

FOREWORD

Modern advancements in the economy are characterised by a series of transformative industrial revolutions over the past three hundred years, each driven by groundbreaking technological innovations that reshaped societies, industries, businesses, and the way we live and work. The first industrial revolution, which began in the late 18th century, was driven by the mechanisation of production through steam power and the advent of factories. This era saw a dramatic increase in productivity and the rise of urban centres, fundamentally altering the social and economic landscape. The second industrial revolution in the late 19th and early 20th centuries introduced mass production and assembly lines, powered by electricity. Innovations such as the telegraph, telephone, and internal combustion engine further accelerated industrial growth and global connectivity, resulting in consumer markets.

The third industrial revolution, starting in the mid-20th century, brought automation and the digitalisation of manufacturing processes. The development of computers and the internet revolutionised industries, enabling unprecedented levels of precision and efficiency. This era laid the groundwork for the interconnected world we live in today. We are currently in the midst of the fourth industrial revolution, characterised by the fusion of digital and physical dimensions, creating smart factories and shipping digital societies. As we stand on the brink of the fifth industrial revolution, the focus shifts towards human-machine symbiosis, ethical AI, and sustainable practices. This emerging era emphasises the integration of advanced technologies with human capabilities, fostering collaboration between humans and robots, and prioritising ecological sustainability and social well-being.

In this rapidly evolving landscape, strategic digital transformation is not just an option but a necessity for organisations to remain competitive and relevant. It involves a holistic renewal of business models, processes, and organisational structures, leveraging digital technologies to create new value and drive innovation. This new textbook describes the components and provides a toolkit for strategic digital transformation, which requires a clear vision, a comprehensive digital strategy, a robust implementation plan, and a commitment to continuous learning and adaptation.

Organisations that embrace this transformation will be better positioned to navigate the complexities of the digital age, capitalise on new opportunities, and contribute to a more sustainable and inclusive future. It is an exciting time to be part of this journey, and I am confident that the insights and strategies presented in this textbook will provide valuable guidance for young leaders and innovators seeking to thrive in the digital era.

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ABOUT THE BOOK

BACKGROUND

This digital transformation textbook will provide students with a learning experience that is academically rigorous, integrating insights from the latest research on the strategic digital transformation of organisations, while supporting the practical application of this knowledge with the ACT (*Analyse, Create, Transform*) method and the *Digital Transformation Toolkit*.

The ACT method and toolkit are the results of a multi-year and ongoing digital transformation research agenda of both authors, involving over 12,000 participants in design science research projects between 2016 and 2025. The textbook and its *Digital Transformation Toolkit* will support students and future managers in understanding the practical realisation of digital transformation of organisations to allow the development of competitive advantages for the digital age, while enabling this to be done in a manner that reflects a sustainable approach.

Students (guided and supported by motivated lecturers) arguably have two jobs to be done while at university, namely (1) to acquire the contemporary state of the art knowledge in their chosen domain of specialisation, and (2) to show that they can communicate and apply this knowledge. This textbook addresses these opportunities by actively embedding a validated and practice-oriented method for the realisation of strategic digital transformation.

In 12 chapters, students are provided with contemporary knowledge about and understanding of strategic digital transformation of organisations across seven distinct strategic action fields (SAF) of digital transformation, while developing their capability to address real world business challenges through the application of the digital toolkit.

The textbook's structure supports this integration of academic rigour and practical relevance to enable an approach to teaching strategic digital transformation that is unique and prepares students for using the knowledge and experience they will acquire in their future careers.

We wish to thank all contributors who supported the making of this textbook (see acknowledgement section). Please visit www.strategic-digital-transformation.com for ancillary resources.

Prof. Marc K. Peter and Dr. Johan P. Lindeque
Australia/Switzerland in November 2025

2

BUSINESS STRATEGY IN THE DIGITAL AGE

Learning Goals

By the end of this chapter, you should...

- Be able to explain how the digital age is shifting the sources of firm strategic competitive advantage.
- Be able to explain how established theories of firm strategic competitive advantage apply in the digital age.
- Be able to critically evaluate the potential of digitisation, digitalisation and digital transformation to allow firms to achieve sustained competitive advantage.
- Be able to explain the appropriate approach to the formulation of firm strategies in the digital age.
- Be able to critically assess the enablers and inhibitors of the formulation of firm strategies in the digital age.

Success Story: Adidas Storefactory and Speedfactory Concepts

Adidas designs, produces, and markets athletic and sports lifestyle products and is headquartered in Herzogenaurach, Germany. Starting in 2016 and continuing through to 2019, Adidas made some of the most public investments in experiments with new production approaches, building on the cyber-physical systems of Industry 4.0 with their Storefactory pop-up store in Berlin from 2016 to 2017 and Speedfactories located in Ansbach, Germany, and Atlanta, USA between 2015 and 2020. The insights and technologies developed from these experiments was transferred to two Asian suppliers to Adidas in 2019 and the Speedfactories closed in 2020. These examples represent two distinct real-world tests of concrete ideas about the future of manufacturing in the athletic and sports lifestyle products industry.

The Storefactory concept allowed customers to undergo a body scan by projection technology and kinetic motion sensors and then use a design station to design a woolen sweater that was then produced in the store. The Storefactory enabled up to ten pullovers a day to be designed and produced in around four hours and at a cost of about EUR 200. The concept employed all of the digital technologies associated with a cyber-physical system and Industry 4.0 into the instore experience of the brand and associating advanced manufacturing and technology experimentation with the consumer brand. While allowing Adidas to gather data about customer preferences and willingness-to-pay for mass customised products and services.

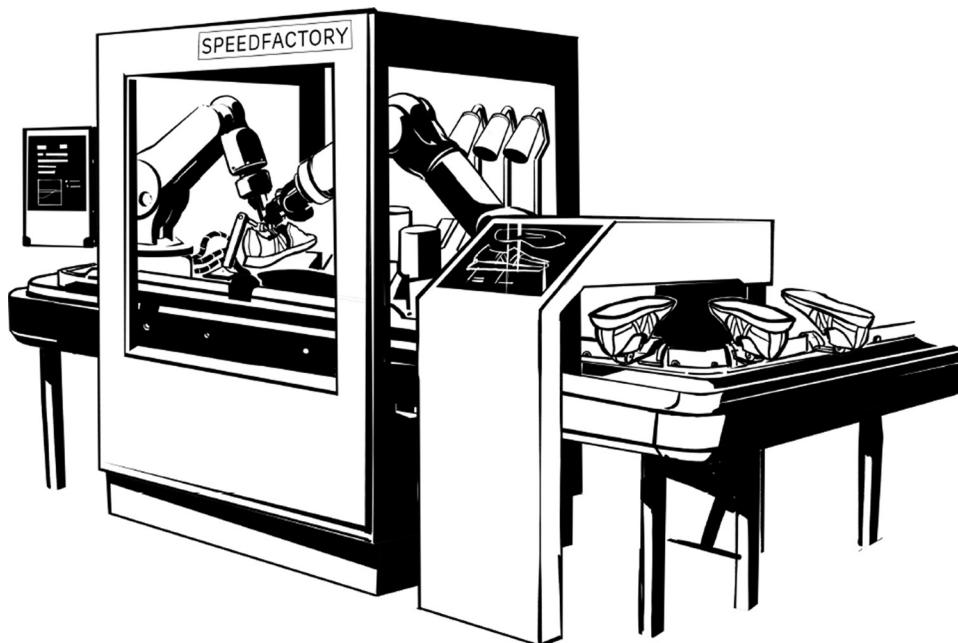


Figure 2.1 Adidas' SpeedFactory Concept

Source: Own illustration

(Continued)

The Speedfactory was a larger scale experiment in highly automated manufacturing, employing digital technologies like 3-D printing, robotics, and computerised knitting machines. But it also adopted the emerging phenomenon of aligning machines and humans in advanced machine-human cyber-physical systems of production, in this case reflecting the acknowledge advantage of humans in especially dexterous physical activities compared to contemporary robots. Strategically the Speedfactories are interesting because of their clear digital strategies, with digital technologies integral to the concept for serving local markets through local production. This provided a test of the arguments for digital technologies and manufacturing with Industry 4.0 logics as a means to shorten supply chains and increase responsiveness to market trends and changing local customer preferences. This larger scale project was another example of mass customisation, with consumers able to design their products within limits. Once the advanced manufacturing technologies had been proven, Adidas adopted digital marketing strategies to create awareness for the project, designing a series of sneakers with input from 'running influencers' as part of a social media campaign. The project is also interesting because it was enabled by an internal incubator unit independent of the parent firm called Future Team, that has adopted new work practices and flexible working space principles. The project stimulated debate about automation and employment and more critical observers wondered if the Speedfactories were nothing more than a marketing campaign.

The Storefactory and Speedfactory reflect a history of innovative experimentation by Adidas, reflecting experiments that arguably respond to societal trends around personalisation and sustainability. The Speedfactories were closed in 2020 and the technology and insights transferred to Asian suppliers, with the promise to enable short production times and flexibility, continuing to allow some responsiveness to consumer demand.

Source: Adidas (2019); Müller (2017); Wiener (2017)

2.0 INTRODUCTION

Digital transformation is a strategic undertaking that improves the ability of firms to create and capture value in the digital age, by leveraging the integration of digital technologies as a central consideration of business strategising (Bharadwaj et al., 2013; Peter et al., 2020). This understanding of digital transformation draws attention to the importance of both digital strategy formulation and implementation for explaining firm performance (Bharadwaj et al., 2013; Rêgo et al., 2022; Verhoef et al., 2021). This chapter explores how established theories of strategic competitive advantage apply to strategy formulation in the digital age and the practical implementation of these explanations are addressed with the ACT Method proposed in Chapter 12 (Analyse, Create, Transform). The necessary knowledge for this practice-oriented strategising across seven strategic action fields (SAFs) of digital transformation is covered in Chapters 4 to 10, and the implementation of digital transformation in Chapter 11.

2.1 STRATEGIES AS THEORIES OF COMPETITIVE SUCCESS

Firm strategies are theories of how to compete successfully (Barney, 1991; Porter, 1996) and research has identified a number of interconnected alternative theories which will explain

the performance of a specific firm to different degrees. This chapter first discusses different understandings of firm performance as the primary outcome of successful firm strategies. Firms however formulate and implement their strategies within the context of the socio-technical systems in which they are embedded (Cherns, 1976; Kant, 2016) and this broader context of the firm needs to be understood before reviewing the established theories of competitive success. The first group of theories for explaining firm competitive success that are reviewed are focused on internal explanations of firm performance and include the important resources (Barney, 1991, 2001), capabilities (Barney, 2001; Porter, 1996), and dynamic capabilities (Teece et al., 1997) of firms. The other strategic theories provide explanations for firm performance based on the external competitive environment of the firm, including corporate decisions on entering specific industries (Porter, 1979; Short et al., 2007) and strategic positioning relative to competitors in an industry (Akan et al., 2006; Kim et al., 2004). The chapter closes with a discussion of how the formulation of strategies drawing on these different theories should be approached in the digital age.

2.2 ASSESSING FIRM PERFORMANCE

Firm performance from a strategic perspective is typically assessed using accounting and finance measures (Barney, 2020), but increasingly there is recognition of the necessity to integrate broader performance measures to take account of the impact of firms on stakeholders, as well as the role of stakeholders in value creation by firms. Where stakeholders are ‘any group or individual who can affect or is affected by the achievement of the organization’s objectives’ (Freeman, 1984, p. 46) external stakeholders are argued to be increasingly important for understanding value creation by firms, as they provide resources and capabilities not owned or directly controlled by firms, but none-the-less needed by them. This phenomenon is being accelerated by the digital transformation of business and society, as in the digital age information and network effects are increasingly determining firm performance for both traditional and digital businesses (Bharadwaj et al., 2013).

Firm performance can thus be understood in terms of (1) economic, (2) natural environmental, (3) societal, and (4) digital performance. A further important distinction is between organisational performance and organisational effectiveness. Organisational performance focuses on the financial performance, product market performance, and shareholder return performance of a firm (Richard et al., 2009). One might say that these are the traditional performance measures for firms, based around measurable quantitative indicators of economic value creation. Organisational effectiveness is a broader concept that focuses on internal performance outcomes related to more efficient and/or effective operations, but also broader internal and external performance assessments beyond those focused on economic value creation, like corporate social responsibility. To support managers, organisational performance, and organisational effectiveness indicators are implemented into balanced scorecards that provide a wholistic assessment of firm performance. The composition of organisational performance and effectiveness indicators on a balanced scorecard will reflect the perceived legitimacy of stakeholders’ interest in the activities of a firm (Richard et al., 2009).

Finally, organisational performance and effectiveness can be assessed at a point in time and over time (e.g., year-on-year comparisons), but also for a single firm or in comparison to

direct competitors (e.g., compared to perceived strategic group members), or firms in other industries (Short et al., 2007). Importantly, the assessment of organisational performance and effectiveness is not only compared over time and to other firms, but also in terms of expectations, see Box 2.1, of both internal and external stakeholders in a firm.

Comparative Firm Performance Assessment

Economic performance assessments emphasise a comparison of performance outcomes to expectations for firm performance for a given industry, but this can also be extended to strategic groups, allowing performance expectations to be assessed relative to a firm's main competitors. The logic can however be extended to between strategic group comparisons within an industry and to include competitive, environmental, societal, and digital performance measures.

- Above Normal Performance: Performance exceeds expectations for the industry and that of members of firm's strategic group
- Normal Performance: Performance meets expectations for the industry and is comparable to members of firm's strategic group
- Below Normal Performance: Performance is below expectations for the industry and members of firm's strategic group

2.2.1 Economic Performance

The economic performance of a firm assessed both in terms of its organisational performance (see Box 2.2) and organisational effectiveness (see Box 2.3) is focused on the effectiveness and efficiency with which the firm creates and captures economic value. Arguably the clearest primary stakeholders in this aspect of firm performance are firm employees, both operative and managerial, customers, suppliers and distributors, and shareholders.

The economic value that is created differs for each customer of a firm's products or services, as the perceived benefit derived from the product or service purchased will differ for each customer, and this will be reflected in the willingness-to-pay of each customer at a given point of time and set of circumstances. The economic performance of a firm is a reflection of the ability of a firm to optimise its ability to capture the value created for customers, through pricing strategies that optimally reflect customers' willingness-to-pay for a single transaction and over time with repeat purchases. Firms should pursue pricing strategies that optimise for the willingness of customers to pay for the value created by products or services for the highest number of customers and purchases over time.

Economic performance is however also concerned with the effectiveness and efficiency with which the value embodied in products and services is created and delivered to customers. The lower the direct and indirect costs of a firm for developing, producing, and delivering a product or service to customers, as represented in Porter's (1985) Value Chain (see Figure 2.2), all other things being equal, the higher the profit of the firm will be. When considered at the level of the individual product or service purchase (transaction) by a customer, the total net profit of a firm represents the total number of sales (volume of transactions) multiplied by the

net profit per unit sold. Of course, these values will vary by product or service and so in practice this calculation will be more complex to calculate for all products and services of a firm, but using a single product or service is helpful to illustrate the logic.

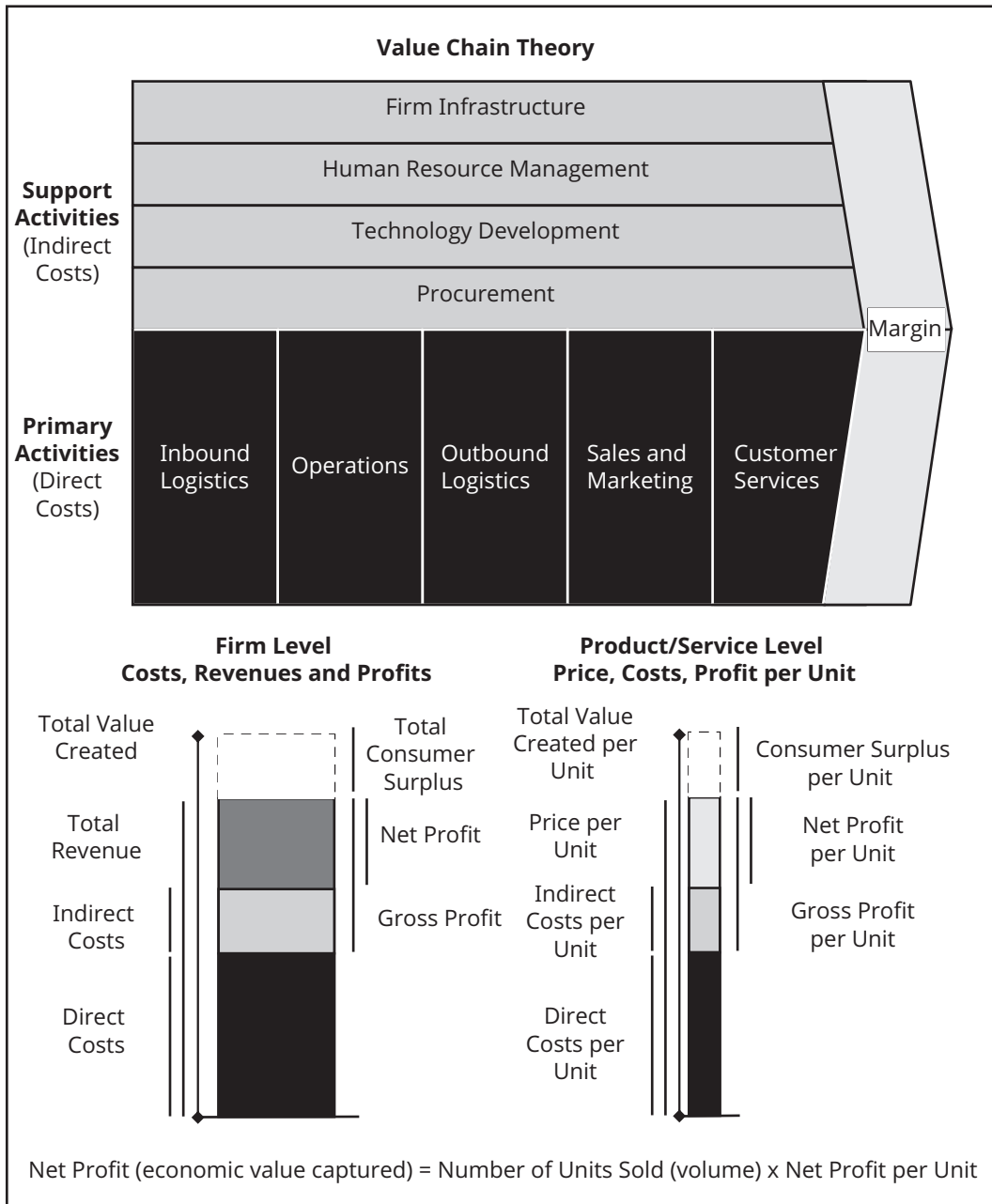


Figure 2.2 Value Chain Theory and the creation and capture of economic value

Source: Adapted from Kaplinsky & Morris (2000) and Porter (1985)

Understanding how digital technologies and the digital transformation of firms, industries and society affect the costs and revenues of firms is a central goal of this text. Being able to understand the effects of digital transformation on the willingness-to-pay in terms of price and frequency of purchase (volume), as well as the cost structures of firms as a whole but also for individual products or services allows a far more careful assessment of the potential for digital technologies to allow firms to both create and capture economic value.

Organisational Performance Measures

Selected exemplary indicators (please see Tables 2, 3, and 4 in Richard et al., 2009) for a comprehensive account of operational performance measures in strategy research.

- **General**
 - Firm Survival
- **Financial Performance**
 - Profit Growth
 - Profit Margin
 - Return on Assets
 - Return on Investments
- **Product Market Performance**
 - Revenue / Sales Growth
 - Growing Market Share
 - Customer Satisfaction / Net Promotor Score
 - Improving Profitability of Existing Customers
 - Gain Profitable of New Customers
- **Shareholder Return**
 - Total Shareholder Return
 - Dividend Payments
 - Stock / Share Price Increases

Source: Adaptation of Richard et al. (2009)

Organisational Effectiveness Measures

- **Operative Performance**
 - Reducing Costs
 - Improving Product and Service Quality
- **People Performance**
 - Culture and Values
 - Employee Satisfaction
 - Employee Retention Rates

Source: Adaptation of Richard et al. (2009)

2.2.2 Natural Environmental Performance

The digital transformation of business and society has both negative and positive impacts on the natural environmental sustainability of economies, industries, and firms. In terms of the natural environment digital technologies and digital transformation are not able to escape the ‘wicked problem’ nature of the pursuit of sustainability goals (von Kutzschenbach & Daub, 2020). For example, a commonly referred to advantage of the digitisation of work is the reduction in use of paper in the office, but increasingly it is being recognised that an unintended consequence of this digitisation is greater e-waste, as more and more ICT equipment is used and over time replaced. Digital technologies may then contribute to enabling solutions to this problem by enabling solutions like recycling or even circular business models. Thereby potentially encouraging ever greater use of new ICT equipment and so on, reflecting the technical and non-technical aspects of sustainability initiatives. Undeniably though as things stand there is currently significant interest in the potential for digital technologies and digital transformation to contribute to a more sustainable impact of business on the natural environment (see Box 2.4 for a selection of potential environmentally related performance measures for firms in the digital age). The potential for digital transformation to contribute to natural environmental sustainability is addressed in Chapter 3.

Natural Environmental Performance Measures in the Digital Age

- Enabling Sustainability of Other Economic Actors
- Reduced Resource Consumption
- Carbon Emissions
- Energy Use and Heat Pollution
- E-waste
- Impact on Natural Habitats

2.2.3 Societal Performance

The comprehensive impact of the digital age on economic and societal activities within countries, but also globally, is clearly fundamentally changing the way in which economies function, and people live their lives (von Kutzschenbach & Daub, 2020). The impact on and the potential for digital transformation to contribute to societal sustainability is addressed in detail in Chapter 3. For most firms their primary societal stakeholders are their local communities, employees, and customers (Lindeque & Samuel, 2022). The digital transformation of business and society has the potential to impact these societal stakeholders in terms of employment, education, access to food and water, physical health, mental health, lifestyles, equality and inclusion, safety and crime prevention (Szalkowski & Johansen, 2023). Reflecting the fact that technologies are value neutral, and their impact is determined by how they are used, digital technologies have the potential for both positive and negative

impacts. The societal performance measures, see Box 2.5, that a firm will adopt will be determined by the societal contexts in which they operate, reflecting their stakeholders' demands.

Societal Performance Measures in the Digital Age

- Employment
- Education
- Physical Health
- Mental Health
- Equality and Inclusion
- Safety and Crime Prevention

Source: Szalkowski & Johansen (2023)

2.3 DIGITAL TRANSFORMATION AND FIRM PERFORMANCE

The impact of digital transformation enabled by digital strategies on firm performance can be assessed in terms of four impacts of digital technologies on the creation and capture of value by firms, including impacts on the (1) scope, (2) scale, (3) speed, and (4) sources of value creation and capture (Bharadwaj et al., 2013). The performance indicators for a digital strategy / digitally transformed firm (see Box 2.6), emphasise the need for stakeholders in a firm to understand the nature of digital technologies. The formulation and implementation of a digital strategy and associated digital transformation of a firm will, for example, lead to changes in how the scope of business activities is understood both internally and externally to the firm (Bharadwaj et al., 2013). But digital technologies not only enable but require a different approach to thinking about the internal and external scale of activities, for example web services allow firms to rapidly scale up and down their digital storage or computing power to reflect demand for such resources. Digital transformation also speeds up the pace of both traditional and newer business activities. Finally, the digital transformation of a firm allows new sources of value creation and capture to be identified and implement.

Dimensions of Digital Technologies Impact on Firm Performance

These performance indicators in relation to digital strategy formulation are discussed in Chapter 11.

- **Scope**
 - Cross Functional and Process Silo Activities
 - Digitisation of Products and Services

- Digitisation of Information and Knowledge
- Participation in Dynamic Ecosystems
- **Scale**
 - Rapid Digital Scaling Up and Down
 - Network Effects for Rapid Scaling
 - Scale through Information Abundance
 - Scale through Networks and Alliances
- **Speed of Business Activities**
 - Speed of Product Launches
 - Speed of Decision-making
 - Speed of Supply Chain Orchestration
 - Speed of Network Formation and Adaptation
- **New Sources of Value Creation**
 - Increased Value from Information
 - Multisided Business Models
 - Coordinated Business Models in Networks
 - Control of Digital Industry Architecture

Source: Adaptation of Bharadwaj et al. (2013)

2.4 FIRM EMBEDDEDNESS

Firms are most commonly described as being members of an industry or, put differently, they are embedded in the technological landscape and the flows of information and goods and services in a given industry. The digital age is showing that the embeddedness of firms extends beyond traditional notions of industry membership and that firms are in fact embedded in ecosystems that may incorporate multiple different industries and which we can describe as socio-technical systems.

2.4.1 Socio-Technical Systems

The socio-technical systems (STS) perspective emphasises the integration of both social (human) and technology (non-human) aspects into a system that pursues a common goal (Kant, 2016; Sony & Naik, 2020). Such integration of the social and (new) technology reflects every proceeding industrial revolution, with humans and the innovative technology of the day co-evolving as the technology was rapidly adopted by organisations and people (see Chapter 1). A socio-technical approach however emphasises that when technology is adopted without taking into consideration the behavioural consequences of the adoption, then sociological challenges are likely to emerge in a business organisation (Sony & Naik, 2020).

Six Dimensions of Cyber-Physical Systems

- People
- Culture
- Infrastructure
- Technology
- Processes / Procedures
- Goals

Source: Sony & Naik (2020)

The current early stages of the digital age are featured by emerging digital socio-technical systems, within which organisations and people are rapidly adopting digital technologies to conduct specific economic and social activities, by developing processes that incorporate digital technologies to achieve business goals (see Box 2.7) for the elements of socio-technical systems. Indeed, the digital age features a complex set of evolving socio-technical systems around specific digital technologies and activities, with these alternative systems at times embedded in, overlapping with, dependent on or independent of each other. Depending on the firm and its activities, a firm can be embedded in one or more such socio-technical systems (see Figure 2.3) for a stylised visualisation of the potential for multiple embeddedness of firms in shared and separate socio-technical systems through horizontal integration (Type 2)). Firms however also have internal socio-technical sub-systems that can be vertically integrated (Type 1). It is important to remember that firms are open systems, that is they taking in inputs and produce outputs with are released into their environments, and that the internal activities of the firm will be aligned with broader external socio-technical systems, through horizontal integration (Menz et al., 2021; Sony & Naik, 2020).

Figure 2.3 further seeks to show how over the last 50 years in broadly speaking five phases of technology development (see ‘industrial revolutions’ (Figure 1.2) in Chapter 1), we have moved from physical systems increasingly supported by ICT to advanced cyber-physical systems with significant human–technology interaction in ever more complex networks. Initially these developments mostly affected managerial work, but increasingly digital technologies also began to impact the work of operative employees. As the technologies underpinning the different socio-technical systems enabling work moved from information and communication to networking and now also controlling and sensing technologies the complexity of the networks within and across socio-technical systems also increased in complexity, to the point today that firms rely on diverse human–human, human–technology and technology–technology networks, featured by increasing automation. The combination of humans and machines in the human technology networks are interesting, as initially the machines were assisting humans to do work and over time humans have increasing taken roles supporting machines to get work

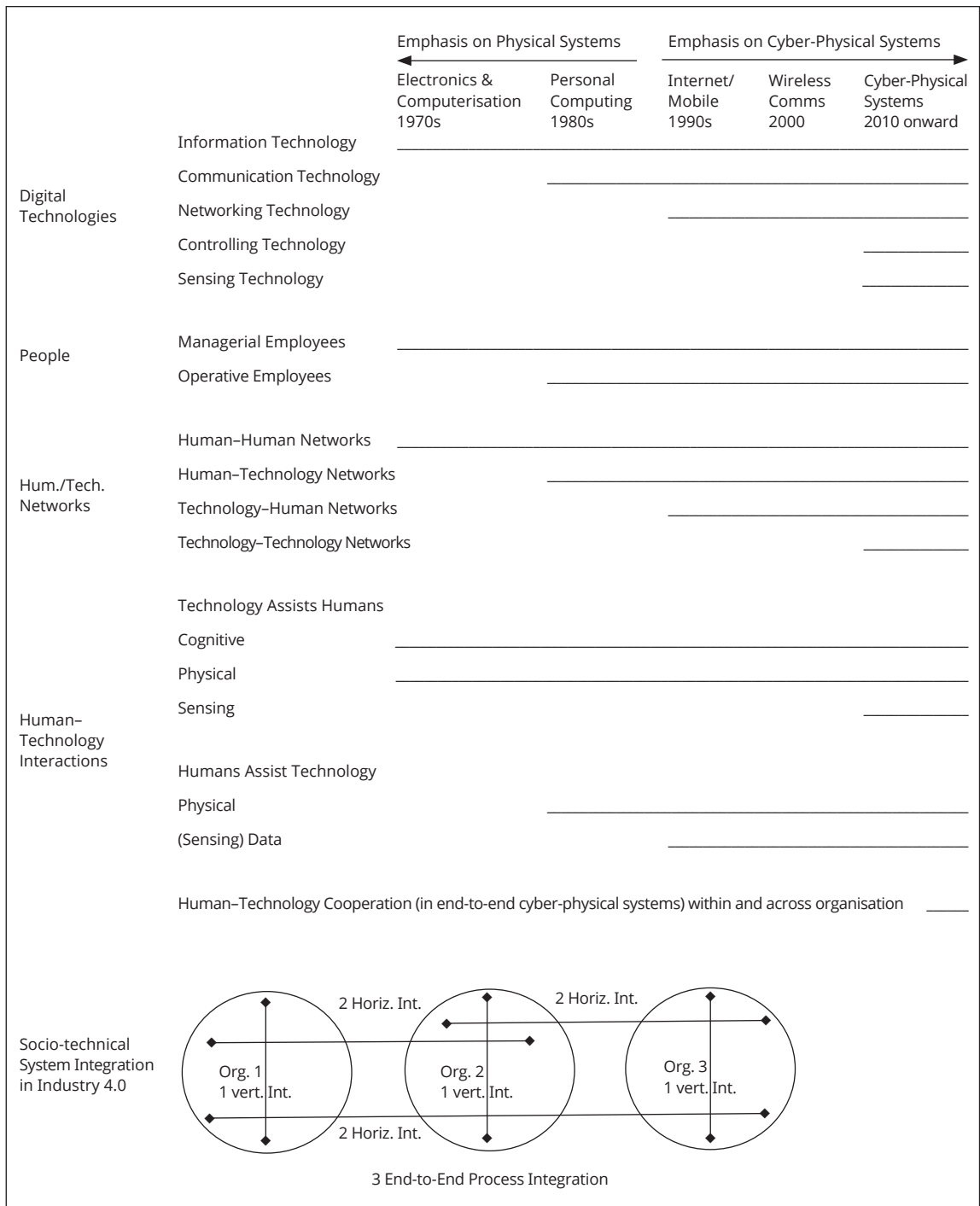


Figure 2.3 Evolving socio-technical systems in the digital age resulting in vertical (Vert.) and horizontal (Horiz.) integrations (Int.)

Source: Adapted from Kant (2016); Kraft et al. (2022); and Sony & Naik (2020)

done. In its most advanced forms this leads to symbiotic cyber-physical systems, where humans and machines are mutually dependent on each other to achieve common goals. These cyber-physical systems can be defined as follows:

Cyber Physical Systems (CPS) are smart networked systems with embedded sensors, processors and actuators that are designed to sense and interact with the physical world (including the human users), and support real-time, guaranteed performance in safety-critical applications. In CPS systems, the joint behaviour of the 'cyber' and 'physical' elements of the system is critical – computing, control, sensing and networking can be deeply integrated into every component, and the actions of components and systems must be safe and interoperable.

Networking and Information Technology Research
and Development Program of the United States Government (NITRD, 2015)

It's important to remember that digital transformation does not need to lead to cyber-physical systems, many digital transformation processes do not integrate sensing and controlling technologies into firm procedures. As can be seen it is equally possible and more likely that firms today are primarily relying on information, communication, and connectivity technologies to realise their digital transformation. Although some firms, especially in manufacturing, have begun to experiment with cyber-physical systems for production, a notable example was Adidas' Speedfactory concept (see the opening chapter case above).

2.4.2 Strategic Action Fields of Digital Transformation

Firms integrate themselves into different socio-technical systems for specific activities and goals and research has shown that this results in the emergence of strategic actions fields for the digital transformation of firms (Peter et al., 2020). The strategic action fields (SAF) of digital transformation emphasise the social aspects of the digital transformation process, by focusing attention on managerial sense-making and related legitimization processes for a specific digital technology. This choice is about which socio-technical systems the firm wishes to develop internally (vertical integration) and participate in externally (horizontal integration). The human and machine networks associated with these choices will reflect one or more of seven strategic action fields that have been identified (see Box 2.8). A SAF may include all or only subsystems of a broader socio-technical system within which a firm is operating, this is dependent on the technology relevance and the perceived attractiveness of different activities (applications) that a specific digital technology enables.

A SAF approach emphasises the importance of managers and employees in the framing and sense-making of socio-technical systems as part of the digital transformation process for a firm (Peter et al., 2020). Figure 2.4 is a reminder that not only the technology networks cross firms, but so do the human networks (managers and employees) that are central to the legitimisation of participating in specific socio-technical systems. Reflecting the internal (vertical) and external (horizontal) integration processes associated with the participation in a specific socio-technical system, key employees act as institutional entrepreneurs and serve to legitimise specific digital technologies, and the socio-technical systems associated with those technologies, internally and externally, as part of the technology adoption process. This is critical, as it is a reminder that firms will not all share the same understanding of the attractiveness of the diverse digital technologies and will make different choices about how to digitally transform, by deciding on which strategic action fields (socio-technical systems) are legitimate and likely to be most beneficial to firm performance.

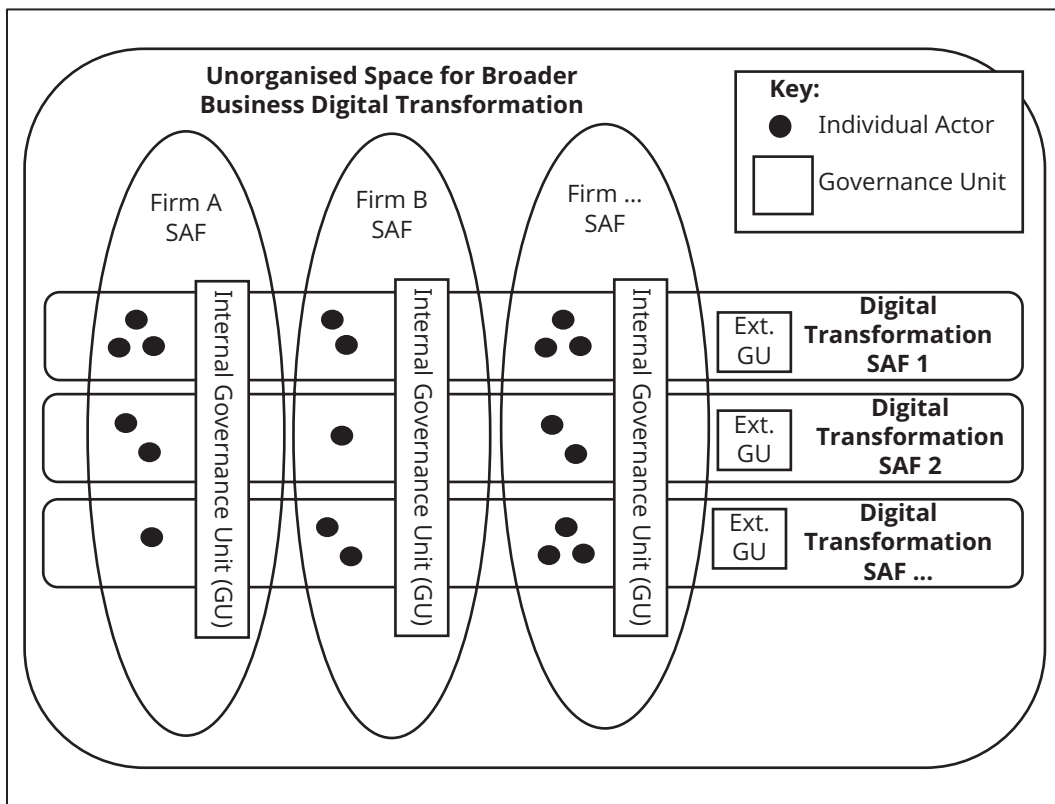


Figure 2.4 Development of strategic action fields of digital transformation

Source: Peter et al. (2020)

Strategic Action Fields of Digital Transformation

The seven strategic action fields (SAF) of digital transformation are (see Figure 2.5):

- 1 Customer Centricity
- 2 New Digital Technologies
- 3 Data and the Cloud
- 4 New Strategies and Business Models
- 5 Operational Excellence / Process Management
- 6 Digital Leadership and Culture
- 7 Digital Marketing

Chapters 4–10 cover all seven strategic action fields of digital transformation in more detail. The SAF sequence starts market-driven with the external perspectives of the customer (SAF no. 1) and new, available digital technologies (SAF no. 2), followed by the internal perspective of available data (SAF no. 3). These insights lead to the creation of customer, technology and data-driven new strategies (SAF no. 4), resulting in an adaptation of the internal operating model (SAF no. 5) and leadership framework (SAF no. 6). Finally, products and services are promoted in the market (SAF no. 7) and with that, the final SAF links back to the initial, market-driven SAF no. 1.

For public-sector/government organisations, the action fields are roughly the same, with the exception of SAF 4 (which for the public sector is focussed on 'digital e-government strategies') and SAF 7 (which focuses on 'digital communication', rather than digital marketing in businesses).

Source: Peter (2017, 2021, 2023, 2024); Peter et al. (2020)

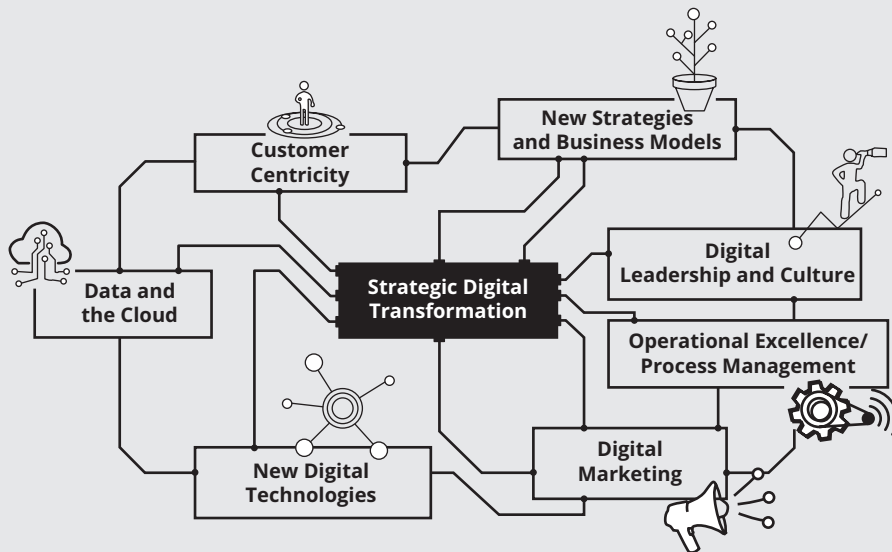


Figure 2.5 Seven strategic action fields of digital transformation

Source: Peter (2017, 2021, 2023, 2024); Peter et al. (2020)

Table 2.1 Theories of competitive advantage and the digital age

	Theory of Competitive Advantage		Implications for Value Creation in the Digital Age	
	Core Assumptions	Source of Competitive Advantage	Generic Strategies Porter (1979) Treacy & Wiersema (1993)	Strategic Action Fields Perspective Peter et al. (2020)
Internal Perspective	Resources Barney (1991a,b; 2001) Newbert (2007)	Resources enable the production of products and services customers demand	Acquire valuable and rare resources needed for production	Firms must evaluate the strategic action fields that support their intended generic strategy
	Capabilities Zacharias et al. (2016) Newbert (2007)	Capabilities are the ability to manage resources within organizational process to create value	Capability to optimally orchestrate firm resources drives sustained competitive advantage	Strategic action fields that are aligned with new logics of value creation, process optimization and enable adaptability are important for supporting firm responsiveness to changing market conditions and customer preferences
	Core Competences Prahalad & Hamel (1990)	Core competencies allow firms to respond to market opportunities	- Control over core products allows competitive advantage in different related final product markets - Inimitability sustains competitive advantage	
	Dynamic Capabilities Baía & Ferreira (2024) Newbert (2007)	- Dynamic external environments require firms be adaptable to survive - Dynamic capabilities allow firms to achieve new resource and capability configurations in response to changing external conditions	Firms do not have to change their generic strategy if market conditions change, by reconfiguring their resources and capabilities they can deliver the same value proposition in a manner that reflects the new external conditions	The strategic action fields within which a firm is operating is a source of sense-making that allows managers better assess how digital technologies can contribute to the process of resource and capability reconfiguration

(Continued)

Table 2.1 (Continued)

Theory of Competitive Advantage			Implications for Value Creation in the Digital Age	
	Core Assumptions	Source of Competitive Advantage	Generic Strategies Porter (1979) Treacy & Wiersema (1993)	Strategic Action Fields Perspective Peter et al. (2020)
External Perspective	Industry Dynamics <i>Structure-Conduct-Performance</i> Porter (1979) Panagiotou (2006)	• Bargaining power in input or final markets • Degree of competition • Barriers to entry • Limited substitute products / services	Successful execution of generic strategies • Change bargaining power of incumbent suppliers or customers • Can create barriers to entry • Change competitive dynamics	The digital strategic action fields have the potential to • Change bargaining power of incumbent suppliers or customers • Change barriers to entry and availability of substitute products / services • Change competitive dynamics
	Strategic Groups Panagiotou (2006) Short et al. (2007)	• Unequal performance between strategic groups, depending on industry segment • Limited inter-strategic group mobility for firms • Strategic group members serve as reference group for other members affecting managerial cognition	• Generic strategies are the outcome of collective sense-making regarding the optimal strategy for a specific firm	• Digital transformation of a firm will reflect the collective managerial sense-making about how different strategic action fields for digital transformation are relevant to a firm given its generic strategy orientation

Source: Newbert (2007); Peter et al. (2020)

2.5 THEORIES OF (SUSTAINABLE) COMPETITIVE ADVANTAGE

This subchapter provides a concise review of the established theories for explaining competitive strategies and firm performance. In all these strategic theories the goal is to explain how firms can achieve not only competitive advantage but even sustained competitive advantage. Where competitive advantage is above normal performance in the short term and sustained competitive advantage can be understood as above normal performance in the medium to long term. This performance assessment could include some or many of the economic (competitive), natural environment or societal performance.

Reflecting the open systems framing from the previous two subsections, an explanation of firm performance requires that the firm, strategic group, and industry effects on firm performance be simultaneously considered, as over time these three levels of analysis will interact and thereby drive co-evolution between firms within a specific industry. This dynamic 'systems theory view of performance suggests that firms, strategic groups, and industries are interdependent parts of a complex system that collectively influences firms' fates. Only by examining each level in the context of the others can each level's role be diagnosed' (Short et al., 2007, p. 149). This complexity has been confirmed in the mixed results of efforts to confirm to what degree firm, industry, or strategic group membership determine firm performance (McGahan & Porter, 1997; Short et al., 2007).

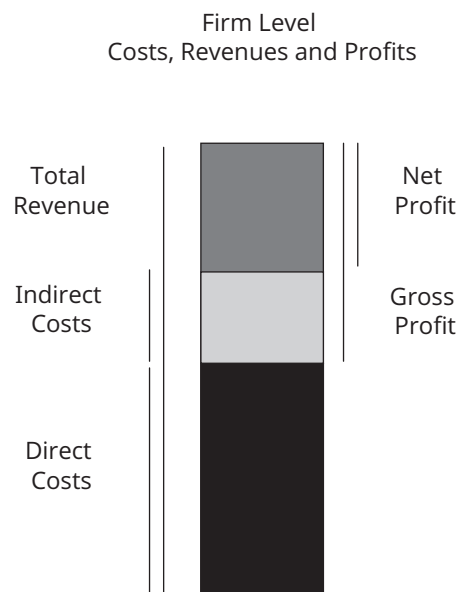


Figure 2.6 Resource-based view

The remaining sub-sections follow this complex system framing of firm performance, starting with an internal perspective (see Figure 2.6 on the evolution of the resource-based view) then covering the external perspective (see Figure 2.7 on industry dynamics and strategic groups) before discussing two main typologies of 'generic' strategies (see Box 2.9) for competitive advantage as integrative logics for linking internal and external explanations for competitive advantage.

2.5.1 Ownership and Control Over Resources

Resource-based explanations for the competitive advantage of firms are a long-established contribution to the strategic management literature; attributed to work as early as the late 1950s (Newbert, 2007). Where resources are defined as 'all assets, capabilities, organisational processes, firm attributes, information, knowledge etc. controlled by a firm that enable the firm to conceive of and implement strategies to improve its efficiency and effectiveness' (Daft, 1983, cited in Barney, 1991, p. 101). The resource-based view, including all the variations that have developed over time, provides an important explanation for why there is consistent support for the primacy of firm effects on firm performance, compared to strategic group and industry membership on firm performance (McGahan & Porter, 1997; Short et al., 2007). All three are discussed in this chapter, as integral parts of an overall open system of value creation.

The formalisation of theory occurred when the link between the direct contribution of products and/or services and the indirect contribution of the resources needed to produce the products and/or services was theorised (Barney, 1991; Wernerfelt, 1984). Barney (1991) understood a firm to have a sustainable competitive advantage when it is implementing a value creation strategy that is not being implemented by current or potential competitors and when these competitors are unable to duplicate the value creation benefits of the strategy. The resource-based view has two main assumptions and a set of four necessary conditions for a sustained competitive advantage resulting in above normal returns to be achieved. The theory assumes that firms do not all have access to the same quality of value creating resources and that high value creating resources are not easily transferable from one firm to another. For the unique and immobile resources of a firm to allow a sustained competitive advantage, they must have four attributes. The source must be valuable, in the sense that it allows opportunities to be exploited and threats to be neutralised, it must also be rare, difficult to imitate, and finally there should be limited or no strategically equivalent substitute resources that do not meet the first three criteria. The implicit assumption is that a valuable resource allows products and services to be produced that have an attractive value proposition for customers. The question of inimitability is of particular interest when thinking about digital transformation, as it relies on causal ambiguity about the link between the resource endowments of a firm and the competitiveness of its products and



Figure 2.7

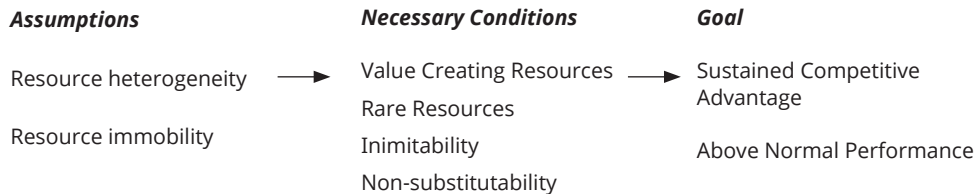


Figure 2.8

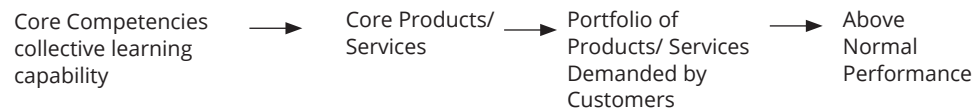


Figure 2.9

services. Social complexity as a result of the internal and relational capital of a firm, including for example organisational culture, is highly related to technology adoption and successful integration and contributes to the inimitability of firm resources and capabilities. These are often the barriers to effective adoption and integration of technology in general and also for digital technologies.

2.5.2 Capabilities

It is not necessarily the ownership and/or control over value creating resources that leads to competitive advantage, but rather the capability to optimally orchestrate the resources of a firms that leads to sustained competitive advantage. These capabilities place a strong emphasis on resource management and organisation processes (Newbert, 2007).

The core competency theory of Prahalad & Hamel (1990) was arguably the first to introduce a capabilities-based explanation for how firms can achieve sustained competitive advantage across multiple final product and/or service markets. The focus on how capabilities contribute to value creation is an answer to one of the main critiques of Barney's (1991) resource-based theory, namely that the value creation process is not explained. Core competencies were defined as the 'the collective learning in the organization, especially how to

coordinate diverse production skills and integrate multiple streams of technology' (Prahalad & Hamel, 1990, p. 82). Understanding the core competence of a firm allows it to focus on core products/services that it is uniquely able to produce and can be integrated into diverse final products and services, while meaningfully adding to the value proposition to customers in these offerings, thereby allowing access to a range of final markets. For the advantages in the final markets to be sustained the core competencies and core products or services need to remain difficult for competitors to imitate. The core competences approach clearly reflects all four conditions for sustained competitive advantage according to Barney (1991), while explaining how value is created.

2.5.3 Dynamic Capabilities

Dynamic capabilities (Vial, 2019; Warner & Wäger, 2019) extended resource and capability-based thinking to explain how firms can 'integrate, build and reconfigure internal and external resources and competencies' (Teece et al., 1997, p. 516) in response to rapidly changing environments. Dynamic capabilities thus 'are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die' (Eisenhardt & Martin, 2000, p. 1107). It is however important to understand that while dynamic capabilities are likely to be rare and very valuable for a firm, there are doubts about the inimitability and non-substitutability of dynamic capabilities. Dynamic capabilities are thus essential for ensure a firm can effectively orchestrate its resource and capability endowments in response to external conditions, but it is not the dynamic capabilities that will lead to sustained competitive advantage but rather the rare, valuable, inimitable, and non-substitutable resources and capabilities, which the dynamic capabilities contribute to organising and managing, that will enable a firm to achieve sustained competitive advantage (Eisenhardt & Martin, 2000).

2.5.4 Industry Dynamics

Industry characteristics have a longstanding and well supported influence on firm performance (Panagiotou, 2006; Short et al., 2007). Reflecting the open systems approach to thinking, underlying socio-technical thinking and the firm as an open system that takes in inputs to produce products and/or services to be outputted for purchase in markets, industry-based explanations of firm performance have also adopted open systems thinking for explaining industry effects on firm performance. Porter's Five Forces (Porter, 1979) model of industry attractiveness, with the related implications for firm performance, synthesises decades of economic and strategic management theorising about industry attractiveness and related firm performance (Panagiotou, 2006) (see Box 2.9). The Five Forces Model is a clear example of the Structure-Conduct-Performance (SCP) school of

thought, which argues that industry characteristics (underlying structure) determine firm behaviour (conduct) and thereby determine firm performance. The SCP approach is rooted in economic thinking about industry market structures, Porter (1979) is in essence a model that allows firms to deduce strategic implications of perfectly competitive, monopolistic, oligopolistic, and monopoly market structures. The attractiveness of an industry is determined by the concentration of firms in different roles in an industry; product or service differentiation and how open the industry is in terms of the ability for new entrants to the industry or for incumbent firms to leave (exit) an industry; this reflects an open systems approach at the industry level. There is also an emphasis on those factors that might change the structure of an industry and firms' conduct in an industry, traditionally chance, innovation/technological change, and government policy-making. Here, digital transformation is likely to have important impacts. Managers are also argued to play a critical role through their sense-making of competitive landscapes and their dynamics, as their decision-making can change industry structure and firm conduct (Panagiotou, 2006).

Industry Dynamics and Competitive Performance (Five Forces Model)

1 Competitive pressure

The degree of active competing by incumbent firms in an industry.

2 Bargaining power of suppliers

The greater the concentration of suppliers compared to the competing firms, the greater their ability to influence the cost of inputs.

3 Bargaining power of buyers

The greater the concentration of customers (buyers) compared to the competing firms, the greater their ability to influence the price (willingness-to-pay) for goods or services offered.

4 Threat of new entrants

New competitors can change the bargaining dynamics by changing the relative concentration of firms in the industry.

5 Threat of substitutes / presence of complementary products or services

Substitute and complementary products or services change the willingness-to-pay of customers (buyers).

Source: Adapted from Porter (1979, 1991)

(Continued)

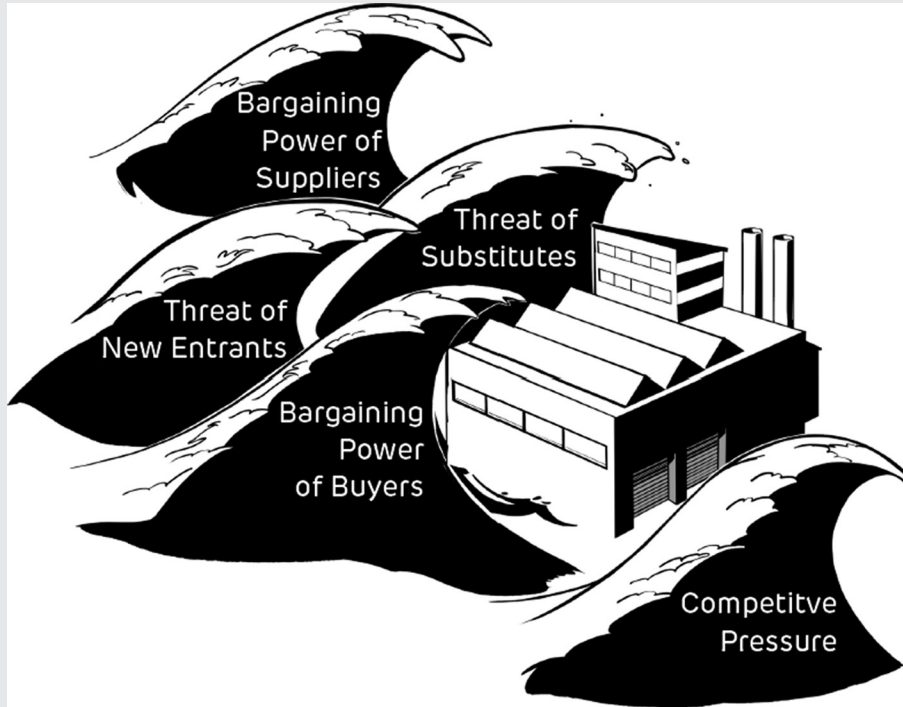


Figure 2.10 Five Forces Model

Source: Own illustration following Porter (1979, 1991)

Porter's (1979) Five Forces Model (see Box 2.9) thus can provide an extremely valuable framework for organising managers analysis and sense-making of their environments, including supplier power over their costs, customer buying power as expressed in their willingness to pay, as well as the threat of new entrants or threat of substitute products or services, or complementary products and services (Panagiotou, 2006). This important role of managerial cognition and sense-making also extends to the exogenous element of the Five Forces Model, chance and government policy (Porter, 1979). The prescriptive guidance of the model is that a firm should seek out a position in an industry that minimises the bargaining power of suppliers and customers, while limiting the risk of new entrants or substitute products or services. Equally important would be aligning with complementary products or services to raise switching costs for customers and seeking out a position that limits the degree of competition between incumbents. External influence that could result in industry dynamics changing includes chance and government policy. Box 2.10 lists the mechanisms that underly the strength of the different forces and these mechanisms also represent the way that digital transformation of an industry will change its attractiveness for incumbents and new entrants.

Underlying Mechanisms for Five Forces Model

It is important to understand the underlying drivers of the different elements of the Five Forces Model, as digital technologies and the digital transformation of firms and their industries has the potential to affect them and thereby they represent the underlying mechanisms through which digital technologies can change industry attractiveness for incumbents and new entrants.

- ***Competitive Intensity (Jockeying for Position)***
 - Concentration of Competing Firms
 - Industry Growth
 - Degree of Standardisation or Differentiation
 - Cost Structures of Competitors
 - Industry Capacity
 - Exit Barriers
- ***Buyer (Customer) and Supplier Power***
 - Concentration
 - Product Standardisation or Differentiation
 - Criticality of Product or Services
 - Substitutes
 - Switching Costs
 - Industry Mutual Dependencies
 - Risk of Value Chain Integration / Disintermediation
- ***Barriers Reducing Threat of New Entrants***
 - Economies of Scale
 - Product Differentiation
 - Capital Requirements
 - Cost Disadvantages Not Associated with Firm Size (e.g., learning curve)
 - Access to Distribution Channels
 - Government Policy / Regulation
- ***Substitute Products or Services***
 - (Changes in) Relative Price-Performance Trade-off
- ***Complementary Products or Services***
 - (Changes in) Relative Price-Performance Trade-off

Source: Adapted from Porter (1979)

2.5.5 Strategic Groups

Strategic groups can be defined as ‘naturally occurring subsets of firms that are more homogeneous in actions than is found across industry incumbents in general’ (Short et al., 2007, p. 150). It is expected that firm performance will differ across strategic groups in an industry. Categorising firms in an industry into strategic groups relies on identifying similarities or

differences in attributes of firms, that may include the strategic orientation of firms for value creation (e.g., exploitation of existing resources vs exploration for new resources), how broad or narrow a firms' scope of operations are (e.g., geographic or number of product types) and the scale of resource deployment (e.g., physical resource endowments, intangible resource endowments, financial resources, and organisational size). Short et al. (2007) found support in their analysis for strategic group membership as an influence on firm performance, when simultaneously also assessing the effect of firm characteristics and industry membership. Although firm effects on performance were clearly the strongest effect, followed by industry and then strategic group membership. Given that strategic groups can be considered a subset of the firms in an industry, this is probably to be expected.

The analysis of objective data to determine the role of strategic groups in influencing firm performance, as was done by Short et al. (2007), however, is not able to capture the important role of other firms in a strategic group as a reference group for managers in a firm competing with the other firms (Panagiotou, 2006). Porter (1991) acknowledges the importance of managerial strategic decision-making over time in relation to the positional strategy and industry attractiveness at any one point in time. This is critical, as the firms in a strategic group are likely to be active in the same strategic action fields of digital transformation and are expected to be clear references for managers seeking to make sense of digital technologies and organisational transformation using those technologies. As a result, the shared belief of managers about industry structure, competitive challenges, and changing industry dynamics will result in firms adapting organisational structures and competitive strategies (Panagiotou, 2006). In essence a firm's managers will collectively be making sense of the meaning and implications of the underlying mechanisms of the Five Forces Model listed in Box 2.10 with reference to the other firms in their strategic group.

2.6 'GENERIC' STRATEGIES FOR VALUE CREATION

Two of the most well-known 'generic' strategy typologies are that of Porter (1985) and Treacy and Wiersema (1995). Both typologies articulate clear and distinct value propositions to customers of firms (see Figure 2.9), that require different resource and capability configurations to be realised. It is in these value proposition typologies that the alignment of internal resource- and capability-based and external market position-based theories of competitive advantage becomes visible. Porter (1996, p. 38) in a less discussed paper indeed makes the point that 'strategic positioning means performing *different activities* from rivals' or performing *similar activities in different ways*.' The resource-based view makes the point that it is the possession of rare, value creating resources and capabilities, that are non-substitutable and inimitable, that allow firms to be able to execute different activities or similar activities differently. Therefore, underlying each of the strategies in the typologies of both Porter (1985) and Treacy and Wiersema (1995) are a set of resources and capabilities enabling activities that create the intended value propositions for customers. As was seen in the opening sections of

Selected Activities Associated with Strategy		Selected Activities Associated with Strategy		
Treacy & Wiersema's (1995) Value Disciplines	Customer Intimacy responsiveness	- Produce products and services for specific customer segments - Sell a total solution - Cultivate long-term customer relationships - Specialise in satisfying unique customer needs that only they can deliver due to unique knowledge through their relationship with the customer	- Extensive training of marketing personnel - Developing a broad range of new products or services - Developing brand identification - Innovation in marketing - Utilization of creative advertising	Differentiation Strategy differentiation
	Product Leadership differentiation	- Product and service innovation - Products and service redefine the state of the art - High performance products or services - Strong emphasis on long-term product or service innovation	- Providing specialty products or services - Producing products or services for high price market segments - Dropping unprofitable customers - Targeting a specific market	Focus Strategy Differentiation differentiation
	Operational Excellence competence/effectiveness	- Produce middle of the market products or services - Products are reliable - Products have the best price in the market - Customers experience the least inconvenience in purchasing process	- Providing outstanding customer service - Improving operational efficiency - Controlling quality of products or services - Extensive training of frontline personnel - Intensive supervision of frontline personnel	Focus Strategy Cost efficiency
				- Vigorous pursuit of cost reductions in production - Tight control of overhead costs - Minimizing distribution costs

Figure 2.11 Generic strategies for value creation

Source: Adapted from Akan et al. (2006) and Treacy & Wiersema (1995)

the chapter, though, it is not only the creation of value but also the ability to capture a meaningful proportion of the value created in net profit that will determine the performance of a firm (Jaeger et al., 2016). In the digital age managers are challenged to actively seek to understand how digital technologies can be integrated into resource and capability bundles, to support activities that support value proposition demanded by customers in the digital age (Kim et al., 2004).

Understanding the customer (Piepponen et al., 2022; Taylor et al., 2020) is a central strategic concern for the digitally transforming firm and customer centricity has been identified as a distinct strategic action field of digital transformation (Peter et al., 2020). The strategy typologies of Porter (1985) and Treacy and Wiersema (1995) (see Figure 2.11) are not entirely aligned but can broadly be synthesised into three shared value proposition categories, firstly those focused on cost-based value for customers, secondly value propositions that address product or services attributes, and final a relational value proposition.

Treacy and Wiersema (1995) do not frame their cost-based strategy in those terms, but rather in terms of operational excellence, but in describing the strategy, the operational excellence strategy relies on the ability to manage costs so that reliable middle market products can be offered at the best price in the market. The extended version of Porter's (1985) generic strategies includes a cost focus strategy (Akan et al., 2006), that similarly pursues outstanding customer service, operational efficiency and actively controls product or service quality to create value for customers. Porter (1985) adds the pure cost leadership strategy focused on efficiency through vigorous pursuit of cost reductions in production, tight control of overhead costs and the minimising distribution costs to allow highly competitive pricing in the market.

Treacy and Wiersema's (1995) product leadership strategy pursues a value proposition around product and service innovation to become the firm that is defining the state of the art in a particular product category over the long term. This value proposition aligns with the differentiation focus strategy (Akan et al., 2006) that offers specialty products or services at high price market segments. The differentiation strategy of Porter (1985) represents a mass market premium pricing strategy, made possible with a broad range of products and services that are associated with strong brand identification developed through innovative marketing and creative advertising.

A final strategy in the Treacy and Wiersema (1995) typology is that of customer intimacy, which can be understood as a differentiation strategy that is based on a more direct and personalised customer relationship building compared to the brand-based relationship in Porter's (1985) differentiation strategy, which focuses on a larger customer base. Customer intimacy thus extends Porter's typology on the differentiation end of the continuum in much the same way as Porter's (1985) cost leadership strategy extends the cost-based end of Treacy and Wiersema's (1995) typology continuum. The customer intimacy strategy moves differentiation from the mass market to smaller niche customer segments offered bespoke value propositions that are total solutions which are specialised, based on the understanding of customers' needs achieved through long-term relationship building.

Key Idea

Customer Segmentation Analysis

Customer segmentation is an important activity in the process of developing value propositions. A value proposition is tailored to address the needs and preferences of customers in a specific customer segment, thereby increasing the customers' willingness-to-pay in that segment. The willingness-to-pay refers not only to the price, but also how frequently a customer in a specific segment is likely to pay for a product or service.

Broadly speaking, there are three approaches that managers can take to developing an understanding of the customer segments in the market, either using previously published research, qualitative primary research (e.g., workshops or focus groups) or quantitative primary research approaches (e.g., surveying customers of a firm / in a specific market). When academically done, the literature is an important place to start but sometimes the qualitative approaches also support the development of the survey instrument for the quantitative segmentation research, in a mixed methods design.

A comparison of the results of a workshop-based approach and a customer survey-based approach to develop customer segments for two electric utilities in Switzerland showed that while the two approaches did not deliver exactly the same empirical results, they were very aligned (see Barjak et al., 2022). The key to a successful workshop-based approach to customer segmentation is a diverse stakeholder representation in the workshops. The key to a successful survey-based approach is a pre-phase of focus groups with purposefully selected customers to rigorously develop the survey instrument. Both of these approaches can benefit significantly from an initial engagement with the research literature to see if some customer segmentation has been done previously or not; this may even be sufficient for business needs.

Source: Adaptation of Barjak et al. (2022)

2.7 DIGITAL BUSINESS STRATEGY FORMULATION

Digital business strategies can be defined as 'organizational strategy formulated and executed by leveraging digital resources to create differential value'. The formulation of digital strategies requires an assessment of how applicable resource-based and structure-conduct-performance (Five Forces Model) thinking, as well as established generic value creation strategies, are to strategy formulation in the digital age.

2.7.1 Digital Technologies and Strategy Formulation

Broadly speaking, the assessment of product-market position and choices about generic value creation strategies are part of the strategy formulation process, while considerations related to organisational structures, resources, and capabilities are related to strategy implementation

(Henderson & Venkatraman, 1999). As with traditional strategising there is an assumption of an open system and dynamic interaction between the different actors in an industry / socio-technical system. Critically, a fit between the internal resources and capabilities and the external competitive positioning of a firm's product and services is essential for competitive success.

Thinking about the position of a firm in the socio-technical system of its industry, it is essential that firms assess the optimal scope of digital technologies for supporting business activities, the development of a digital transformation capability to support integrating the digital technologies into business activities, and digital governance for gaining access and control over required digital technologies. Internally the digital technology strategy must make choices about the IT infrastructure needed (portfolio of applications, hardware, data architectures, etc.), information systems processes, and related human skills needed from an information systems perspective (adaptation of Henderson & Venkatraman, 1999). See Box 2.12 for an exposition of the dimensions in a cyber-physical system.

Digital Technology Resources and Capabilities in Cyber-Physical Systems

- Digital Technology Capability
- Information Technology (IT) Infrastructure Resources
- Computing Technology (CPT) Infrastructure Resources
- Communication Technology (CT) Infrastructure Resources
- Connectivity Technology (CNT) Infrastructure Resources
- Control Technology (CNTR) Infrastructure Resources
- Human IT Resources
- Human CPT Resources
- Human CT Resources
- Human CNT Resources
- Human CNTR Resources
- IT-enabled Intangible Resources
- CPT-enabled Intangible Resources
- CT-enabled Intangible Resources
- CNT-enabled Intangible Resources
- CNTR-enabled Intangible Resources

Source: Integration of Bharadwaj (2000);
Bharadwaj et al. (2013); and Sony & Naik (2020)

Today the relationship between competitive strategising and digital technology strategy needs to be more than just an alignment; the two disciplines rather need to be merged (Henderson & Venkatraman, 1999) to an integrated co-evolving digital strategy in which competitive and technological considerations are simultaneously considered. There is no longer a distinction between the competitive business strategy and the digital technology

strategy (Bharadwaj et al., 2013). This approach has fundamental implications for thinking about the interaction of a firm with the socio-technical system within which it is embedded, i.e., the scope of the business (horizontal integration in Figure 2.3), as many of the digital technologies are fundamentally dependent on interacting with the broader ecosystem of the firm to create the intended value of the competitive strategy. At the same time digital technologies also raise important challenges for thinking about the digital scale of the business (vertical integration in Figure 2.3). But digital technologies also allow businesses to think more dynamically about the scale of a business, due to the potential of digital technologies to allow rapid scaling up/down in terms of storage and computing capacities, for example, as well as in terms access to partners and information. This offers unique potential for thinking about how rescaling of the scale of the business could change competitive dynamics in an industry; think about the drivers of barriers to entry in the Five Forces Model. Digital technologies also have the potential to accelerate product/service launches and strategic decision-making, with fundamental consequences for industry competitive dynamics. Finally, digital strategising needs to consider the value creation potential in information abundance and new business models (Bharadwaj et al., 2013).

2.7.2 Implementing Digital Strategies to Create and Capture Value

As firm performance is additionally increasingly dependent on external stakeholders and the information and network effects of the digital age, the ability of firms to not only create but also capture value from the integration of digital technologies into business processes, products, and services, and leverage the associated information (Bharadwaj et al., 2013) is critical if above normal performance is to be achieved through sustained competitive advantage.

As described in Chapter 1.3, there are various ways to capture value from digitisation/digitalisation and strategic digital transformation. The seven action fields of digital transformation, as presented in Section 2.4.2, provide the topical context for value creation. Depending on the competitive pressure in the industry and the firm's individual situation (e.g., its digital maturity), these action fields (see Figure 2.12) can be considered holistically as a strategic digital transformation, as individual strategic initiatives/projects, or in the less mature form as digitalisation efforts.

From a resource-based view digital technologies in and of themselves are unlikely to lead to sustained competitive advantage due to their general availability and imitability. Instead, it is firms' dynamic capabilities to reconfigure non-digital and digital resources into capabilities (Volberda et al., 2021) that meet the criteria of being rare, value creating, non-substitutable, and inimitable that will allow firms to develop core competences that allow sustained competitive advantage (Bharadwaj, 2000). These resources and capabilities need to enable firm activities that are either different to those of competitors or the execution of similar activities differently to support unique product/service market positional strategies. Under these conditions firms are more likely to be able to execute a generic value creation strategy that realises sustained competitive advantage.

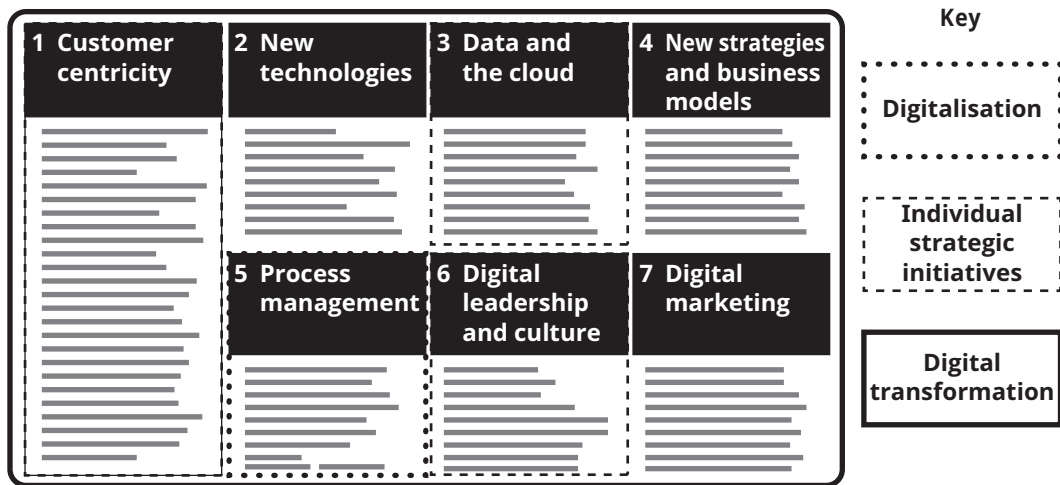


Figure 2.12 Value capture options based on the seven action fields of digital transformation

Source: Peter et al. (2020); Peter (2017, 2021, 2023, 2024)

2.8 CONCLUSION

The digital transformation of society, industries, and firms is bringing about fundamental changes in the way firms create and capture value. Digital strategies go beyond simply aligning technology and competitive strategies, instead managers are challenged to think about how digital technologies change the resources and capabilities of their firms and how the activities of the firm that allow chosen generic strategies are changed by this process. At the same time, the competitive forces that a firm is subject to are changing and there is a need to ensure that the activities of the firm are still fit for purpose in terms of realising the generic value creation strategies of the firm that underpin the market positional strategies that are being pursued.

Case Studies

Take your assigned or self-selected focal case study from week 1 (Chapter 1) or one of the cases provided with this text to complete the following tasks / answer the questions posed below.

Students should complete the following tasks:

- 1 Explain to what degree the case study shows evidence of the focal firm responding to changes in the socio-technical systems in which the firm is embedded (see Chapter 2.4.1).
- 2 Identify the stakeholders of the focal firm in the case and justify their selection.
- 3 Justify a set of metrics, e.g., key performance indicators (KPIs) based on the case study, that includes KPIs that account for the diverse stakeholders of the firm (see Boxes 2.2 to 2.5 for performance measures).
- 4 Explain which of the seven strategic action fields of digital transformation are relevant in the case study (see Box 2.8).

- 5 Discuss the degree to which you believe the firm in the case study is likely to be able to achieve sustained competitive advantage, from both an internal resource/capabilities-based, and external market positioning strategy perspective.
- 6 Given the value proposition in the case study, which other firms can you find online that would be members of the strategic group (i.e., which are strategically relevant) of the firm?
- 7 How similar do you consider the generic (digital) business strategies of the firms in the strategic group?

You will find the collection of case studies for strategic digital transformation in the Appendix and additional cases online at www.strategic-digital-transformation.com

Exercises

Discuss the following questions in your class, in your group or assignment:

- 1 What are the six dimensions of cyber-physical systems (see Box 2.7) that allowed Adidas to implement their Storefactory and Speedfactory concepts? (see opening case)?
- 2 Identify an established industry/sector that you think has been transformed by digital technologies and explain how you believe the digital age has shifted the sources of firm strategic competitive advantage as a result.
- 3 Identify a firm of your choice that has achieved significant success by relying on digital technologies and discuss how well the success is explained by established theories of firm strategic competitive advantage.
- 4 Forming two small groups (2–4 students in each group), assign a pro and contra position to each group and debate the degree to which digital transformation allows firms to achieve sustained competitive advantage.
- 5 Identify a firm that is largely or entirely analogue in the way it serves its customers and formulate a strategy for the firm that is adequate for competing in the digital age.
- 6 Critically assess the enablers and inhibitors of the formulation of the firm strategy for the digital age developed in exercise 5.

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