction is not an inherent IT system performance criterion since it is not germane to an IT system. Of course, the question as to how IT can enhance customer satisfaction is evidently relevant. But that question cannot be addressed within the IT domain; it can only be addressed from the (design) perspective of the enterprise as a whole. As we will show below, the fundamental reason for inadequate benefits of IT systems lies in a lack of unified and integrated enterprise and IT design.

Business and IT Alignment Models and Processes: Not Much Help

The dictionary notes that 'to align' means 'to be or to come into precise adjustment or correct relative position,' whereby the 'alignment' term denotes 'the act or state of being aligned.' Alignment can thus refer to a *process* or a *state*. The notion of IT alignment as mentioned in the literature has to do with unity between the enterprise and IT strategy such that IT supports the business strategic intentions adequately. Also the term 'harmony' between business and IT is sometimes used (Weil and Broadbent 1998). The core goal of IT governance is seen as obtaining strategic alignment of business and IT such that IT adds value to the business (IT Governance Institute 2003). Understandably, the *state* of alignment is not incidental but requires intentional activities: the *process* of bringing about alignment. We will return to these activities later.

As we have seen, the business and IT alignment problem emerged out of frustration with the results of IT deployment in enterprises. Within the perspective of alignment as 'state,' the question is, through which concepts and methods the notion of alignment can be utilized in a practical way? Put another way, how can the state of alignment be established and ascertained? Although the state of alignment may be understandable intuitively, the aforementioned questions can hardly be answered satisfactorily, unless the alignment process is the enterprise-wide design process with information supply and IT as integral aspects. This process will then yield alignment as state. In fact, we submit that alignment appears to be a concept that is difficult to operationalize outside the realm of design. Nonetheless a number of alignment models are mentioned in the literature that supposedly would lead to alignment. A number of frequently mentioned models will be discussed below in order to portray the essentials of this type of 'alignment thinking,' as well as to depict why and where our approach differs.

Strategic Alignment Model

A well-known model is the one developed by Henderson and Venkatraman which is shown in Fig. 1.9 (1993). The model distinguishes between business and IT (columns) and the external versus internal focus (rows). Four cells or areas of attention are defined that are considered important for obtaining alignment. The unity between business and IT strategy is called 'functional integration,' and that between the external and internal perspective the 'strategic integration.' For overall integration, multiple alignment perspectives concurrently play a role, as indicated by the arrows between the four areas of attention. Within these four areas, some subdomains are indicated for which mutual alignment is considered important. The multiple facets are an indication of the difficulty of operationalizing the alignment concept in a practical way, at least by means of these concepts.

Alignment Processes

Within the strategic alignment model, the *process* of alignment is understood as a certain pattern to bring into unity (alignment as *state*) the relationships between (remarkably only) three of the four areas of attention (Macdonald 1991). Four patterns are distinguished, depending on the chosen starting point. That starting point is called the 'dominant alignment perspective.' The four alignment patterns are shown in Fig. 1.10. With the first pattern, the dominant alignment perspective is

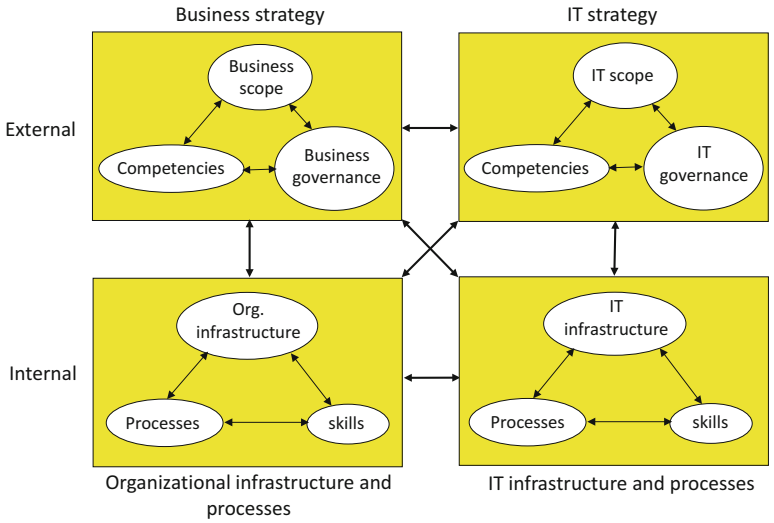

Fig. 1.9 Strategic alignment model

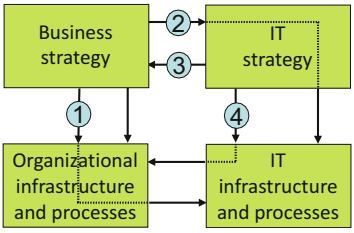

Fig. 1.10 Alignment processes

called *strategic execution*. The starting point is the business strategy which subsequently defines the organizational infrastructure and processes that must be supported by the IT infrastructure and processes. Notably, an explicit IT strategy is not addressed within this dominant alignment perspective. The organizational IT function is seen merely as a service and cost center. Possibilities and opportunities offered by IT for arranging the organizational infrastructure and processes differently are not a primary focus within this perspective. Note that the concept of organizing is limited to infrastructure and processes. The second dominant alignment perspective and associated pattern is labeled *technology potential*. Here too, the business strategy is the starting point but is used to formulate the IT strategy that subsequently defines the IT infrastructure and processes. Within this perspective, the central issue concerns how to use technology for supporting the business optimally. The *competitive potential* is the third dominant perspective. In this case, the IT strategy is the starting point, where the renewing possibilities and opportunities that IT can offer are utilized for defining an innovative and competitive business strategy. Subsequently, the business strategy defines the organizational structures and

processes. Finally, the fourth dominant alignment perspective is labeled *service level*. Again, the IT strategy is the starting point, but unlike the third perspective, the focus lies with arranging the IT infrastructure and processes such that IT services can be delivered effectively and efficiently. One can also label this the IT supplier perspective since the business strategy does not play a primary role. It is emphasized that the four perspectives (and associated alignment patterns) are dominant but not necessarily exclusive (op. cit.). Given a certain dominant perspective, the other perspectives might also play a role.

The strategic alignment model contains relevant areas of attention, with recognizable dominant perspectives and associated patterns. However, the following remarks can be made. First, within the notion of alignment as a process, merely 'perspectives' are offered with no indication as to *how* alignment is accomplished, and how, given a certain dominant perspective, the aspects falling outside the dominant perspective are brought within the alignment process. Put another way, there is no attention for organizational competences, processes, and methods that bring about alignment. Second, according to the model (Fig. 1.9), governance is part of strategy, while one might argue that rather conversely, the governance competence is the source for defining strategy. Third, governance is limited to the external perspective. However as we will outline later, governance clearly has an internal aspect and must encompass the total spectrum from strategy development, the subsequent enterprise design (including IT), the definition of projects to implement design, to the implementation of projects. The model does not address these aspects. Fourth, the precise meaning of the subdomains within the cells remains unclear, while further, one might question whether the four cells and their subdomains are sufficient. Additional areas of attention can be identified that are relevant for enterprise and IT design and hence relevant for alignment. One might consider customer interaction channels, informational aspects, human resources engagement, employee behavior, the behavioral context, and so on, aspects that are all part of enterprise-wide design.

In view of our fourth comment, some publications argue for extra rows and columns. An example is the 'nine-cell model' shown in Fig. 1.11 (Maes et al. 2000). An extra row is created by dividing the internal perspective into a structural and operational perspective. In essence, the structural perspective concerns the organizational blueprint: essential (functional) units and their duty. These units perform by means of processes and skills, which are contained in the operational perspective. Further, the extra column follows from considering 'information and communication' as an area of attention between the business and IT perspective, which is the bridge between information and communication needs of the business on the one hand and IT (the technology) answering these needs on the other. The extra row and column create five additional cells. The creators of the nine-cell model pay little attention to elucidating the precise meaning and alignment activities of these additional cells (and the other cells for that matter). Nonetheless, the extra cells are considered essential in view of establishing alignment.

A variant of this model is created by dividing the 'technology' column into two columns, pertaining to information systems and technology infrastructure, respectively, thereby creating a 12-cell model (Maes et al. 2000). Yet others have added

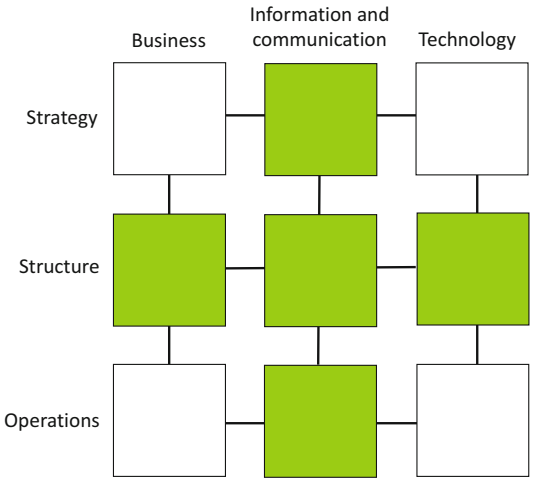

Fig. 1.11 The nine-cell model

even more extra cells and have defined—in a comparable sense as before—alignment patterns based on dominant alignment perspectives (Avison et al. 2004).

Recalling our earlier comments, one might question the practical value of categorizing different alignment perspectives, in light of an alignment model chosen. As indicated, certain alignment patterns are associated with chosen alignment perspectives. These patterns are expected to bring about alignment, but *how* that is supposed to happen remains unclear. Put another way, there is no attention for organizational competences, processes and enterprise design theories, methodology, and methods that bring about the state of alignment. Our fundamental difficulty with these models and the alignment patterns provided is that they appear to be introduced without formal underlying theories and associated methodology and methods for establishing alignment: the theories, methodology, and methods for *designing* enterprises whereby the utilization of IT is an integral part. The models are merely graphical representations of some alignment aspects, but these models do not in and of themselves produce alignment; only enterprise design does. Anticipating our later discussion, we contend that alignment as 'state' has to do with the design of the enterprise as a whole, in which information supply and with that information systems are designed concurrently in a unified and integrated manner. Within this vision, alignment as a 'process' has to do with the realization (the process) of design and its ultimate implementation. The creators of the nine-cell model have also acknowledged the importance of design for realizing alignment, but no formal theories, methodology, and methods are presented.

Enterprise-wide Design Focus Is Essential for Alignment

For decades, the 'business and IT alignment' theme has taken a prominent place in the literature about ensuring enterprise success with IT deployment. This theme is a specific example illustrating the importance of enterprise unity and integration, in this case between 'business' and 'IT.' Despite decades of attention, alignment

continues to be problematic (PWC 2006; Haes and Grembergen 2009). Unfortunately, as indicated, much of the literature about business and IT alignment advocates IT governance as the preferred means to establish alignment (IT Governance Institute 2003). We submit that the focus on IT governance is not conducive to bringing about alignment. In fact, this focus might be the very reason why this theme is still discussed. We will argue this assertion by presenting a comparable example as the one given earlier (Hoogervorst 2018).

Consider a 'provisioning system' or 'supplying system' *S* that delivers a certain function to a 'using system' *U*. For example, a generator (*S*) that delivers electrical energy to a car (*U*) under specified conditions. It is *impossible* to determine the function of the generator (*S*) from, or based on, the function of the car (*U*). Indeed, knowledge that the car is used for driving does not give any clue as to the required function of the generator. Understandably, the only source for the generator *function* is the *construction* of the car. Generally stated, the only source for the function of a supplying system *S* is the construction of the using system *U*. Indeed, it is the car's construction—its arrangement and operation—where the function of the generator is used. Hence, the functional design of the generator proceeds from the constructional perspective of the car. Figure 1.12 illustrates these considerations.

Since the function of the generator is based on insight in the construction of the car, the car/generator alignment is first and foremost an issue of the car's construction: its design. There is no need for knowledge about the internal construction of the generator; the only relevant knowledge concerns the generator's mechanical and electrical interface. And that knowledge is determined by the *construction* of the car. Speaking of governance and design, it is primarily 'car governance and design' and not 'generator governance and design' that determines car/generator alignment. This evident insight is practiced by all design disciplines, except so it seems, in case of IT systems delivering services to the enterprise 'construction.'

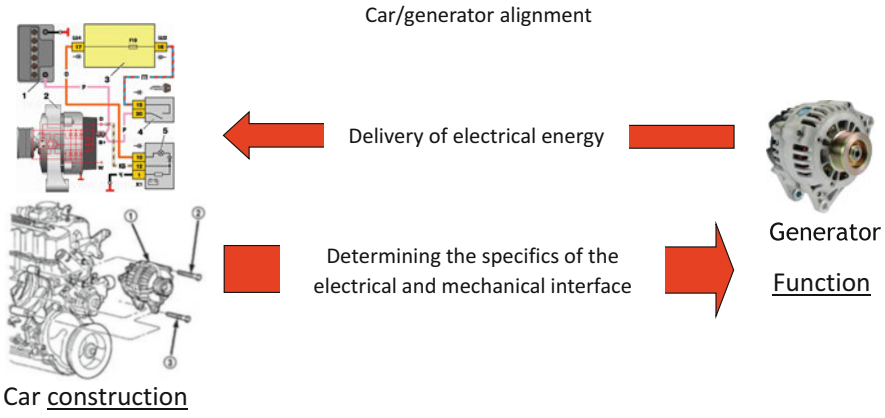

Fig. 1.12 Focus for car and generator alignment

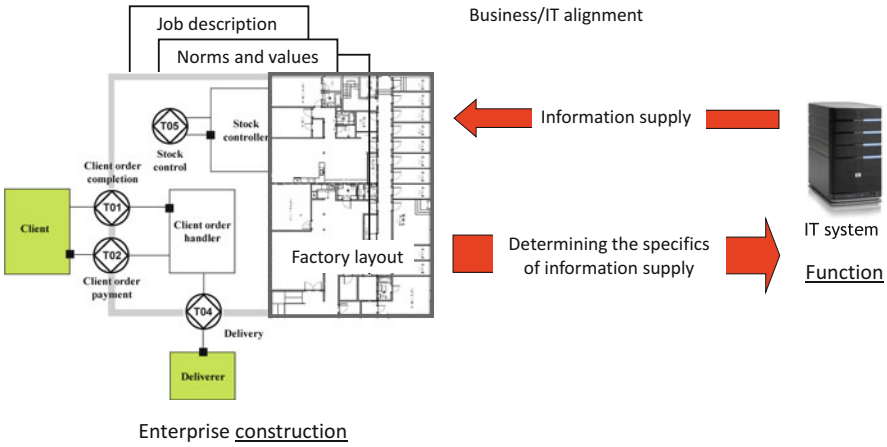

Fig. 1.13 Focus for business and IT alignment

Figure 1.13 shows the analogy whereby the car is replaced by an enterprise and the generator by an IT system. In this case, the IT system (S) delivers a certain function to the enterprise as the using system (U). Similarly as before, it is *impossible* to determine the function of an IT system based on the function of an enterprise. Knowledge about the function of a supermarket, police department, legal institution, or university gives no clue as to the required IT function. The *function* of the IT system can only be determined from the *construction* of the enterprise, as defined by the collaborative patterns, employee and management competences, operational rules, work instructions, job profiles, decision-making prerogatives, level of employee self-organizing, norms and values, compliance requirements, and so on. Likewise, functional design of the IT system proceeds from the constructional design of the enterprise. Both designs are the ultimate basis for any adequate and *subsequent* financial analysis. Further, these designs are also the very, and only, basis for business and IT alignment. Designing concerns the *process* towards alignment, and the design manifests the *state* of alignment. Within this perspective, there is no need for knowledge about how the IT system is developed. As for governance and design, business and IT alignment is thus first and foremost an aspect of enterprise governance and enterprise design. Focusing only on IT governance for realizing business and IT alignment must be considered as essentially ineffective. Moreover, the management- and structure-oriented perspectives on IT governance seem to suggest that once the framework for decision-making is defined, business and IT alignment will progress in the desired manner. How that is supposed to happen remains unclear however.

Despite the relative unimportance of IT governance, experiences show that attention is virtually only paid to IT design and IT governance. Maybe said attention is driven by sheer necessity because of an apparent lack of attention to enterprise governance and enterprise design. However, this situation will prolong the problematic issue of business and IT alignment. Insight in the nature of this issue clarifies

that the often-introduced function of 'information management' will not solve the core problem of business and IT alignment because of the continued lack of focus on the design of the enterprise. Similar remarks can be made about the effectiveness of CIO functions in this respect. Ideological considerations about enterprise governance and enterprise engineering clarify the various manifestations of institutionalized ineffectiveness that frustrate business and IT alignment (Hoogervorst 2018). Some of these considerations are presented in Sect. 3.2.10. Ultimately, alignment concerns the central theme of enterprise unity and integration and hence concerns enterprise engineering whereby information supply and IT design are integral aspects. We stress that Figs. 1.12 and 1.13 merely aim to illustrate the constructional perspective with a few constructional aspects. For constructional design of both the car and enterprise, a comprehensive set of construction documents are needed to clarify how the car as a system and the enterprise as a system are to be arranged.

1.4.2 Effectively Addressing the Compliance Theme

Short History of Corporate Governance

When enterprises issue shares to acquire capital, the shareholders are considered, at least from their perspective, as owners of the enterprise. This viewpoint might be seriously contested. Nonetheless, the whole idea of shareholder 'ownership' inevitably leads to ideas about protecting the interests of shareholders, which led to the emergence of the corporate governance theme (cf. Sect. 1.5*). Already at the beginning of the former century, the core issue concerning corporate governance was identified: the problem resulting from the split between the 'owners' of an enterprise (the shareholders) and the people who manage it. According to the proponents of 'shareholder value,' management should act in the interest of shareholders. However, there is a high likelihood that the goals of owners and management are diverging and conflicting because management is directed towards their own agenda (or even their own interests) and not focused on what matters to shareholders. This problem easily develops since ownership is dispersed among many shareholders. Various financial scandals emerging around the 1980s due to questionable or even megalomaniac management behavior manifested the full magnitude of aforementioned problem.

Not surprisingly, the financial scandals led to the wake-up call to return to the basis of the corporate governance doctrine: focus on creating financial value for shareholders. However, this very focus was the prelude to new and even more serious scandals (op. cit.). An important force fuelling these new scandals can be traced back to the education given by mainstream business schools. Graduates of this type of education were instilled with the idea that the only purpose of enterprises lies in creating economic wealth for shareholders. Financial incentives for management were created in order to align their activities with the interests of shareholders. The whole approach created a dramatic 'institutional shift' in beliefs about the purpose of enterprises and in the type of executive management. The fixation on shareholders

inevitably leads to a short-term financial focus of executive management in order to boost short-term economic performance. Also, here business school education has been charged to inflict serious damage because of their espoused theories (cf. Sect. 1.7.2*).

So much is meanwhile clear: the strong focus on the value of shares led a number of enterprises to present their financial figures in a highly favorable way to stimulate and secure the growth in share price. Remarkably enough, these attempts to polish up reality were partly in accordance with accounting rules but were nonetheless dubious, while some attempts were outright fraudulent. Sometimes questionable or even nonexistent income was reported. The enormously short-term-focused mindset and activities of enterprises were amplified by institutional investors who were more interested in short-term gain than in enterprise survival in the long-term. However, much of the apparently wonderful short-term performance turned out to be bogus, based on nothing. Large-scale fraud and malversation was covered up. Discovery turned out to be disastrous. Various authors argue that management remuneration based on shares or share options has caused the aforementioned shortsighted and, in many cases, also unjustified top management behavior (op. cit.).

Ironically, the financial focus (e.g., share value) was an attempt to address the first financial scandals but led to the arguably more serious subsequent financial scandals. One would expect that corporate governance in general and the pursuance of shareholder value in particular were seen as the root cause of these problems. Questions might be raised regarding the narrow focus on the value of shares and the income per share as the ultimate unit of measure for enterprise performance, without any regard for ethical and social considerations. It is argued that the narrow financial/economic focus is detrimental to enterprise performance, also in view of shareholders. Hence, we have criticized the basic tenets of the corporate governance focus (cf. Sect. 4.8.4*). Contrary to expectations one might have, the theme of corporate governance gained even more attention. Important reforms were initiated that secured such attention, among which are the reforms dictated by the American Sarbanes-Oxley legislation (cf. Sect. 1.5*). Rather remarkably, analysis showed that this legislation could not have prevented the scandals that led to drafting the legislation (op. cit.). Moreover, the suggested reforms are structural in nature and are virtually not concerned with moral issues. Hence, the renewed attention to corporate governance primarily concerns the structure of governance mechanisms and their associated management responsibilities, such that the financial benefits of shareholders are safeguarded.

The Compliance Theme

Satisfying the requirements of corporate governance is commonly identified with the term 'compliance.' These requirements can be distinguished in an *internal* and *external* perspective. The internal perspective concerns attention for enterprise systems and structures for control and risk management aimed at ensuring that enterprises exercise their responsibilities towards shareholders adequately and responsibly, thereby avoiding undesired financial/economic developments (avoiding risks) within enterprises. Underlying this approach is the assumption that internal

control is the ultimate method to safeguard prudent financial/economic enterprise developments and avoid risks in this sense. The chapter about the ideological foundation has questioned that assumption (cf. Sects. 4.2.2* and 4.8.4*).

The manner by which internal control is effectuated is also determined by rules (such as those issued by stock exchanges) and legislation, specifically the American Sarbanes-Oxley legislation (cf. Sect. 1.5.6*). Legislation concerns topics like the structure of the executive board, the form of internal control and financial reporting, the auditing of compliance, and the type of lawful sanctions in case of serious misconduct. Accounting and its rules are likewise considered important for safeguarding prudent behavior for protecting the interests of shareholders. All these rules and legislation can be seen as *external* corporate governance aspects. In summary, corporate governance, as the basis for compliance requirements, is the totality of internal structures and systems, as well as external rules and legislation, for internal control and risk management that ensures that enterprises exercise their responsibilities towards shareholders effectively and adequately.

Compliance: Enterprise-wide Design Inevitable

As mentioned, compliance has to do with satisfying rules and legislation about corporate governance. Internal corporate governance arrangements must thus satisfy external corporate governance directives. An important aspect of compliance is the form and trustworthiness of financial reporting. Various regulating bodies have defined accounting rules or principles, such as the US Federal Accounting Standards Advisory Board that defined the set of 'Generally Accepted Accounting Principles/ Practice' (GAAP) or the International Accounting Standards Board that issued the 'International Financial Reporting Standards' (IFRS). The latter set of standards is used by many countries and is mandatory within the European Community. The two sets of standards differ in various areas, whereby from an overall perspective, the IFRS is considered principles based with little application guidance and the GAAP is considered rules based with specific application guidance. The IFRS covers a wide range of topics concerning the financial treatment of assets, acquisitions, joint ventures, mergers, inventory, loans, debtors, creditors, profit, taxes, costs, amortization, etc. Further, the IFRS indicates how the various financial statements must be interpreted and presented. Examples of IFRS principles might be (in our own wording) that (1) financial assets must be based on the 'fair' (actual) value, (2) negative goodwill must be recognized immediately in the profit and loss statement, or (3) the effect of events (e.g., transactions) must be recorded financially when they occur, not when cash is received or paid (IASB 2007). Accounting principles should evidently be applied when designing the administrative organization and the supply of financial information. Put another way, accounting principles must be *designed* formally into the respective IT systems. Further, since events that have a financial impact occur in operational processes, these processes must be linked to financial informational systems. This points to a broad perspective on enterprise design.

The broad focus on enterprise design also follows from a fundamental IFRS requirement, which holds that enterprises must adopt the 'management approach' to financial reporting, implying that enterprises must use the same underlying data for

financial reporting as is used for managing the enterprise and enterprise performance. In doing so, financial (performance) reporting can be linked transparently to operational performance and reporting. The approach is also efficient: data is used that is already available from enterprise operations. Clearly, in this sense, financial reporting is not something separate but an integrated aspect of enterprise performance reporting. Again, proper financial reporting thus requires a broad perspective on enterprise design.

As we have seen, another important aspect within corporate governance is internal (financial/economic) control. A typical facet concerns the systematic gathering, recording, and processing of financial/economic data for internal control and effectuating accountability. Evidently, this requires such measures that financial data and reporting are trustworthy. Understandably, the trustworthiness of financial reporting depends on the trustworthiness of the financial data itself, which might degrade due to:

- Flawed informational or documental process design, creating diverging or incompatible data.
- Inadequate data management.
- Inadequate data or system security.
- Faults or disruptions in IT systems.
- Deliberate manipulation.

This summary of possible causes for degrading data quality also brings the design, utilization, operation, and maintenance of IT systems formally within the scope of compliance. The requirement thereby is that the utilization of IT systems and the activities within IT operations management—among them change, problem, and release management of IT systems—should not negatively affect the trustworthiness, completeness, and availability of (financial) data. This also points to the operation and design of the enterprise and IT systems within, such as processes and their informational aspects, data management, and security, for example. Various operational policies—applicable to different organizational domains—should thus be defined to safeguard the integrity of the informational system. We return to this topic in the chapter about enterprise design.

For effectuating corporate governance, the notion of internal control extends beyond merely safeguarding the trustworthiness of financial data but also tends to focus on operational integrity, such as through assessing and avoiding risks. Within this broader view on internal control, the following aspects play a role for example:

- Tasks, authorizations, and responsibilities.
- Tasks execution, policies, and rules (including those for avoiding unwarranted risks).
- Process control, execution, and improvement.
- Resources and their planning.
- Performance criteria.

This view on internal control necessitates attention for a wide range of operational, support, informational, and documental processes. As argued previously, the

utilization of information technology must also be included in the perspective for arranging internal control, since operational systems, decision support systems, management information systems, knowledge systems, and office automation are all dealing with aspects relevant to internal control. Hence, we submit that properly effectuating internal financial/economic control inevitably leads to attention for the arrangement of the enterprise as a whole. Put another way, the proper arrangement of corporate governance should take place within the overall enterprise governance context.

Although compliance requirements do not consider ethical aspects, one might nonetheless argue that alongside formal arrangements for internal control, corporate governance has an, probably the most important, ethical dimension: norms and values, as well as certain desired management and employee behavior, in the interests of avoiding unjustified or fraudulent behavior. As Sect. 2.3.9 will summarize, norms, values, and behavior are determined strongly by the internal enterprise context. For example, certain behavior might be stimulated or invoked by structures and systems for employee review and reward, as well as by the associated reporting structures about unit, process, and employee performance. Desired forms of behavior should thus be enabled and supported by the enterprise behavioral context. This ethical aspect also points to a unified and integrated design of the enterprise as a whole.

Previous considerations show that the focus on compliance (financial reporting and internal control) inevitably leads to an enterprise-wide scope. Compliance is thus an integral part of enterprise-wide design. So, for example, design activities for IT systems providing secure network access and the management of the associated authentications and authorizations are relevant to enabling customers, business partners, employees, and suppliers to have secure access to the enterprise network. Evidently, this is essential in view of the primary enterprise purpose and objectives, such as pertinent to e-business, or end-to-end process integration. However, the IT systems to be designed from the primary enterprise purpose and objectives are likewise relevant from compliance considerations. This illustrates that compliance is connected implicitly to the design of the total enterprise.

Anticipating our discussion in the chapter about enterprise design, ‘compliance’ can be seen as a strategic area of concern. For this concern, design principles should thus be defined such that the concern for ‘compliance’ can be effectively addressed. Likewise, the IFRS directives for accounting should be translated into principles for design. For example, the accounting principle that ‘the effect of events (e.g., transactions) must be recorded financially when they occur, not when cash is received or paid’ can be translated into a design principle reading ‘financial operational events must update financial informational systems in real time.’ In the chapter about enterprise design, we will present design principles that are relevant from the compliance perspective.

As our discussion clarifies, satisfying compliance requirements generally follows from the design of the enterprise and the design of IT systems within, based on considerations such as process excellence, quality, efficiency, security, and so on. Put another way, enterprise design, wherein information system and IT system design are integral parts, is relevant for enterprise strategic and operational

performance and at the same time also relevant in view of corporate governance (compliance) requirements. We underline thus yet again the importance of enterprise-wide design.

1.4.3 Enterprise-wide Design: The Basis for Enterprise Performance

The Creative Hinge Point Between 'What' and 'How'

Section 1.3 identified two core competences, one concerning enterprise operations ('running the mill'), the other concerning enterprise change and adaptation ('changing the mill'). Roughly speaking, operational performance regards the effective, efficient, quality-oriented, and service-oriented production and delivery of products and services. Performance regarding enterprise change is determined by the degree of realizing the intended changes, as well as by timely recognizing the need to achieve them. Changes might have a direct relationship with operational activities, such as concerning the process of continuous improvement. Change and adaptation are often of a strategic nature, that is, certain desirables are formulated that enterprise change should accomplish. Strategic desirables come in two principal categories concerning (1) the type of, and market for, products and services and (2) the ways of organizing for bringing about the products and services (cf. Sect. 4.4.4*). Most likely, the first category of strategic desirables will impact operational organizing. Based on foundational insights, enterprise design must (1) establish the relationships between the strategic desirables and the new ways of organizing and (2) effectuate the new ways of organizing through design. These observations constitute the first reason why enterprise design is the basis for enterprise performance: design effectuates the strategic desirables. It is, as stressed earlier, the creative hinge point between *what* is desired and *how* that is realized. Two other reasons are discussed next.

Addressing Common Causes of Poor Enterprise Performance

Causes of poor operational performance can be dived into two categories: (1) systemic causes that are the inevitable result or consequence of the way of organizing and (2) nonsystemic causes that are incidental and random (cf. Sect. 1.2.5*). Deming labeled these causes, respectively, as *common* and *special* causes (1986). According to Deming's analysis, 94% of the causes of poor enterprise performance are common causes. Put differently, virtually all instances of poor performance—ranging from bad service and employee cynicism to operational inefficiency, as further discussed in the next chapter—are the consequences of inadequate ways of organizing. Avoiding or rectifying common causes of poor enterprise performance thus necessitates a focus on enterprise design.

As we have stressed in Sect. 1.1.1, enterprise performance critically depends on enterprise unity and integration. Not satisfying this condition creates poor performance and is thus a major contributor to common causes.

Creating Performance Possibilities for Employees

Closely associated with the previous point is the following. Enterprise mechanization summarized in Sect. 2.4.2 entails the traditional focus on employee control, such as through performance targets and periodic assessments. We argued that this practice is fundamentally flawed since the implicit message to employees is that their performance willingness is distrusted. This practice becomes a self-fulfilling prophecy and destroys employee motivation and breeds employee cynicism (cf. Sect. 4.6.3*). A far better approach is to focus on the *performance possibilities* of employees, which are determined by the characteristics of the working environment and are aspects of enterprise-wide design.

Addressing a Core Reason for Strategic Failures

Next to operational performance, also enterprise strategic performance is an issue of great concern. Numerous studies showed that the majority of strategic initiatives fail, in the sense that the intended goals are not realized (cf. Sect. 1.2.3*). These studies cover a broad spectrum of topics, such as total quality management, business process reengineering, business process management, six sigma, e-business, customer relationship management, and mergers and acquisitions. The high failure rates are likewise manifest when applying technology in enterprises. Failing initiatives are thus also associated frequently with failing technology introductions. Much has been reported about failing introductions of information technology (IT). Rather remarkably, research into a large sample of enterprises over a lengthy period of time did not prove any positive relationship between IT investments and measurable improvements in enterprise performance. In view of these problems, the topic of 'business and IT alignment,' discussed previously, is a case in point and has been a topic of interest for decades without any noticeable improvement in 'alignment.' To appreciate the enormity of these observations, we reiterate the following. In 1996, the seminal book *Leading Change* by John Kotter was published, indicating that 70% of change initiatives failed. After studying numerous publications, Keller and Price published their investigation about strategic failures and wrote: "Fifteen years later, we can choose from more than 25,000 books on organizational change, and hundreds of courses of how to lead and manage it. In spite of this abundance of advice, all available evidence suggests that—you guessed it—still only one in three programs succeeds" (2011, p. xix).

While strategic failure might be the result of an inherently poor strategy, substantial evidence indicates that failure is the avoidable consequence of (1) inadequate concepts about how to successfully realize strategic desirables and hence how to accomplish successful enterprise change and (2) lack of enterprise coherence and consistency (unity and integration) which precludes the enterprise to operate as a unified and integrated whole (cf. Sect. 1.2.4*).

The first core reason for strategic failures refers to the concepts about governance that are in our view fundamentally inadequate, as outlined in Chap. 3. A fundamentally different perspective will thus be argued. The second core reason for strategic failures concerns enterprise design since only through enterprise-wide design can the

coherence and consistency among the ways of organizing be established. Numerous publications have stressed the importance of enterprise unity and integration (op. cit.). We reiterate that an enterprise design focus is therefore crucial for successfully operationalizing strategic choices. A McKinsey publication confirmed this observation: rather than the traditional management focus on structural changes for strategic success, "they would be better of focusing on organizational design" (Bryan and Joyce 2007, p. 22). The report emphasizes that "most corporate leaders overlook a golden opportunity to create durable competitive advantage and generate high returns for less money and less risks: making organizational design the heart of strategy" (op. cit., p. 21). We therefore fully support the view that "the field of organization design can and should play a much larger role in management theory and practice than it presently does" (Burton et al. 2006, p. xi).

In summary, the focus on enterprise design is essential for:

- Effectuating enterprise strategic desirables.
- Ensuring the proper way of organizing.
- Addressing common causes of poor enterprise performance.
- Ensuring enterprise unity and integration.

1.4.4 Overcoming Theoretical Fragmentation and Avoiding the Traditional Myopia About Organizing

Coherence and Consistency

Previous paragraphs stressed that enterprise design, and hence enterprise engineering, plays a crucial role within the enterprise change process and is thus a crucial aspect of enterprise governance. Additionally, enterprise design is the basis for enterprise performance, as argued in the preceding paragraph. Various performance topics play a role such as customer satisfaction, employee satisfaction, motivation, quality, efficiency, productivity, security, and compliance. Obviously, in view of the importance of enterprise unity and integration (coherence and consistency), the set of strategic desirables and requirements must be coherent and consistent. Indeed, it seems highly unlikely that incoherent and inconsistent strategic desirables and requirements would be conducive to enterprise success and performance, while such incoherence and inconsistency would nonetheless lead to a coherent and consistent enterprise design. Ascertaining aforementioned coherence and consistency already involves the foundational insights for enterprise design. For example, a strategic desirable about performance-related pay is inconsistent with the strategic desirable to increase employee motivation (cf. Sect. 4.6.4*). Likewise, the intention to use classic accounting measures conflicts with the intention to increase customer loyalty (cf. Sect. 4.7.10*).

The Multidimensional Enterprise Aspects

Actually turning strategic desirables into reality implies realizing new forms of organizing based on a new enterprise design. Since enterprise unity and integration is a crucial condition for operational performance and strategic success, as argued in the preceding paragraph, enterprise design must ensure this crucial condition. Violating the crucial condition will imply full or partial failure in realizing strategic desirables. We argued that enterprises are organized complexities with many different aspects like employee behavior, management behavior, culture, communication, accounting, security, safety, employee assessment and rewards, motivation, and so on (Hoogervorst 2018). Hence, a multitude of different aspects and areas of concern must be effectively addressed and integrated for obtaining enterprise unity and integration. That is no easy task. For this task, the foundational insights are indispensable (op. cit.). In view of the high rate of strategic failures mentioned before, the question of *how* strategic desirables and concerns can be successfully addressed thus requires a well-grounded answer. It is not to be expected that strategic desirables and concerns can be adequately operationalized without adequate theories, methodology, and methods that can address the desirables and concerns. This evident truth is acknowledged in many areas. Indeed, one would probably not board an aircraft manufactured by a company with a concern for safety but without adequate theories and methods to address that concern. Further, recall from the preceding paragraph that poor enterprise performance is virtually always attributable to inadequate enterprise design (common causes). The ability to address all enterprise facets, given the strategic desirables, areas of concern, and manifestations of poor performance, requires theoretical and methodological completeness (cf. Sect. 1.7*). For example, we consider theories, concepts, and methods as incomplete, and thus inadequate, if the concern for motivated employees or a customer-oriented culture cannot be effectively addressed. Again, a comprehensive basis of foundational insights for enterprise design is crucial.

Theoretical Fragmentation

As Sect. 1.3.4 outlined, the outcome of enterprise design is artifacts that detail the future organized state. Examples of such artifacts were mentioned earlier: description of desired norms and values, employee and management behavior characteristics, process models, information object descriptions, work instructions, operational rules and regulations, production means, job profiles, reporting structures, remuneration and assessment criteria, (IT) system designs, infrastructural designs (offices, utilities, etc.), and so on. Collectively, these artifacts form the new enterprise design: the conceptual realization of the future ways of organizing.

Unfortunately, the ability to address the enterprise in a unified and integrated manner is hampered by the fact that relevant enterprise topics are treated by different academic disciplines. When employed by enterprises, specialists educated within these academic domains almost ‘naturally’ continue the conceptual and practical fragmentation due to the lack of any overarching integrating theory and methodology. Hence, there is considerable fragmentation in the study of enterprises, which in and of itself also forms the key obstacle to practicing the foundational insights. Not

only is there a lack of integration concerning the various topics of the foundational insights but consequently a lack of fit between the problems addressed by these various disciplines and the problems enterprises are facing. Partial solutions are thus provided for problems that require an integral approach (cf. Sect. 1.7.3*).

The Traditional Organizing Myopia
One might observe that the theoretical fragmentation has led to traditional organizing myopia, whereby the incompleteness of the enterprise design scope is even more profound. Often, attention for design is limited to the usual four traditional structural functionalist (mechanistic) design aspects: processes, information relevant for these processes, the IT applications that supply the information, and finally the infrastructure supporting the applications. We fail to see how, by paying attention to these four design aspects, one could effectively address the concern for motivated employees, a customer-oriented culture, or meaningful work. Clearly, the notion of an enterprise as a social entity is virtually excluded within this traditional design scope. Although the mentioned design aspects are evidently relevant, the approach is theoretically and methodologically incomplete. As a consequence of incompleteness, enterprise unity and integration cannot be realized. Indeed, unity and integration is not to be expected if relevant enterprise aspects are not brought within the design perspective. Many approaches concerning enterprise design can be noticed with a focus on models and representations, whereby adequate attention to all relevant enterprise aspects can be questioned (Dietz and Hoogervorst 2011). Note that the business and IT alignment models discussed in Sect. 1.4.1 manifest the traditional organizing myopia: only organizational and IT processes and infrastructure are considered. Avoiding the traditional organizing myopia by enabling an integrated approach is what enterprise-wide design based on the enterprise engineering theories, methodology, and methods aims to offer.

1.5 Enterprise Design Science

1.5.1 The Importance of Sound Theories

A First Fundamental Truth: The Danger of a Bad Theory
When speaking about the preferred theory of organization in Sect. 1.1.2, we introduced the first fundamental truth: "nothing is as dangerous as a bad theory" (Ghoshal 2005, p. 86). Despite the warning that is implicit in this truth, enterprise reality is rife with examples of bad theories in use. Ways of thinking and acting that are total nonsense or dangerous half-truths continue to be widely applied (cf. Sect. 1.7.1*). Organizing beliefs and practices are continued with complete disregard for the facts about their validity. This points to the unproductive, if not damaging, chasm between what organization science knows and what management practices reveal. For a considerable part, the continuation of nonsensical management practices is caused by the so-called 'management industry' that has produced enormous amounts of

misleading and also conflicting advice (op. cit.). Prescriptions based on the 'best managed companies' or 'best practices' are anecdotal, folkloric, or based on hypes, fads, and unsubstantiated pseudotheories.

Sadly enough, the propagation of bad theories has been greatly facilitated by business or management schools. Postwar business school education focused on a conception of management that was separated from the nature of the enterprise itself (cf. Sect. 1.7.2*). No specifics of the enterprise needed to be understood since, as the prevalent thoughts would have it, concepts like forecasting, planning, and controlling within the context of enterprise financial performance can be applied anywhere. A zone of detachment was thereby created between managerial work and the particular organization of any one enterprise. Not inventors and engineers that understood the inherent activities of the enterprise and had a sincere interest in the quality of products but managers only interested in profit were 'managing' enterprises. Since enterprises were basically seen as 'black boxes' run by management in pursuit of primarily financial goals, not much progress has been made in developing theories for effectively addressing the organized complexity of enterprises.

Many scholars have questioned the notion of 'management' as an autonomous profession and hence have questioned the very possibility of this notion as an adequate foundational topic for an autonomous academic discipline. However, the 'theory' that would give business schools their own respectable turf was believed to be the collection of viewpoints summarized previously in the paragraph about corporate governance. Everything that enterprises, and hence management, should do must be in the economic interest of shareholders. Next to profit maximizing, concepts for doing so are 'restructuring,' 'leveraged recapitalizations,' 'leveraged buyouts,' 'takeovers,' 'downsizing,' or 'outsourcing.' Clearly, this way of thinking and the concepts used frame the perspective on enterprises as merely 'money-making machines.' This perspective is further associated with a strong legal and contractual focus: the enterprise as a legal fiction, as summarized in Sect. 2.4.1. Contracts define enterprise relationships. An amoral position is thereby advocated since the only responsibility of management lies in creating economic wealth for shareholders within the accepted legal boundaries. The focus on financial gain inevitably induces a short-term management focus, which has been labeled as 'short-termism,' leading to detrimental consequences and is considered 'the management to economic decline' (Hayes and Abernathy 2007).

The point has been made that, unfortunately, business school education developed into a proliferation of different viewpoints without any cohesion and an overarching integrating theoretical perspective (cf. Sect. 1.7.2*). Business schools did not provide an antidote to the 'witch doctor approaches' but, in fact, largely contributed to its widespread proliferation. Many serious failures were and are the inevitable consequences. Even more seriously, certain forms of business school education have been charged with inflicting severe social damage because of improper enterprise (management) conduct as a result of this education (Khurana 2007). As Ghoshal observes, "many of the worst excesses of recent management practices have their roots in a set of ideas that have emerged from business school academics over the last 30 years" (2005, p. 75).

A Second Fundamental Truth: The Practical Value of a Good Theory

A proper theory of organization matters for the simple reason that ways of thinking and acting concerning enterprises not only affect enterprise performance but, equally important, affect employee and society well-being (cf. Sect. 1.1.1*). Such well-being is in the hands of managers applying a management 'theory.' And the number of managers is increasing rapidly (cf. Sect. 1.7.1*). Unfortunately, both employee and society well-being is seriously jeopardized if not inflicted with severe harm: the bleak nature of enterprise reality (cf. Sect. 4.8*). Various organization theorists have stressed the need for a proper theory of organization already decades ago. Barnard spoke about the need for developing a "science of organization" (1938, p. 200). Roughly a decade later, Urwick voiced his plea for an effective theory of organization, whereby "the development of a technique of administration, a body of professional knowledge without which those who attempt to manage other people appear increasingly amateurish, is likely to have a profound effect on our institutions" (1947, p. 7). Inflicting severe harm as a consequence of 'bad theories' was also pointed out by Urwick because no attention is paid to design: "lack of design is illogical, cruel, wasteful and inefficient" (op. cit., p. 38). It is cruel "because the main sufferers from lack of design in organization are the individuals who work in the undertaking" (ibid.). Along similar lines, Nobel laureate Herbert Simon states that "the theory of administration is concerned with how an organization should be constructed and operated in order to accomplish its work efficiently" (1997, p. 45).

As illustrated, most business school education did not provide the proper theory of organization. So, almost a century after the plea of the organization theorists mentioned above, an alternative for the management theory and business school education criticized above is strongly voiced (Adler 2002; Ghoshal 2005; Khurana 2007; Wooldridge 2011). We have mentioned the need to adopt the employee-centric theory of organization in Sect. 1.1.2 and will summarize core reasons in the next chapter. This theory has to be put into practice by crossing the chasm between the social and organizations sciences and the engineering sciences. Hence, the employee-centric theory of organization is the input for the enterprise engineering design science. In doing so, our aim is to provide a sound theoretical base for business or management schools. According to social scientist and Nobel laureate in economics Herbert Simon, such a design focus is essential for the professional school concerned with organization and management theory. "The professional schools will resume their professional responsibilities just to the degree that they can discover a science of design, a body of intellectually tough, analytic, partly empirical, teachable doctrine about the design process" (1969, p. 58). Simon was convinced that through such design theory, business schools could distinguish themselves from economics or psychology. Lack of such theory will continue the detrimental demand from the 'management industry.' Moreover, like the other engineering sciences or medical sciences demonstrate, a sound enterprise engineering design science will likewise prove Kurt Lewin's dictum: "there's nothing so practical as a good theory" (In: Thomas 2003, p. 74). As will be outlined below, a good design theory is firmly rooted in foundational sciences. This is no different for

enterprise design. Indeed, "before we can establish any immutable 'principles' of administration, we must be able to describe, in words, exactly how an administrative organization looks and how it works" (Simon 1969, p. xi). Insight into how 'it works' comes from the foundational sciences on which the science of organization, and hence enterprise design, must be based.

1.5.2 Design Sciences and Foundational Sciences

About What Is and What Can Be

Under the label 'foundational science,' we identify science and research that seek to understand natural (physical or biological) or social phenomena, obtain theoretical knowledge, and discover law-like relationships between these phenomena. Unlike the 'ideographic' perspective on science whereby phenomena are described that are considered unique and not guided by underlying general regularities, foundational sciences are 'nomothetic'; they are 'law giving' (Nagel 1961). Others have used the term 'factual science' to identify a science concerned with exploring, explaining, and describing how the world *is* (Dresch et al. 2015). Thus, foundational sciences are concerned with understanding and explaining why phenomena manifest themselves as they do: it is about how and why things *are*. Foundational sciences are physical, biological, social, and behavioral sciences. Specifically regarding enterprises, social and behavioral sciences seek to understand, explain, and predict organizational and human phenomena (Hevner et al. 2004).

Next to foundational sciences that focus on how the world *is*, another important scientific domain is concerned with how the world *can be*. Hence, this scientific domain concerns the creation of artifacts: artificial, human-made entities. In his book *The Sciences of the Artificial*, Herbert Simon argues the importance of establishing a science of 'the artificial' and hence argues the importance of a science for creating artifacts (1969). This importance seems evident since there are numerous cases where human beings are not concerned with how the world *is* but how it *can be* or *should be*. The creation of artifacts is identified as *design*. Section 1.1.1 identified design (designing) as courses of action aimed at changing existing conditions into preferred ones. Comparably, others have identified design as the activities for addressing practical problems, whereby a practical problem is characterized by the difference between the actual and the desired state of affairs (Johannesson and Perjons 2014). The scientific approach to design is identified as *design science*. Although this term is not used uniformly in the literature, we will define it as:

- *Design science* The coherent and consistent scientifically valid body of knowledge (theories, methodology, methods) based on foundational sciences, which is used for the creation of artifacts as they are developed with the goal of solving practical problems of general interest.

It should be stressed that the application of insights from a foundational theory—such as creating an employee reward system based on some insight about human behavior—is not the same as applying a design science (Dresch et al. 2015). An enterprise design science encompasses all relevant enterprise design aspects and can address the influence of the reward system on these other aspects. In order to qualify as a design science, three conditions must be satisfied concerning the body of knowledge, which must be (1) based on the associated foundational sciences, (2) based on rigorous research, and (3) generally applicable for the design of a class of artifacts. In view of the second point, closely related to the notion of design science is the notion of *design science research*. For understanding this latter notion, it must be stressed that design within the scope of design science research is not concerned with merely designing an artifact for some practical use based on the existing design science body of knowledge, but the process of design aims to contribute to the scientific body of knowledge itself. So, the design science research within aircraft engineering aims to contribute to the scientific body of knowledge about the design of aircraft, for example, in view of safety or energy efficiency. In order to scientifically demonstrate that design is indeed improved, the design within a particular design science research scope is thus inextricably linked to the particular design science. Hence, design science and design science research are closely intertwined, since it is design science research that makes a particular design science a 'science.' To bring the message home: "The purpose of design is to create an artefact that fulfills the needs and requirements of some stakeholders, possibly only for local practice. Design science research, in contrast, aims at producing and communicating new knowledge that is relevant for a global practice" (Johannesson and Perjons 2014, p. 161). That's why the definition of design science speaks about practical problems of general interest. Hence, the artifacts produced through design science research are evaluated in view of improving design theories, methodology, and methods that are valid for a certain class of artifacts, such as the class of aircrafts, houses, electrical generators, IT systems, or enterprises. In view of the somewhat ambiguous term 'design science research,' one might speak about *design research*, which aims to improve the associated design science (Winter 2008). In addition to the qualifying conditions for design science, the following conditions are relevant for design science research (op. cit.):

1. Rigorous research methods must be applied in order to make the creation of new design knowledge scientifically valid.
2. New knowledge must relate to an existing body of well-founded knowledge of the design science.
3. New knowledge must be made known to the applicable community of researchers and practitioners.

Since there are various types of artifacts, there are likewise also various design sciences and associated research methodologies (Johannesson and Perjons 2014; Dresch et al. 2015).

Close Relationship Between Foundational Sciences and Design Science

The definition of design science stresses the importance of being grounded in the foundational sciences. This importance can be understood as follows. In view of our previous reflections, we might say that foundational sciences are concerned with what is *true*, hence describing how things are, whereas design sciences are about how things have to be created (March and Smith 1995). Put differently, design sciences are concerned with finding out what is *effective* (Hevner et al. 2004). A design science is thus necessarily *prescriptive*: a body of knowledge that indicates *how* a certain class of artifacts needs to be designed. Nonetheless, prescription must be based on valid scientific knowledge, which is the very reason why both types of sciences are closely related. For example, the design science about aircraft design rests on theories and concepts from aerodynamics, metallurgy, chemistry, and so on. Within electrical engineering sciences, for example, the foundational theory of electromagnetic fields is highly intertwined with the design theory for antennas. Hence, the relationship between a design science and the associated foundational sciences is rather close since explaining why a design is (in)effective rests for a large part on foundational sciences. Otherwise stated, the foundational sciences provide the theory and its justification, whereby the theory is the basis for design. Conversely, the evaluation about the design is input for (further) theory development, justification, and possible adaptation. Any design science must thus have an adequate theory base (Hevner et al. 2004).

As indicated, for the engineering sciences, the relationship with the design science aspect and the foundational science aspect is rather close, such that the distinction is just about absent. For the social sciences, the situation is rather different, as outlined below.

Closing the Social Sciences Versus Design Sciences Gap

Several important social, behavior, and organization foundational theories for easy reference identified as social and organization sciences will be summarized in the next chapter. These theories explore, explain, and describe social, human behavioral, and organizational phenomena. The next chapter summarizes a few topics. Unfortunately, within the realm of these phenomena, the focus is on how the social world *is*, while less formal attention, in the form of design, is paid to how the social world *can be*. One might thus observe a detrimental gap between the valid body of knowledge about social and organizational phenomena, and the practical application of that knowledge in solving social and organizational problems (Dresch et al. 2015), and hence a gap in applying knowledge for changing existing social and organizational conditions into preferred ones. A 'social and organization design science' is thus urgently needed. In view of our focus on enterprise design, we thus submit that an enterprise design science, which we have identified as enterprise engineering, is needed to close the gap between the foundational social sciences and their practical application.

From the perspective of design science research, important aspects that are relevant for the respective sciences have been identified along the axes of the, slightly adapted, grid devised by March and Smith, shown in Fig. 1.14 (1995). As indicated previously, design science research aims to improve the associated design

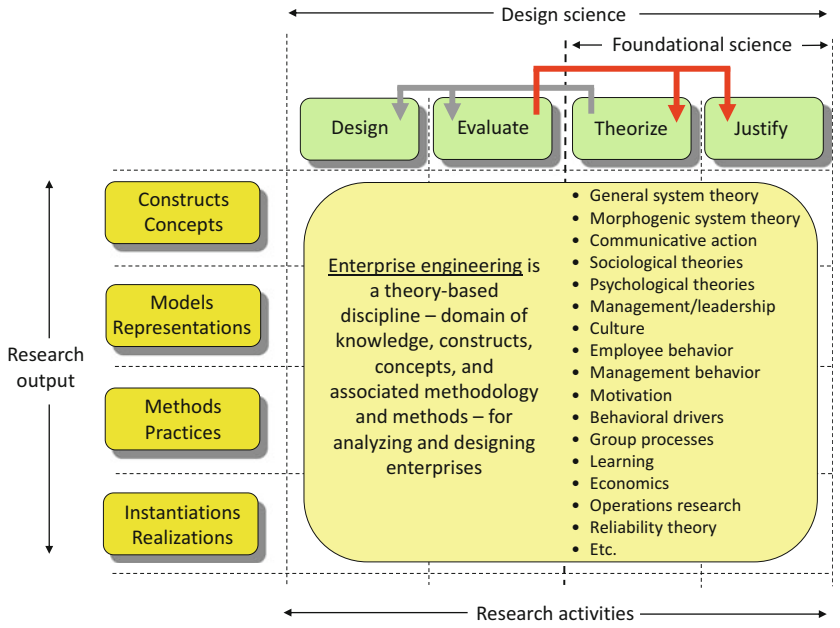

Fig. 1.14 Aspects of design and foundational sciences

science. Two important research aspects are identified: research activities and research output. We will illustrate this grid in case the design science is enterprise engineering.

Research activities concern the foundational theories and their justification, as well as the design and its evaluation. Various topics of the foundational sciences that are relevant for enterprise engineering are identified in Fig. 1.14. As indicated, theorizing is obviously a central aspect of a foundational science, whereby adequate empirical data justify a theory. The understanding provided by the theories of the foundational sciences is the basis for the enterprise engineering design science which is subsequently used for the design and realization of an artifact within the realm of enterprises. The evaluation of the design result takes place pertinent to the theoretical foundation. In turn, evaluation of the design result is then used for considerations about the foundational theories, their justification, and application. These considerations might then be used for further foundational theory development and understanding. The research activities are conceptually divided in various phases that can be broadly identified as (Johannesson and Perjons 2014; Dresch et al. 2015) (1) problem description, (2) formulation of possible solutions for addressing the problem and final selection of preferred solution, (3) design, (4) demonstration of solution feasibility, (5) evaluation of design in view of the initial problem and applicable theories, and (6) communication about results to the relevant research community. Depending on the type of artifact, various research methods might

additionally be used, such as surveys, action research, simulation, pilots, and so on (op. cit.).

As for the research output, Fig. 1.14 mentions a number of typical aspects relevant for both sciences (Johannesson and Perjons 2014). For example, theoretical constructs or concepts are 'system,' 'function,' 'construction,' 'culture,' or 'behavior context.' Design constructs or concepts are, for example, 'requirement,' 'architecture,' 'area of concern,' or 'design domain.' All these and other constructs or concepts will be discussed in subsequent chapters. Models and representations are the artifacts created through design. Different models will be introduced when discussing the various social and organization theories, as well as when discussing enterprise engineering. In the case of enterprises, the term 'representations' refers to various other artifacts that outline the future enterprise arrangements (ways of organizing), such as documents detailing the implications of the meaning and purpose(s) of the enterprise and the enterprise units, performance criteria, job profiles, information systems and their purposes and functions, or culture and behavior characteristics, etc. Methods and practices express prescriptive knowledge about conducting foundational and design science, respectively. For enterprise engineering, the frameworks that will be introduced are typical examples. Finally, the instantiations manifest the realized artifact: an (partial) enterprise (re)design.

As stressed, an effective design science, based on design science research, has its fundaments in the foundational sciences. Design science research contributes to design science development and further theoretical development of the associated foundational theories. Figure 1.15 graphically shows this iterative cycle. Again, the close reciprocal relationship between the application of theory in actual design on the one hand and the use of evaluation data for theory development on the other hand stresses the convolution of a design science and its associated foundational sciences. Without such close interrelatedness, design activities can never develop into a mature design science. Likewise, the design of enterprises, and hence enterprise engineering, must be rooted in the foundational sciences. These sciences provide insight into the nature of enterprises. Such insight is crucial prior to any design.

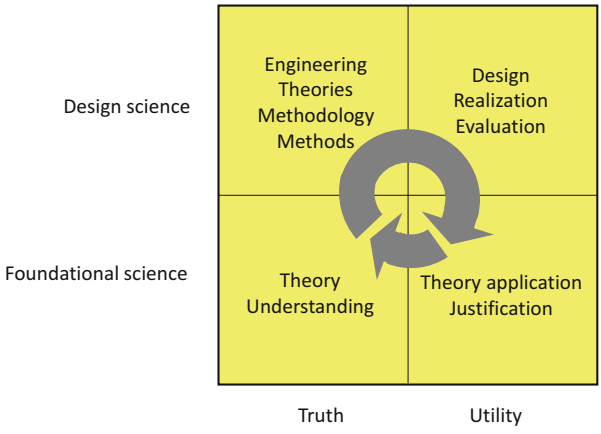

Fig. 1.15 Foundational theory–design theory iterative cycle

Recall the words of Nobel laureate Herbert Simon: "before we can establish any immutable 'principles' of administration, we must be able to describe, in words, exactly how an administrative organization looks and exactly how it works" (1997, p. xi). In view of the multitude of aspects relevant for enterprises, the theoretical basis for understanding 'how enterprises work' is considerable. Hence, also the foundational basis for enterprise design is inherently broad and, as indicated before, must not be treated fragmentally. Various foundational sciences thus play a role. One might think of theories like organizational behavior (micro level and macro level), work and organizational psychology (employee behavior, learning, culture, motivation, leadership, etc.), sociology (views on human groups, social order, social change), theory of communicative action, system theories, or operations research. Some of these theories are shown in Fig. 1.14. All these foundational theories contribute to the theoretical and methodological completeness of the enterprise design approach. Important theories of the foundational sciences have been discussed in Hoogervorst (2018). It will become clear that the foundational sciences provide, as the name suggests, the content for design guidance in view of enterprise strategic intentions and areas of concern.

Arguably, a design science without a firm rooting in the foundational sciences poses a threat. When using, for example, aircraft, trains, automobiles, bridges, or buildings, one trusts that the design has been adequate. Also within the enterprise context, the danger of not developing and maintaining an adequate 'theory base' has been stressed (Hevner et al. 2004). Unfortunately, many approaches concerning enterprise design can be noticed with a focus on models and representations, whereby adequate attention to the theory base can be questioned (Dietz and Hoogervorst 2011). As indicated earlier, witch doctor approaches and certain types of business school or management school education developed into a proliferation of different viewpoints without any cohesion and failed miserably in producing an overarching integrating theoretical perspective on enterprises. From the perspective of enterprise design, the relevance of these different viewpoints is questionable. Under the label enterprise engineering, an approach will be discussed that aims to avoid aforementioned danger of an inadequate theory base. Noticeably, the concept of engineering an enterprise has been emphasized in earlier publications. For example, as far back as several decades ago, James Martin stated that "Enterprise Engineering is an integrated set of disciplines for building or changing an enterprise, its processes, and systems" (1995, p. 58). With deep insight, he foresaw that "a new type of professional is emerging—the enterprise engineer" (op. cit., p. xii). Underlying the approach advocated by James Martin was the notion that enterprise success necessitates unity and integration of various enterprise aspects, a notion we have likewise emphasized before. Despite the similar use of the term 'enterprise engineering,' our approach nonetheless differs in various aspects. The difference lies primarily in our emphasis on the formal theories and associated methodology and methods for enterprise design, as well as in our focus on the characteristics of effective governance for enabling the enterprise engineering approach to be successful.

1.6 The Close Relationship Between Enterprise Governance and Enterprise Engineering

1.6.1 Core Topics in Perspective

As amply stressed before, enterprise unity and integration is a crucial condition for enterprise success. That is not to say when that condition is satisfied, enterprise success is secured. Indeed, a chosen strategy might turn out to be flawed. However, violating the crucial condition will imply full or partial failure in realizing strategic intentions (cf. Sect. 1.2.4*). Recall that enterprises are organized complexities with many different aspects like employee behavior, management behavior, culture, communication, accounting, security, safety, employee assessment and rewards, motivation, and so on. Various performance areas play a role, such as customer satisfaction, employee satisfaction, quality, efficiency, productivity, security, and compliance. These topics can be identified as enterprise *areas of concern*. Hence, a multitude of different aspects and areas of concern must be effectively addressed and integrated for obtaining enterprise unity and integration. That is no easy task. For successfully performing this task, our core concepts of enterprise governance and enterprise engineering are essential. We will put these concepts in an overall perspective with the aid of Fig. 1.16.

Central in Fig. 1.16, the notion of enterprise unity and integration is depicted. This notion is about coherent and consistent (conceptual) relationships between all enterprise aspects that collectively express, define, and realize intended enterprise behavior and performance. In Chap. 4, we will return more formally to the various

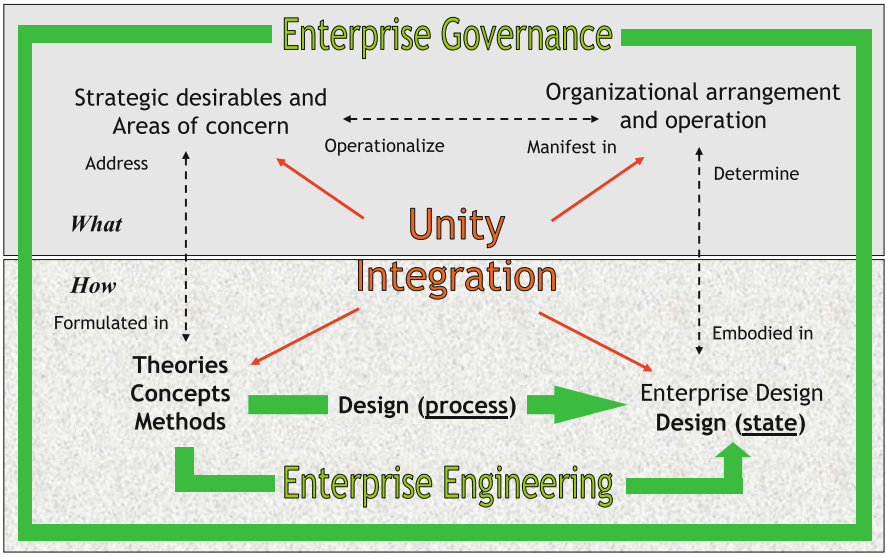

Fig. 1.16 Enterprise governance and enterprise engineering in perspective

enterprise aspects and address how they can be methodically brought into a unified and integrated perspective, such that a unified an integrated enterprise design is realized.

Understandably, the first area where unity and integration is required is that of strategic desirables and areas of concern. Indeed, it seems highly unlikely that incoherent and inconsistent strategic desirables and concerns would be conducive to enterprise success and performance, while such incoherence and inconsistency would nonetheless lead to a coherent and consistent enterprise design. Next, the actual enterprise arrangement and operation should operationalize—hence make real—the strategic desirables and areas of concern in a unified and integrated manner, while conversely, strategic desirables and concerns must be manifest in the enterprise arrangement and operation. Unfortunately, that is all too often not the case: *what* is being desired is not realized. For example, the actually experienced enterprise might not reflect the espoused strategic desirable about, and concern for, customer satisfaction.

In view of the high rate of strategic failures mentioned before, the question of *how* strategic desirables and concerns can be successfully addressed requires a well-grounded answer. It is not to be expected that strategic desirables and concerns can be adequately operationalized without adequate theories, concepts, and methods that can address the desirables and concerns. This requires theoretical and methodological completeness, as stressed before. This evident truth is acknowledged in many areas. As mentioned before, one would probably not board an aircraft manufactured by a company with a concern for safety but without adequate theories and methods to address that concern. Hence, as Fig. 1.16 depicts, the theories, concepts, and methods must be able to address the strategic desirables and areas of concern. Conversely, formulation of these desirables and concerns must be possible within the theories and concepts. For example, we consider theories, concepts, and methods as incomplete, and thus inadequate, if the concern for motivated employees or a customer-oriented culture cannot be effectively addressed.

Ultimately, the organizational arrangement and operation of the enterprise is determined by its design: the very way the enterprise 'is put together,' that is, the way the intentional design actions—also those concerning emerging organizing—are manifest. Conversely, enterprise arrangement and operation are embodied in enterprise design. These observations must be emphasized: except for the special causes of poor performance discussed in Sect. 1.4.3, enterprise design is the primary source, or origin, of the way the enterprise manifests itself. Poor performance is thus virtually always attributable to enterprise design (common causes). Enterprise engineering is, as mentioned before, the overall label for the theories, concepts, and methods for enterprise design. In view of the multifaceted aspects of enterprises, the theories and concepts of enterprise engineering are likewise multifaceted. Finally, enterprise governance concerns all activities from the initial development of strategic desirables and areas of concern, until their ultimate operationalization. Enterprise governance and enterprise engineering are thus closely related as will be further elucidated in later chapters.

1.6.2 Three Governance Themes: Summary

Corporate Governance
We have seen that this governance theme has a long history and concerns protecting the interests of shareholders (cf. Sect. 1.4.2). Given the purpose of corporate governance, the type of discussion about this theme and the character of the proposed reform manifest strong dominance of the financial/accounting and auditing profession. The perspective is heavily structurally oriented, focused on internal risk management and control in financial/economic developments. Formal reporting and auditing play an important role, including compliance: satisfying rules and legislation on corporate governance. Such rules and legislation are directed for a considerable part to the responsibilities of (executive) management towards shareholders. As indicated earlier, the notion of corporate governance is therefore associated strongly with (executive) management. The rules-and-regulations-based approach to corporate governance manifests structural, legal, and contractual characteristics which are assumed to establish compliance and prudent financial behavior. We have argued that financial reporting and internal control, as the two crucial pillars of compliance, can only be properly addressed through enterprise-wide design (op. cit.).

IT Governance
Section 1.4.1 sketched that the IT governance theme surfaced as an area of interest at the end of the 1980s in an attempt to address the revolutionary IT developments and solve the business and IT alignment problem. Various other problematic issues concerning IT would be cured through IT governance, such as unclear value of IT investments, IT systems limiting enterprise flexibility, mere technology-driven IT developments, or high costs of IT developments and operation. Supposedly, IT governance would lead to such innovative use of IT that competitive advantage is gained.

As clarified, many IT governance approaches provide a management- and structure-oriented answer to the issue of business and IT alignment, whereby IT governance is viewed as the process of decision-making and associated accountabilities around IT investments. Such perspectives seem to suggest that once the structure for decision-making is defined, IT developments will progress in the desired manner. What those IT developments should be remains unclear, however, within the focus on management and structures.

Obviously, these perspectives inevitably associate IT governance strongly with management responsibilities and their assumed decision-making prerogative. Similarly as with corporate governance, the visions regarding IT governance are thus almost exclusively associated with (executive) management of enterprises and are apparently only concerned with accountabilities and structures for decision-making. However, we have illustrated that the problem of business and IT alignment can only be solved through enterprise-wide design in which the definition of information supply and the design of the IT system are integral parts.

Enterprise Governance
Recall that we have defined enterprise governance as the enterprise competence (unified and integrated whole of skills, knowledge, culture, and means) for continuously inciting enterprise adaptive and reshaping initiatives and their unified and integrated operationalization through enterprise (re)design and subsequent implementation.

Enterprise adaptive and reshaping initiatives include all activities that aim to change existing enterprise conditions into preferred ones. Hence, these activities range from initiatives in the realm of strategy development to initiatives associated with continuous operational improvements. It is within this overarching scope of enterprise governance that all activities must be addressed that are traditionally addressed from the perspectives of IT governance and corporate governance. We have discussed the two other perspectives on governance because of their frequent mentioning in the literature, not because we think these themes are inevitable as topics of autonomous bodies of knowledge. Rather, the unrelated emergence of corporate governance and IT governance is the unfortunate consequence of the theoretical fragmentation discussed before. To be effective pertinent to the goals that corporate and IT governance promote, they must be addressed from an enterprise-wide design perspective within the overarching scope of enterprise governance. The strong relationships, to be discussed next, between corporate and IT governance mutually and with enterprise governance further elucidate the importance of the overarching enterprise governance perspective.

1.6.3 Enterprise Governance: The Overarching, Integrative Scope

The previous paragraph summarized three different perspectives on governance briefly. In addition to earlier remarks, this paragraph will further outline their mutual relationships and thereby provide arguments for the overarching, integrative scope of enterprise governance to address the various governance perspectives in a unifying treatment. The mutual relationships are depicted schematically in Fig. 1.17 and will be discussed below. As will become clear, enterprise governance as the overarching governance competence is necessary and sufficient for addressing all change initiatives and covers, in an integrative fashion, all the topics that IT governance and corporate governance might identify.

IT Governance and Enterprise Governance Relationship
When discussing the background of the attention for IT governance, the questionable results of IT investments were mentioned in Sect. 1.4.1. A clear positive relationship between enterprise performance and IT investments is absent. We have argued that successful utilization of IT systems can only be based on enterprise-wide design. Lack of such design implies lack of aforementioned positive relationship with as the inevitable consequence the suboptimal use of IT. That means applying IT whereby a

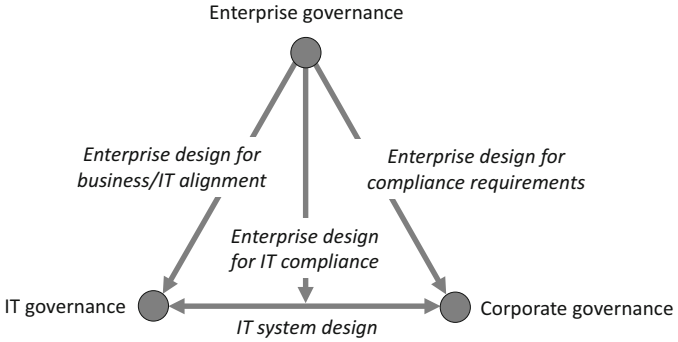

Fig. 1.17 Relationships between various governance perspectives

mismatch exists between the possibilities and capabilities of IT and the enterprise context in which IT—more specifically the function of an IT system—is utilized. So, introducing an IT system for local, distributed decision-making by employees hardly seems effective in a context where decision-making is seen primarily as a (central) management prerogative. Likewise, the introduction of a system for customer relationship management appears less meaningful in an enterprise context devoting little attention to customer satisfaction. A call center where employees are rated by the number of customers 'served' per hour is an example. These examples illustrate, as amply stressed before, the importance of unity and integration between IT functions and the organizational context where these functions are to be made productive. That importance can only be addressed from an enterprise-wide perspective, as expressed by the fact that business and IT alignment is first and foremost an aspect of enterprise design that defines the necessary informational requirements and functions, as Fig. 1.17 expresses. These observations show that IT systems and their functionality must be designed concurrently and in unity with the enterprise context. This constitutes the fundamental grounds for the strong mutual relationship between IT and enterprise governance. Stated otherwise, IT governance must be an integral part of enterprise governance.

Corporate Governance and IT Governance Relationship

An important aspect of corporate governance indicated previously concerns the arrangement of internal control: the totality of (financial) arrangements and associated activities for ensuring financial prudence and the adherence to rules and legislation for safeguarding the interests of shareholders. The Sarbanes-Oxley legislation formulates stringent requirements for financial reporting and the formal top management testimonial that said reporting reflects the actual state of affairs.

Understandably, many IT systems are for a considerable part, if not exclusively, involved with initiating, authorizing, handling, storing, and reporting on financial transactions. Put another way, important aspects for adequately arranging corporate governance rest on the adequate arrangement of IT systems, such that corporate

governance requirements can be satisfied. One might consider obvious attention areas like (IT Governance Institute 2004):

- Security management and data classification.
- Identity management (authentication and role-based authorization).
- Data management and data warehousing (data integrity).

Another reason for the strong relationship between corporate and IT governance lies in the fact that IT systems are generally not developed primarily from a corporate governance perspective. Rather, those systems are developed for supporting enterprise operational processes, yet at the same time provide essential data which is relevant to corporate governance considerations. Consequently, the quality of the development, implementation, and operation of IT systems must be such that corporate governance requirements can be fulfilled concurrently. Moreover, changes in IT systems might have considerable implications for the integrity and completeness of (financial) data. Aspects of the design, implementation, and operation of IT systems thus have a bearing on the ability to satisfy corporate governance requirements (compliance). Hence, corporate governance entails important implications for the total spectrum of IT governance, while conversely, measures within the realm of IT governance might impact compliance with corporate governance requirements. The overall enterprise responsibility in this respect is not alleviated if parts of IT services delivery are outsourced to third parties.

Our considerations indicate, as we have stressed before, that enterprise design requirements regarding compliance—satisfying corporate governance rules and regulations—are not unique in the sense that they are only defined from the corporate governance perspective. On the contrary, fulfilling compliance follows likewise (and primarily) from design requirements that are already defined on other grounds, such as areas pertinent to information security and data management mentioned earlier. This implicit relationship between design requirements based on compliance considerations and those based on the design of IT systems constitutes another reason for the strong mutual relationship between corporate and IT governance. As Fig. 1.17 aims to illustrate, IT systems design takes place within the scope of enterprise governance and enterprise-wide design, as argued previously, wherein satisfying compliance requirements for IT systems is an integral part.

Corporate Governance and Enterprise Governance Relationship

In addition to the preceding observations, the necessity to address corporate governance requirements within the scope of enterprise governance is based on the following. The internal aspects of corporate governance reform concern the manner of control in view of shareholders' interests. This begs the question as to how these interests are best served. Fraud and the publication of misleading (financial) information are evidently not conducive to shareholders' interests. However as indicated earlier, failing strategic developments and implementations are likewise—and probably even more so—damaging to shareholder interests and do not enhance the enterprise economic value. As said, some authors on corporate governance therefore

bring enterprise strategy development and execution within the scope of corporate governance.

Roughly, two approaches can thus be identified: (1) a narrow perspective on corporate governance that is focused primarily on executive management supervision and compliance in view of financial/economic aspects and associated reporting and (2) a broad perspective on corporate governance that also includes the enterprise strategy and execution. In the latter case, corporate governance reform is also argued based on examples of failing enterprise strategies, since internal control is viewed to have failed in adjusting the enterprise strategy timeously (cf. Sect. 1.5.2*).

Evidently, corporate governance in the broad perspective concerns enterprise strategy development, the subsequent design of the enterprise, the definition of relevant programs and projects for realizing the design, and the execution of programs and projects for implementing the design. Hence, within this perspective, corporate governance concerns not merely internal structures and systems for (financial) control, reporting, and risk management, but the broad perspective concerns the strategic development of the enterprise itself. Aspects that concern enterprise (strategic) development—with business, organizational, informational, and technological aspects—require a perspective that encompasses the enterprise in all its facets, from design and implementation to actual operation. This points to the themes of enterprise governance and enterprise engineering. We submit that the broad view transcends the corporate governance theme and the financial/economic perspective of its proponents considerably: adequate enterprise performance and the control of risks in the financial/economic domain require an approach that surpasses this domain fundamentally and conceptually, which thus inherently *cannot* be developed within the financial/economic domain and its associated concepts and thinking. Ideological considerations clarify the fundamental limitations of the financial/economic perspective in this respect (cf. Sect. 4.7.2*).

Comparably as with IT governance, the strong mutual relationship between corporate governance and enterprise governance follows also from the fact that design requirements for the enterprise as a whole must also concurrently address requirements following from compliance considerations. Indeed, it seems rather problematic to arrange the enterprise, with enterprise governance as the guiding competence, and then afterwards to separately incorporate requirements and conditions following from corporate governance. On the contrary, requirements and conditions following from corporate governance must form an integrated part of enterprise design and are thus addressed concurrently. One might consider requirements on process design to safeguard coherent and consistent process execution and control. For example, through minimizing reconciliation, the avoidance of process reversals, or the assurance of nonrepudiation, coherent and consistent process operation is ensured, which at the same time improves the coherence and consistency of financial/economic data. Corporate governance must thus be an integral part of enterprise governance.

1.7 Outlining the Next Chapters

1.7.1 Summing Up the Previous Discussion

Our previous discussion can be summarized as follows:

- Enterprises are purposeful social entities. In view of their purposeful nature, organizing is necessary: the harmonious ordering and arrangement of activities. A considerable part of organizing has an emerging character because organizing must address emerging, here-and-now phenomena. Since organizing is the process of continuously evolving activities, organizing is not synonymous with enterprise design but critically depends on it. Enterprise design must enable the different facets of organizing.
- Enterprise design—changing existing enterprise conditions into preferred ones—is the creative hinge point between desirables and intentions on the one hand and their conceptual realization (the design) on the other hand. The design is the basis for final realization (implementation).
- A given enterprise purpose can lead to various ways of organizing and hence various designs. Not every enterprise design is equally effective nor desirable. Some forms of organizing are flagrantly inadequate if not damaging. Based on foundational insights, the employee-centric theory of organization is adopted which is the basis for enterprise design. Adopting this theory is crucial for adequately performing emerging organizing.
- Modern enterprises are characterized by (1) highly dynamic internal and external context, for a considerable part driven by technology developments, (2) new ways of business conduct, (3) new ways of organizing requiring extended integration, and (4) extensive informatization. Adequately coping and exploiting these developments and their associated paradigm shifts ultimately implies adapting the enterprise through enterprise (re)design.
- The success rate of enterprise strategic initiatives is alarmingly poor. Core reasons are (1) the lack of enterprise unity and integration and (2) inadequate governance. The condition of unity and integration must be intentionally created through enterprise design, which is a core aspect of enterprise governance.
- Almost all causes of poor enterprise performance are the consequences—the common causes—of the arrangement and operation (the design) of the enterprise. The only solution to rectify common causes of poor performance is enterprise (re)design.
- Enterprises must have two essential competences: (1) the enterprise operational competence for adequately maintaining operational relationships with the environment, specifically concerning the delivery of products and services, and (2) the enterprise governance competence concerning enterprise change and adaptation. Both competences will be shown to be highly intertwined and are determined through enterprise design.
- The function of an IT system can only be determined based on knowledge and insight into the organizational context ('construction') where the function is to be

utilized. Additionally, the performance of IT cannot be expressed in terms of enterprise performance or value. The contribution of IT in this respect can only be determined and expressed with reference to the design of the enterprise context where enterprise performance or value is to be realized. Both these fundamental insights imply that 'business and IT alignment' follows from enterprise-wide design, whereby information supply and IT systems are integral aspects. Enterprise-wide design must thus take place within the overarching scope of enterprise governance, rather than focusing merely on IT governance.

- Corporate governance concerns financial/economic internal control and the trustworthiness of associated data. These data are largely, if not exclusively, contained in information systems and generated in operational processes. Further, norms and values (culture) about prudent financial/economic behavior are likewise relevant. The broad spectrum of aspects concerning compliance with rules and regulations about internal control and financial/economic reporting can thus only be effectively arranged through enterprise-wide design that holistically addresses all relevant aspects. Similarly, the strong relationship between corporate and IT governance can only be effectively addressed within the overarching scope of enterprise governance.
- Much management and organizational practices are 'witch doctor practices' that lack any sound theoretical foundation and justification. Mainstream business school education did not address this issue but rather contributed to it and prolonged it. A design focus is considered essential for professional schools concerned with organization and management theory. Enterprise design theories enable such focus.
- There is unfortunate theoretical fragmentation since enterprise issues are addressed from within different disciplines. Fragmented solutions are offered for problems requiring an integrated approach. Moreover, due to the traditional organizing myopia, only the usual structural functionalist enterprise aspects are considered as design aspects: processes, information relevant for these processes, the IT applications that supply the information, and finally the infrastructure supporting the applications. Numerous other enterprise design aspects are not addressed due to the lack of professionals that are able to effectively utilize an overarching and integrating theoretical approach. The theories, methodology, and methods of enterprise engineering aim to provide the needed overarching and integrating theoretical design perspective and enable to integrate the insights of the various foundational disciplines.
- Enterprise engineering as the enterprise design science must be firmly rooted in the foundational sciences. Since enterprises are social entities, the social and organization sciences are of specific importance. The employee-centric theory of organization is the principal foundational theory for enterprise design.

Our previous reflections make plausible the importance of understanding and designing enterprises. Additionally, we observe that society has become a society of enterprises: the nature and prosperity of society are largely defined and determined by enterprises. Successes and failures of enterprises spill over to society at large,

while the nature of work has a considerable impact on the physical and mental health of enterprise and hence societal members. In view of the significant influence of enterprises, there is clearly a definite need for academically educated people—organization or enterprise specialists—who thoroughly understand enterprises in all their multidimensional aspects, also in view of certain ethical and ideological perspectives following from responsibilities of enterprises towards employees and society at large. Next to the foundational insights briefly summarized in the next chapter, subsequent chapters will outline the enterprise engineering design science for practicing the foundational insights.

1.7.2 Chapter 2. Foundational Insights for Enterprise Change and Enterprise Design Summarized

The foundational insights are presented with reference to the fundamental maxim of Burrell and Morgan mentioned in Sect. 1.1.2 that all theories of organization are based upon a philosophy of science and a theory of society. Philosophical considerations are thus the starting point for the foundational insights. The philosophical foundation is followed by the ontological foundation that outlines the nature of society and the different theories of society. Subsequently, various organization theories are briefly summarized. Since the argued employee-centric theory of organization also involves ethical viewpoints, the final part of the foundational insights is formed by summarizing ideological foundation.

Philosophical Foundation[3]

Questions about what is true, good, or right are evidently very relevant in the case of society and enterprises. These questions refer to beliefs about society and enterprises and the justifications whereupon the beliefs are based. This refers to scientific viewpoints about the justification for beliefs. Further questions might be raised about whether scientific investigations are morally neutral or whether certain forms of scientific inquiry already, perhaps inadvertently, involve normative choices. Hence, questions about what is good or right already creep in when conducting science, especially social science. The manner of inquiry determines how society and enterprises are arranged. Moreover, the philosophical foundation outlines the origin of the concepts used to study society and enterprises. Specifically relevant in this respect is the 'mechanization of the worldview' and the subsequent dominant influence on the perspective on society and enterprises. All these topics have a bearing on the content of enterprise design science, which is thus the very reason for presenting the philosophical foundation. We are convinced that without

[3] From the Greek word *philos* = loving, beloved and *sophia* = knowledge, wisdom or *sophis* = wise, learned.

presenting such foundation, the approach to understanding and designing enterprises becomes bereft of its essential meaning.

Ontological Foundation[4]

The term 'ontology' refers to the study about the nature of 'being' or reality, in our case the reality of society and enterprises. Hence, the ontological foundation probes into the nature of society and, subsequently, into the nature of enterprises. Understanding the nature of society and enterprise is thus a prerequisite for properly designing enterprises.

Our starting point for discussing the ontological foundation is by showing how the different philosophical viewpoints, outlined in the chapter about the philosophical foundation, lead to viewpoints about society and viewpoints about the way society should be studied. A number of research paradigms and archetypical sociological theories will be discussed. These are (1) structural functionalism, which includes the theory about bureaucratic institutions; (2) symbolic interactionism; (3) social system theory; and (4) social conflict theory. As it turns out, some of these sociological theories have a dominant influence on the way enterprises are perceived and hence have a dominant influence on theories about enterprises and subsequently on the concepts used for enterprise design.

The philosophical foundation spoke about the 'mechanization of the worldview' and its influence on how society and enterprises are perceived. The ontological foundation seriously questions that worldview and presents a fundamentally different viewpoint that acknowledges the crucial notion of emergence: the occurrence of unpredictable and novel phenomena. Acknowledging the dominance of emergent phenomena has profound implications for conceptualizing and modeling society and enterprises. A conceptual model of society will be presented that acknowledges emergent phenomena and is the basis for the conceptual enterprise model. Based on the theories of society, four categories of organization theories are presented: classical, neoclassical, modern, and postmodern organization theories. The enterprise conceptual model will be the basis for the enterprise design theory. Much of the content of this theory, however, is of ideological nature. It concerns answers to the philosophical questions about what is good and right, specifically for enterprises. Answering these questions is the purpose of the ideological foundation.

Ideological Foundation[5]

Having explicated the nature of enterprises, various ideological viewpoints are presented. Much of the traditional ideas are severely criticized as seriously flawed or even damaging. Alternative viewpoints are presented and corroborated in support of the employee-centric theory of organization. The ideological foundation is of particular importance since the insights illustrate how ideological convictions determine the design of enterprises.

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[4]From the Greek word *óntos* = being and *logos* = word, speech, reason, doctrine.

[5]From the Greek word *idea* = thing in the mind, archetype of the ideal world. The notion of *ideal* refers to the world of ideas.

In view of the 'mechanization of the worldview' discussed in the philosophical chapter, the 'mechanization of enterprises' will be subsequently sketched. Said mechanization is shown to be a direct consequence of dominant social theories. More generally, the different social theories will be recalled and discussed in light of enterprise strategy development and will be placed against the perspective of emergence. In view of a fundamental law about regulating systems, the traditional viewpoints on strategy development will be severely criticized. A fundamentally different perspective is advocated which allows to embrace the concept of enterprise governance and enables the utilization of the enterprise design theory. It will become clear that within the traditional perspective on strategy development and operationalization, enterprise design theory has virtually no place.

A core aspect of the ideological foundation is arguing the importance of employee involvement in enterprise operational and strategic activities. Empirical considerations are provided based on the positive effects of employee involvement on enterprise performance in areas such as productivity, quality, service, enterprise learning, and innovation. Additionally, theoretical considerations are offered based on the very nature of enterprises and the crucial notion of emergence that characterizes enterprises. It will become clear that only through employee involvement can emerging phenomena in enterprises be effectively addressed. These theoretical considerations consequently lead to viewpoints about the enterprise operational and governance competence that differ fundamentally from traditional viewpoints. All these empirical and theoretical considerations about employee involvement will be shown to have a bearing on enterprise design.

Having outlined the empirical and theoretical considerations for employee involvement, the employee-centric way of organizing will be summarized. Typical traditional viewpoints concerning this topic will be rejected and others supported. Among the latter is the unitarist viewpoint on employee and enterprise interests, arguing that no necessary conflict exists between these two interests. The practical consequences of the employee-centric way of organizing will be given. Finally, we will reflect on what most of enterprise reality shows. Particularly, we focus on the difference between the ideological viewpoints and the often-experienced enterprise reality.

1.7.3 Chapter 3. Enterprise Governance and the Process of Enterprise Design

The foundational insights showed how the mechanization of the worldview has ultimately led to the mechanization of enterprises. Plainly visible is the mechanization of enterprises in the disproportionate burden of planning and control mechanisms in the form of rules, protocols, record keeping, targets, performance contracts, evaluation reports, management reporting, and yearly plans, combined with frequent meetings to discuss and sustain all that material. Strategy development and the

activities to realize strategic desirables have likewise become mechanized as the management-initiated top-down causal chain of planned activities that would supposedly yield strategic success. Chapter 3 criticizes this perspective and probes into the nature of enterprise change. Two different phases of change will be discussed as well as the incommensurability of these phases because of their fundamentally different nature. Failing strategic initiatives are all too often the inevitable consequence of mixing up these two different phases of enterprise change.

Enterprise change essentially boils down to creating a new form of social organization. Based on the foundational insights, the nature of social organization will be discussed which subsequently identifies the nature of enterprise change. This nature is further clarified in view of emerging phenomena that must be adequately addressed. As likewise becomes clear, emerging phenomena make social determinism—a viewpoint tightly associated with the mechanization of the worldview—an elusive notion. Said elusiveness has consequences for the perspective on enterprise governance. For properly addressing emerging phenomena, the fundamental regulating law—the Law of Requisite Variety—must be satisfied.

Two core enterprise competences were discussed in Sect. 1.3: the operational competence ('running the mill') and the governance competence ('changing the mill'). Unlike the management-biased view, Chap. 3 will outline that for both competences, the involvement of employees is crucial. For governance, this involvement is expressed by the notion of *distributed governance*. This notion will clarify the close relationship between the operational and the governance competence. Specifically important for enterprise governance is the central enterprise governance function which is instrumental for leading enterprise change and practicing the enterprise engineering design discipline. Two core areas of activity will be outlined which are associated with the two different phases of enterprise change mentioned above.

1.7.4 Chapter 4. Poietical Foundation[6]: Theories, Methodology, and Methods of Enterprise Engineering

Having summarized the foundational insights and provided the understanding about the nature of enterprise change, this chapter provides the foundation for enterprise design—the poietical foundation—by outlining the enterprise engineering approach for practically effectuating enterprise change. Since enterprise engineering covers a wide range of different aspects, we limit ourselves to those aspects of enterprise engineering that (1) are closely related to the notion of enterprises as social entities, (2) are concerned with organizing, (3) can link strategic enterprise desirables and areas of concern with enterprise design methods, and (4) can link concepts and theories of the foundational sciences with enterprise design. Specific topics that have

[6]From the Greek word *poiesis* = making, creating.

to do with the design of technical systems, such as production systems and IT systems, are out of scope. For these systems we refer to the relevant literature.

Regarding the different system views, the chapter about the poetical foundation starts by outlining the precise notion of the functional and constructional system perspectives. Next, the conceptual language for design is introduced, which includes the notions of system requirements, architecture, and essential implementation-independent modeling. By taking a technical system as an example, these concepts for design are illustrated and the concept of system design domain is introduced and illustrated through functional and constructional decomposition in functional and constructional design domains. Also the publication structure for requirements and architecture is sketched. As will become clear, these design domains are essential for effectively defining requirements and architecture, as well as for effectively addressing system areas of concern. All concepts for design are expressed and further illustrated by the generic requirements and architecture framework and the generic system development framework. Using the technical system as an example, the importance of essential, implementation-independent modeling will be argued as the starting point for system, and hence enterprise, design.

The design concepts that are introduced and illustrated, using a technical system as an example, are subsequently applied in case the system is an enterprise. We will start by discussing enterprise functional and constructional decomposition into functional and constructional design domains. As in the general system case, these design domains are essential for effectively defining requirements and architecture, as well as for effectively addressing enterprise strategic desirables and areas of concern. Next, enterprise requirements and architecture are discussed and expressed by the enterprise requirements and architecture framework. Special attention will be paid to the publication of enterprise requirements and architecture as an important aspect of enterprise governance since the publication provides the initial linkage between the expression of strategic desirables and design activities.

The totality of enterprise development and the associated concepts will be expressed by the generic enterprise development framework. Likewise, as in the case of the technical system, enterprise development starts with essential, implementation-independent modeling, followed by further design wherein the wide spectrum of design aspects is addressed.

The enterprise design process and content will be positioned within the conceptual overview of the enterprise engineering framework and within the context of the viewpoints developed in the chapter about the ideological foundation. This will further corroborate the core reasons for strategic failures mentioned before. Finally, by discussing the case of a considerable enterprise transformation in Chap. 5, the concepts of enterprise governance and enterprise engineering are further explained and illustrated.

1.7.5 Chapter 5. Case Illustration: Creating EnerServe

The development of Europe's open energy market necessitates traditional energy companies to change fundamentally in numerous areas, such as concerning the relationships with customers and business partners, employee and management behavior, culture, organizational roles and processes, information supply, as well as concerning economic and market perspectives. This energy market development and the associated fundamental changes are taken as the basis for the case illustration, whereby the theories and viewpoints developed and discussed in the previous chapters are applied for transforming a traditional energy company into a new fictitious energy company called EnerServe. For this transformation, the enterprise governance competence—within which the enterprise engineering theories, methodology and methods are applied—is essential. Therefore, in addition to illustrating how enterprise engineering is applied, special attention is given to the arrangement of enterprise governance, the core processes of enterprise governance, and the personal competences of the enterprise engineers within the central enterprise governance function. Maturity levels of enterprise governance will be discussed. The case will further illustrate the approach for addressing the existing information technology systems in view of the needed transformation. Finally, a crucial facet of the transformation is ensuring cultural and behavior change. Critical aspects of such change will be outlined.

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