



Business models and organization design



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Despite a voluminous literature, business model research continues to be plagued with problems. Those problems hinder theory development and make it difficult for managers to use research findings in their decision-making. In our article, we seek to make three contributions. First, we clarify the theoretical foundations of the business model concept and relate them to the five elements of a business model: customers, value propositions, product/service offerings, value creation mechanisms, and value appropriation mechanisms. A clear definition of a business model enables theory to develop systematically and provides coherent guidance to managers. Second, we suggest that value configuration is a contingency variable that should be included in future theorizing and model building. Each of the elements of a business model is affected by a firm's value configuration depending on whether the firm is a value chain, value shop, or value network. Third, we link business models to organization design. We show how organization design is affected by value configuration and how new collaborative organizational forms enable open and agile business models. We derive the implications of our analysis for future research and management practice.

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More than sixty years ago, Peter Drucker insightfully declared that “the purpose of a business is to create a customer” (Drucker, 1954: 31). In hindsight, Drucker seems to have understood what is meant by the term business model, and much of the jargon used today in describing business models merely reflects Drucker's original ideas. For example, rather than saying the purpose of a business is to create a customer, we say that business models are “customer centric.” Drucker also asked, what will the customer buy? Now we say that a business model must contain a “value proposition.” Drucker said the business enterprise must organize its resources and capabilities in order to generate revenues and profits. This is now called “delivering value” to the customer.

Had management and marketing researchers built on Drucker's ideas about business enterprise from the beginning, the literature on business models would not be in its current state. A recent review of 681 peer-reviewed articles concluded that “... a basic clarification of the business model concept seems to be necessary” (Wirtz et al., 2016: 36). From a theoretical perspective, Wirtz et al.'s conclusion reflects our belief that the business model literature is in a rudimentary stage of development. In order for business model theory to progress, it needs to converge on the definition of basic constructs and then move systematically to the stages of explanation and prediction (Kerlinger and Lee, 1999).

In this article, we offer ideas for researchers to consider when studying business models and for managers to harness the power of business model innovation in developing their organizations. In the first section on theoretical foundations, we

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describe two discourses that we perceive in the business model literature, operational and dynamic, and relate these to the broader literature on organizations. In the second section, we discuss the application of value configurations to business models. In the third section, we link business models to organizational design. In the final section, we derive implications for future research and management practice.

Theoretical foundations of business model research

According to Zott et al. (2011), business model research needs conceptual consolidation in order to cumulatively develop. We believe that the conceptual building blocks were laid many decades ago and that revisiting them will not only help researchers interpret the existing literature but also guide future model building and theory development.

Drucker (1954: 29) asked the essential question: “What is a business?” In answering that question, he articulated the main elements of a business model. “The purpose of a business is to create a customer” (p. 31) ... “The business must control wealth-producing resources to discharge its purpose of creating a customer” (p. 35). He further elaborates: “Who is the customer?” (p. 44) ... “What does the customer buy?” (p. 45) ... “What is value to the customer?” (p. 47). Drucker later notes, “...only a thorough and careful activities analysis can bring out what work has to be performed, what kinds of work belong together, and what emphasis each activity is to be given in the organization structure” (p. 168–169). Finally, he calls attention to value appropriation: “The objective ... is to increase the proportion of contributed value retained as profit” (p. 60). Drucker’s book thus described the essential elements of a business model: customers, value propositions, product/service offerings, and mechanisms of value creation and appropriation.

Writing around the same time as Drucker, Forrester (1958) provided a general theoretical statement linking the elements of a business model to organizational processes (he called it a “company model”): “...company success depends on the interaction between the flows of information, materials, money, manpower, and capital equipment” (p. 37) ... “After adequately representing the current operations of a particular company ... the next step is to determine ways to improve ... company success” (p. 47). He also introduced a dynamic dimension to the company model: “It is not just the simple three-dimensional relationships of functions that counts, but ... their relationships as dynamic activities” (p. 52).

We perceive two discourses running through the business model literature that can be traced to the works of Drucker (1954) and Forrester (1958). The first discourse deals with the operation of a business – how a firm creates value for customers and appropriates value by performing its activities efficiently and effectively. The second discourse deals with dynamics – how a firm modifies the elements of its business model over time in order to adapt to changes and disruptions in its environment.

Operational dimension

The operational dimension of a business model refers to how a firm conducts its business. A firm makes choices about its product/service offerings, its target customers, and the markets it intends to cover, as well as choices about how it will produce and deliver its products and services. Having made such choices, the firm forms an organization that can control and coordinate the activities it performs to satisfy customers and sustain the business (Miles and Snow, 1978).

Ideas related to the operational dimension can be found throughout the business model literature. For example, Christensen (1997) contrasts the activities and cost structure of Dell’s business model of selling computers over the telephone and the Internet and then assembling to order vs. Compaq’s and HP’s model of selling through distributors. Applegate (2001) classifies e-businesses based on their vertical position in a value stream. Chesbrough and Rosenbloom (2002), emphasizing the importance of a business model as a guiding framework to maintain focus on and coherence among activities, describe how Xerox’s established way of doing business prevented the company from pursuing its revolutionary breakthroughs in personal computer technology because the inventions did not appear to complement the company’s strengths in activities such as copier services. Amit and Zott (2001) describe how e-commerce companies create value by introducing novel, more efficient ways of transacting and appropriate value by exploiting lock-in from network externalities. Accounts such as these in the business model literature typically make reference to the elements covered by Drucker (1954) – customers, resources, and revenue sources as well as their inter-relationships with the firm’s activities. For a comprehensive review that highlights the importance of the operational aspects of business models, in the form of activity systems and cost-revenue architectures, see Zott et al. (2011).

Several organization theories are related to the operational dimension of business models. Theories of scale, scope, and transaction costs (Chandler, 1990; Porter, 1980, 1985; Williamson, 1975) inform choices about the economics of performing certain combinations of activities and governing the transactions among them. They therefore apply to understanding choices that firms make about value creation and value appropriation mechanisms. Theories of transaction services (Economides, 1996; North and Wallis, 1994) and institutions (North, 1991) show the importance of technological innovation and network externalities in transaction services and the institutions that they embody, which in turn affect other major aspects of the economy. Theories of industry transformation and disruption (Christensen et al., 2002; Schumpeter, 1934; Tushman and Anderson, 1986) explain how technological and institutional innovations lead to new scale and scope configurations and industry structures. Taken together, these theories highlight the necessity of studying business models at the ecosystem level in order to understand how firms with different business models symbiotically and competitively affect each other.

Dynamic dimension

The dynamic dimension of a business model refers to how a firm changes and adapts over time. The dynamic dimension reflects Forrester's (1958) goal – *to redesign an organization and its policies so that it stands a better chance of success (op.cit.: 66)*. Effective organizations constantly align the elements of their business model to the environment in which they are operating. A number of articles in the business model literature have addressed the dynamic dimension of business models. Johnson et al. (2008) propose starting with the choice of a value proposition and aligning the other elements to it. They describe how companies such as Procter & Gamble, Corning, and Tata have been able to create new business models that complement their existing businesses. Using Arsenal FC as their focal case, Demil and Lecocq (2010) conceptualize business model adaptation as a continuous interaction between the environment and the elements of a business model. Chesbrough (2006) focuses on innovation processes as a means of business adaptation. In what he calls “open innovation” business models, firms share knowledge and collaborate. Teece's (1986) profiting-from-innovation framework explains how firms appropriate value from innovation by using mechanisms such as improving their products and services, licensing the technology, or some combination of the two. Applying Teece's model, Desyllas and Sako (2013) use the case of Progressive's pay-as-you-go auto insurance to show how the value of a particular business model innovation can be protected by superior capabilities.

The theoretical foundations of the dynamic dimension of business models are found in theories of problem solving (Newell and Simon, 1972; Simon, 1991) and organizational learning (March, 1991; Nelson and Winter, 1982). Miles and Snow (1978) portray organizational adaptation as an “adaptive cycle” in which firms solve the *entrepreneurial* problem of product/market positioning, the *engineering* problem of activities and resource configuration, and the *administrative* problem of balancing exploration and exploitation. The approach that a firm uses to go through its adaptive cycle represents a problem-solving strategy – a strategy for how the firm changes the elements of its business model. Further, the dynamic dimension of a business model is informed by the economic theory of knowledge and information (Hayek, 1937, 1945), which holds that information and knowledge are distributed in society. Firms must choose the opportunities they will pursue and how to pursue them, as well as who they will work with in order to effectively adapt. The work of von Hippel (2005) on user innovation and Chesbrough (2006) on open innovation business models applies Hayek's insights by extending the locus of firm innovation to its environment.

Value configuration as a contingency variable

The five elements of a business model allow researchers to describe and specify a business – how it creates and appropriates value. Following Drucker (1954), a business is created when a firm matches its product/service offering to a set of customers. The firm matches its value proposition to what customers value and are therefore willing to pay for. A sustainable business model must consistently deliver value to customers over time. Increasingly, value creation is a process of co-production between a firm and its customers, suppliers, and partners (Hienerth et al., 2011; Ramirez, 1999). Co-production results in organizational networks where member firms collaborate with one another in the creation and delivery of products and services. The business must specify the activities it needs and control wealth-producing resources to discharge its purpose of creating a customer (Drucker, 1954). Value creation mechanisms combine activities and resources across the firm's boundaries. Co-production also affects value appropriation. Value appropriation mechanisms, such as favorable resource (Barney, 1991) and industry positions (Porter, 1980), increase a firm's bargaining power vis-a-vis other actors (Brandenburger and Nalebuff, 1997; Zott and Amit, 2010).

The chain-shop-network typology of value configuration (Stabell and Fjeldstad, 1998), which draws on Thompson's (1967) concept of organizational technologies, provides activity-centered representations of firm value creation. We suggest that value configuration is a business model contingency variable which affects the properties of all the business model elements. Value configurations differ with respect to the role of the customer, the nature of value propositions to customers, value creation (the activities and resources used to create value and the economic factors that drive performance), and value appropriation (sources of revenue and mechanisms that protect profits from innovation). In the contingency framework outlined in Table 1, we highlight the characteristic effects of value configurations on business model elements.

Value chain

A value chain transforms inputs into products, as in a manufacturing firm. The customer is a recipient of the product, which embodies the value created by the firm's transformation process (Ramirez, 1999). Scale, capacity utilization, and the flow of components and products are important to efficient operations, whereas tailoring activities to differentiated customer needs are important for value to the customer (Porter, 1985). These counteracting effects on product cost and customer value lead firms to choose between offering a standardized set of products at low cost or targeting differentiated demand with differentiated products. Embodiment of the technology in the product or in the production process is an important value-protection mechanism (Teece, 2010). Value chains form sequentially linked value system of suppliers, partners, and customers.

Table 1
Relationships among value configurations and business model elements.

Value configuration	Business model						
	Value proposition	Role of customers	Value creation mechanisms			Value appropriation mechanisms	
Value Chain	Product benefits	Recipients of products and services	Activities	Inbound logistics, operations, outbound logistics, sales and marketing, post-purchase service		Revenue mechanisms	Pay for product
			Resources	Brand, product, and process technology		Protection mechanisms	Pay for post-purchase service
			Economics	Cost economies of scale, value from differentiation			Patents, Embodying technology in products or processes
Value Shop	Promised solution quality	Co-producing clients	Activities	Problem-finding and acquisition, problem-solving, choice, implementation, evaluation		Revenue mechanisms	Pay for resource utilization
			Resources	Competencies, reputation		Protection mechanisms	No-cure, no-pay licensing
			Economics	Information asymmetry, learning and knowledge			Status Patents
Value Network	Connectivity and conductivity	Co-producing network members or owners of network nodes	Activities	Network promotion and contract management, service provisioning, infrastructure operations		Revenue mechanisms	Subscription and transaction fees, third-party payment, interconnection and roaming fees
			Resources	Network (set of members or nodes)			
			Economics	Direct and indirect network externalities		Protection mechanisms	Lock-in from network externalities

Value shop

A value shop resolves customer problems on a case-by-case basis. Examples are hospitals and consulting firms (Christensen et al., 2008, 2013). Knowledge and therefore learning is particularly important to value creation (Löwendahl et al., 2001). Problem-solving industries such as medical care typically consist of generalists, who have knowledge about a variety of problems, and specialists, who have deep knowledge in a particular area. The client embodies the problem to be solved and may be an active participant in the process of creating solutions (Skjølsvik et al., 2007). Value shops form reciprocally linked value systems of referring, sub-contracting, and collaborating firms that together harness the knowledge required to develop the desired solutions. Status and intellectual property rights, in the form of patents or copyright, safeguard value appropriation.

Value network

A value network links nodes – customers, things, and places – and provides services that allow various kinds of exchanges among them. Examples of value networks include communication services, transportation, banking and finance, and a wide range of Internet businesses (Afuah and Tucci, 2000). Customers co-produce their own value but also value for other customers by making themselves, or nodes that they control, available for networking. Therefore, network scale and composition positively affect the customer value proposition. In many Internet-based network services, there are in addition strong cost economies of scale resulting from low marginal costs associated with each new user or exchange transaction (Varian, 2000). These dual effects of size can create winner-take-all markets (Shapiro and Varian, 1999). The value systems are vertically layered and horizontally interconnected. Layering allows one service to use another service as its infrastructure. This is common in Internet service ecosystems. Interconnection allows customers of one firm to network with customers of other firms, typical in banking and telecommunications. Lock-in is an important value appropriation mechanism when network externalities affect value creation (Farrell and Klemperer, 2007).

Modelling business models

We believe that adding value configuration as a contingency variable in future model building allows for the exploration of characteristic similarities and differences related to the five business model elements as well as the relationships among classes of business models. Doing so would increase business model explanation and prediction and, even more importantly, enable what Baden-Fuller and Morgan (2010) refer to as “intervention”. Intervention in order to improve organizational effectiveness and efficiency is a primary goal of organizational design and redesign.

Linking business models and organization design

According to Chandler (1962), “structure follows strategy” – that is, the design of an organization must support its purpose and objectives. A firm’s value creation and appropriation results from organizing resources and activities as well as the

relationships within which they are embedded. The organizational design affects overall effectiveness, efficiency, and agility. Efficiency refers to doing things right whereas effectiveness is doing the right things (Drucker, 1967). Being agile means keeping pace with a dynamic environment (Alberts, 2007). A business model frames the sources of effectiveness, efficiency, and agility as well as the firm's strategic domain. It is the role of organization design to facilitate control and coordination, for which the requirements arise from the value configuration underlying a particular business model.

Organizing operations

A value chain creates and combines components into products, and therefore the organizational design is focused on the flow of components within the supply chain. A value shop creates and combines competencies to deliver solutions. As a result, the organizational design centers on the mobilization and integration of human and information resources from the network in which the firm is embedded. Value networks create and combine connections among people, places, and things. They organize around the platforms that enable those connections and their associated exchanges. A firm may use multiple value creation logics (Stabell and Fjeldstad, 1998). For example, technology development uses a value shop logic whereas distribution uses a value network logic. In industries such as pharmaceuticals, software, and entertainment, business models that separate the value configuration logics have emerged. Effective integration and coordination across different value creation logics present important organizational design challenges.

Business model innovation

Business model innovation occurs when firms improve their existing business models or introduce new ones. We suggest that value configurations can be used to characterize and explain many of the business model innovations found in the literature. A typical business model innovation represents variations around a single value configuration – for example, changes in revenue streams or activity configurations. Christensen et al. (2008) exemplify business model innovations made by BCG relative to McKinsey, Toyota relative to other major auto manufacturers, and Skype relative to traditional fixed-line telephony service, as respectively being within the value shop, value chain, and value network configurations.

In addition to within-value-configuration business model innovations, there are cross-value-configuration transformations (Fjeldstad and Haanaes, 2001). The change from the DVD-based creation and distribution of video to YouTube's linking of content creators and content consumers represents a transformation from a value-chain business model to a value-network model. A similar transformation is underway across the entire media and entertainment sector. 3-D printing has the potential to transform much of the logic of manufacturing and distribution from value chains to combinations of value networks distributing raw materials and design specifications and value shops creating streamable designs. Cross-value-configuration transformations are more challenging than within-value-configuration transformations, and the results can be highly disruptive. A number of companies have business models with complementing value configurations. For example, Apple uses a value-chain model in creating, manufacturing, and selling devices, which is complemented by value-network services such as iMessage and FaceTime. Firms also selectively adopt elements from other logics. For example, the Mayo Clinic, a value shop known for its ability to treat the most complex medical problems, was able to reduce costs and increase quality by channeling surgical cases not needing custom treatment through a standardized process typical of a value chain (Cook et al., 2014).

We expect that business model innovations that alter the value configuration are more difficult to conceive and implement because the dominant logic of an established firm serves as a blinder (Pralhad, 2004). Also, innovations due to disruption may be more difficult to implement because they rely on different resources and activities, and they require different organizational designs. The cross-value-configuration disruptive changes currently underway in consulting may serve as an interesting laboratory (Christensen et al., 2013).

Business model innovation seeks to align the elements of a business model to a particular environment. Complex, dynamic, and interconnected environments require agile and continuous adaptation. Generally speaking, alignment can be achieved in two different ways (Dorst and Dijkhuis, 1995). In the deliberate approach, alignment is a rational problem-solving process (Simon, 1981). Organizational problem solving consists of anticipating the future, generating alternatives, and implementing plans (Simon, 1993). Deliberate approaches work best in situations where goals and means can be well defined. Johnson et al. (2008) and Teece (2010) exemplify deliberate alignment processes. In the emergent approach, alignment is the outcome of adjustments made by reflective practitioners to an evolving situation. According to Schön (1983), emergence is a reflective “conversation” with the situation, in which organizational problems are actively set or framed by managers who act to improve the perceived situation. The work of Demil and Lecocq (2010) and Casadeus-Masanell and Zhu (2013) reflect the emergent approach.

Firms increasingly work with their customers, suppliers, and partners when altering the elements of their business models. Among the reasons for such “open” innovation are access to diverse and situated knowledge (von Hippel, 1994), pooling knowledge resources (Boudreau et al., 2011; von Hippel and von Krogh, 2003), and products and services that depend on larger platforms and ecosystems (Gawer and Cusumano, 2002). Business models, therefore, increasingly extend across firm boundaries (Amit and Zott, 2015), and modifying them may affect all or part of the network the firm is embedded within.

Business ecosystems and new organizational forms

Some firms provide users with development resources and the means of bringing user designs into the new product development process. Other firms choose to organize collaboration with large numbers of partners around platforms for which external developers provide complementary goods and services. Some platforms are simply a set of standards – for example, the Intel processor architecture or the Microsoft Windows developer interfaces (Baldwin and Clark, 2006). Other organizations choose collaborative organizational architectures that rely on infrastructures, commons, and protocols to organize resources and exchanges among key actors (Fjeldstad et al., 2012).

Ecosystems represent a promising source of business model innovation and operation. Whereas multi-firm networks enable firms with complementary business models to specialize and offer their member firms increased flexibility and capacity (Miles and Snow, 1986), even closer collaboration reduces risk, speeds products to market, and decreases the cost of product development and process improvement (cf. Eisenhardt and Schoonhoven, 1996; Hagedoorn, 1993). Increased modularization of products and firm activities is shifting innovation as well as operations from firms to ecosystems comprised of firms, individuals, and other relevant actors. This shift both drives and is driven by new collaborative organizational forms (Fjeldstad et al., 2012) that may provide managers with new opportunities for simultaneous exploration and exploitation (Tushman and O'Reilly, 1996). Ecosystems, and the organizational designs that enable them, are important to business model innovation. They make new business models viable and offer firms new arenas, structures, and processes for business model experimentation.

Implications for research and management practice

Researchers have made considerable progress in understanding how properties of strategic variables such as firm resources and activities, and the environment in which the firm operates, affect firm performance. Yet business strategy entails making choices that integrate all the aspects of a business in the pursuit of company goals. Business models offer an opportunity to close the gap between knowledge about the effects of individual variables on firm performance and the need for knowledge about how relationships among those variables affect performance. Accordingly, business model research could benefit from incorporating conceptualizations and methods from the work of researchers such as Forrester (1958) on system dynamics and Simon (1961) on problem-solving. Examples include Sterman (2000) and Morecroft (2015) on modelling business dynamics.

North and Wallis (1994) developed the argument that technological innovations in the transaction and transportation sectors, such as banking, communications, and logistic services, are the enablers of new ways of organizing and doing business in other sectors of the economy. Their historical observation is important in today's rapidly changing political and economic environment. Many innovative business models, such as Alibaba, Airbnb and Uber, are in the realm of transaction and transportation services. Using the North and Wallis (1994) argument, business model innovation does not occur independent of institutional and technological innovations. Their framework implies that research be conducted beyond the boundaries of the individual firm and even the boundaries of the firm's immediate ecosystem. The works of Afuah (2003) on the effects of the Internet on firm boundaries, and Afuah and Tucci (2012) on crowdsourcing and search, merit further pursuit.

In line with Smith et al. (2010), we believe that organizational architecture should be an essential component of future business model research. Specifically, we need to better understand how new architectures that span conventional organizational boundaries affect the emergence, development, and transformation of business models (Gulati et al., 2012). Research on business models and their associated organizational designs needs to move beyond the firm level to the ecosystems in which firms are embedded.

Managers can benefit by using the business model concept in their strategizing and decision-making – but only if the concept is clarified and the research findings are made more interpretable and actionable. We offer several practical recommendations regarding business models and value configurations along with questions that managers can ask when considering business model innovation.

1. *Understand how value is created in your firm.* Value configuration affects all the elements of a business model as well as its associated organizational design. In your organization, how well are the five business model elements aligned with the firm's value configuration? Are there opportunities for complementary configurations? For example, Apple operates network services that increase the functionality of its products, and Tesla operates a network of charging stations to increase the range of its electric cars.

2. *Have a plan for changing your business model.* Effective firms align their business models to the environmental conditions under which they operate. Alignment is a dynamic process that requires constant vigilance. Existing business models usually can be kept in alignment through incremental, planned changes. However, when a disruptive technology or innovation threatens your firm's business model(s), you must be prepared to make some difficult decisions. Do you simply want to reaffirm your firm's present business model and figure out how to minimize the impact of the disruption? Does your firm want to experiment with a new business model even if it cannibalizes its current businesses?

3. *Know how collaboration fits into your firm's business model.* Newer business models call for increased collaboration, both within and across organizations. Your firm must understand how interpersonal and inter-organizational collaboration works. Also, your firm must be prepared to make the investments needed to develop collaborative capabilities. In knowledge-

intensive industries, where the knowledge base underlying products and services is complex, growing, and widely diffused, the ability to collaborate is a must.

4. *Anticipate the future of your firm's business model.* What are the emerging trends that may present business opportunities for your firm? Some potential candidates are smart cities, green transportation, participative healthcare, the sharing economy, and the circular economy. If your firm chose to develop business models for such conditions, what would those models look like? What value configurations would be used, and what organizational designs would be needed to create and sustain them?

Conclusion

The business model concept can be useful to the designers and managers of organizations as they strategize, plan, and adjust. A business model highlights the importance of thinking of a business enterprise as a system rather than a collection of parts. Considering the specific elements of a business model and their interrelationships is important when environmental threats or opportunities require changing the logic of doing business rather than merely improving how it is currently being conducted. The global economy is increasingly digital, networked, and knowledge-based, which requires firms to constantly reconsider their chosen business models and to modify them if necessary to adapt to changing conditions. To keep pace with the dynamic global economy, firms must be agile in their management of both the operational and dynamic dimensions of their business models.

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References

- Afuah, A., 2003. Redefining firm boundaries in the face of the internet: are firms really shrinking? *Acad. Manag. Rev.* 28 (1), 34–53.
- Afuah, A., Tucci, C.L., 2000. *Internet Business Models and Strategies*. McGraw-Hill Irwin, New York.
- Afuah, A., Tucci, C.L., 2012. Crowdsourcing as a solution to distant search. *Acad. Manag. Rev.* 37 (3), 355–375.
- Alberts, D.S., 2007. *Agility, Focus, and Convergence: the Future of Command and Control*. Office of the Assistant Secretary of Defense for Networks and Information Integration, Washington DC.
- Amit, R., Zott, C., 2001. Value creation in e-business. *Strat. Manag. J.* 22 (6–7), 493–520.
- Amit, R., Zott, C., 2015. Crafting business architecture: the antecedents of business model design. *Strat. Entrep. J.* 9 (4), 331–350.
- Applegate, L.M., 2001. E-business models: making sense of the Internet business landscape. In: Dickson, G.W., DeSanctis, G. (Eds.), *Information Technology and the Future Enterprise: New Models for Managers*. Prentice Hall, Upper Saddle River, NJ.
- Baden-Fuller, C., Morgan, M.S., 2010. Business models as models. *Long Range Plan.* 43 (2), 156–171.
- Baldwin, C.Y., Clark, K.B., 2006. The architecture of participation: does code architecture mitigate free riding in the open source development model? *Manag. Sci.* 52 (7), 1116–1127.
- Barney, J., 1991. Firm resources and sustained competitive advantage. *J. Manag.* 17 (1), 99–120.
- Boudreau, K.J., Lacetera, N., Lakhani, K.R., 2011. Incentives and problem uncertainty in innovation contests: an empirical analysis. *Manag. Sci.* 57 (5), 843–863.
- Brandenburger, A.M., Nalebuff, B.J., 1997. *Co-opetition*. Currency Doubleday.
- Casadesus-Masanell, R., Zhu, F., 2013. Business model innovation and competitive imitation: the case of sponsor-based business models. *Strat. Manag. J.* 34 (4), 464–482.
- Chandler, A.D., 1962. *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. M.I.T. Press, Cambridge, MA.
- Chandler, A.D., 1990. *Scale and Scope: the Dynamics of Capitalism*. Harvard University Press, Cambridge, Mass.
- Chesbrough, H.W., 2006. *Open Innovation: the New Imperative for Creating and Profiting from Technology*. Harvard Business School Press.
- Chesbrough, H., Rosenbloom, R.S., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spinoff companies. *Ind. Corp. Change* 11 (3), 529–555.
- Christensen, C.M., 1997. *The Innovator's Dilemma: when New Technologies Cause Great Firms to Fail*. Harvard Business School Press, Boston, MA.
- Christensen, C.M., Grossman, J., Hwang, J., 2008. *The Innovator's Prescription*. McGraw-Hill, New York.
- Christensen, C.M., Verlinden, M., Westerman, G., 2002. Disruption, disintegration and the dissipation of differentiability. *Ind. Corp. Change* 11 (5), 955–993.
- Christensen, C.M., Wang, D., van Bever, D., 2013. Consulting on the cusp of disruption. *Harv. Bus. Rev.* 91 (10), 106–114.
- Cook, D., Thompson, J.E., Habermann, E.B., Visscher, S.L., Dearani, J.A., Roger, V.L., Borah, B.J., 2014. From 'solution shop' model to 'focused factory' in hospital surgery: increasing care value and predictability. *Health Aff.* 33 (5), 746–755.
- Demil, B., Lecocq, X., 2010. Business model evolution: in search of dynamic consistency. *Long Range Plan.* 43 (2), 227–246.
- Desyllas, P., Sako, M., 2013. Profiting from business model innovation: evidence from pay-as-you-drive auto insurance. *Res. Policy* 42 (1), 101–116.
- Dorst, K., Dijkhuis, J., 1995. Comparing paradigms for describing design activity. *Des. Stud.* 16 (2), 261–274.
- Drucker, P.F., 1954. *The Practice of Management*. Harper Brothers, New York.
- Drucker, P.F., 1967. *The Effective Executive*. Heinemann, London.
- Economides, N., 1996. The economics of networks. *Int. J. Ind. Organ.* 14 (6), 673–699.
- Eisenhardt, K.M., Schoonhoven, C.B., 1996. Resource-based view of strategic alliance formation: strategic and social effects in entrepreneurial firms. *Organ. Sci.* 7 (2), 136–150.
- Farrell, J., Klemperer, P., 2007. Coordination and lock-in: competition with switching costs and network effects. *Handb. Ind. Organ.* 31 (3), 1967–2072.
- Fjeldstad, Ø.D., Haanæs, K., 2001. Strategy tradeoffs in the knowledge and network economy. *Bus. Strategy Rev.* 12 (1), 1–10.
- Fjeldstad, Ø.D., Snow, C.C., Miles, R.E., Lettl, C., 2012. The architecture of collaboration. *Strat. Manag. J.* 33 (6), 734–750.
- Forrester, J.W., 1958. Industrial dynamics: a major breakthrough for decision makers. *Harv. Bus. Rev.* 36 (4), 37–66.
- Gawer, A., Cusumano, M.A., 2002. *Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*. Harvard Business School Press, Boston, MA.
- Gulati, R., Puranam, P., Tushman, M., 2012. Meta-organization design: rethinking design in interorganizational and community contexts. *Strat. Manag. J.* 33 (6), 571–586.

- Hagedoorn, J., 1993. Understanding the rationale of strategic technology partnering: interorganizational modes of cooperation and sectoral differences. *Strat. Manag. J.* 14 (5), 371–385.
- Hayek, F.A., 1937. Economics and knowledge. *Economica* 4 (13), 33–54.
- Hayek, F.A., 1945. The use of knowledge in society. *Am. Econ. Rev.* 35 (4), 519–530.
- Hienerth, C., Keinz, P., Lettl, C., 2011. Exploring the nature and implementation process of user-centric business models. *Long Range Plan.* 44 (5), 344–374.
- Johnson, M.W., Christensen, C.M., Kagermann, H., 2008. Reinventing your business model. *Harv. Bus. Rev.* 86 (12), 57–68.
- Kerlinger, F.N., Lee, H.B., 1999. *Foundations of Behavioral Research*, fourth ed. Cengage Learning, Stamford, CT.
- Løwendahl, B.R., Revang, Ø., Fosstenlökken, S.M., 2001. Knowledge and value creation in professional service firms: a framework for analysis. *Hum. Relat.* 54 (7), 911–931.
- March, J.G., 1991. Exploration and exploitation in organizational learning. *Organ. Sci.* 2 (1), 71–87.
- Miles, R.E., Snow, C.C., 1978. *Organizational Strategy, Structure, and Process*. McGraw-Hill, New York.
- Miles, R.E., Snow, C.C., 1986. Organizations: new concepts for new forms. *Calif. Manag. Rev.* 28 (3), 62–73.
- Morecroft, J.D.W., 2015. *Strategic Modelling and Business Dynamics: a Feedback Systems Approach*. John Wiley & Sons.
- Nelson, R.R., Winter, S.G., 1982. *An Evolutionary Theory of Economic Change*. Harvard University Press.
- Newell, A., Simon, H.A., 1972. *Human Problem Solving*. Prentice-Hall, Englewood Cliffs, NJ.
- North, D.C., 1991. Institutions. *J. Econ. Perspect.* 5 (1), 97–112.
- North, D.C., Wallis, J.J., 1994. Integrating institutional change and technical change in economic history a transaction cost approach. *J. Inst. Theor. Econ.* 150 (4), 609–624.
- Porter, M.E., 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. The Free Press, New York.
- Porter, M.E., 1985. *Competitive Advantage*. The Free Press, New York.
- Prahalad, C.K., 2004. The blinders of dominant logic. *Long Range Plan.* 37 (2), 171–179.
- Ramirez, R., 1999. Value co-production: intellectual origins and implications for practice and research. *Strat. Manag. J.* 20 (1), 49–65.
- Schön, D.A., 1983. *The Reflective Practitioner: How Professionals Think in Action*. Basic Books, New York.
- Schumpeter, J.A., 1934. *Capitalism, Socialism and Democracy*. Routledge.
- Shapiro, C., Varian, H.R., 1999. *Information Rules: a Strategic Guide to the Network Economy*. Harvard Business School Press.
- Simon, H.A., 1961. Modeling human mental processes. In: *Papers presented at the May 9-11, Western joint IRE-AIEE-ACM Computer Conference Association for Computing Machinery*, pp. 111–119.
- Simon, H.A., 1981. *The Sciences of the Artificial*. MIT Press.
- Simon, H.A., 1991. Bounded rationality and organizational learning. *Organ. Sci.* 2 (1), 125–134.
- Simon, H.A., 1993. Strategy and organizational evolution. *Strat. Manag. J.* 14 (S2), 131–142.
- Skjølsvik, T., Løwendahl, B.R., Kvalshaugen, R., Fosstenlökken, S.M., 2007. Choosing to learn and learning to choose: strategies for client co-production and knowledge development. *Calif. Manag. Rev.* 49 (3), 110–128.
- Smith, W.K., Binns, A., Tushman, M.L., 2010. Complex business models: managing strategic paradoxes simultaneously. *Long Range Plan.* 43 (2), 448–461.
- Stabell, C.B., Fjeldstad, Ø.D., 1998. Configuring value for competitive advantage: on chains, shops, and networks. *Strat. Manag. J.* 19 (5), 413–437.
- Sterman, J., 2000. *Business Dynamics: Systems Thinking and Modeling for the Complex World*. Tata McGrawhill, India.
- Teece, D.J., 1986. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Res. Policy* 15 (6), 285–305.
- Teece, D.J., 2010. Business models, business strategy and innovation. *Long Range Plan.* 43 (2–3), 172–194.
- Thompson, J.D., 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. McGraw-Hill, New York.
- Tushman, M.L., Anderson, P., 1986. Technological discontinuities and organizational environments. *Adm. Sci. Q.* 31 (3), 439–465.
- Tushman, M.L., O'Reilly, C.A., 1996. The ambidextrous organizations: managing evolutionary and revolutionary change. *Calif. Manag. Rev.* 38 (4), 8–30.
- Varian, H.R., 2000. Buying, sharing and renting information goods. *J. Ind. Econ.* 4 (8), 473–488.
- von Hippel, E., 1994. "Sticky information" and the locus of problem solving: implications for innovation. *Manag. Sci.* 40 (4), 429–439.
- von Hippel, E., 2005. *Democratizing Innovation*, second ed. MIT Press, Cambridge MA.
- von Hippel, E., von Krogh, G., 2003. Open source software and the 'private-collective' innovation model: issues for organization science. *Organ. Sci.* 14 (2), 209–223.
- Williamson, O.E., 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press, New York.
- Wirtz, B.W., Pistoia, A., Ullrich, S., Götzel, V., 2016. Business models: origin, development and future research perspectives. *Long Range Plan.* 49 (1), 36–54.
- Zott, C., Amit, R., 2010. Business model design: an activity system perspective. *Long Range Plan.* 43 (2–3), 216–226.
- Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. *J. Manag.* 37 (4), 1019–1042.