

# Digital Business Modeling

## A Structural Approach Toward Digital Transformation



# Executive Summary

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## EVERY COMPANY WILL BECOME DIGITAL (OR VANISH)

It has become common sense that digital transformation does not only affect a few enterprises that were born digital, but rather all enterprises. This challenge confronts all business leaders with the necessity to **reimagine their business** in terms of digital. However, currently the tools for this endeavor are in their infancy.

## TECHNOLOGY AND BUSINESS INNOVATION DRIVE DIGITAL TRANSFORMATION

The digital economy creates a stronger bond between technological and business innovation than ever before. There are five **digital key elements** that represent the strategic hotspots of this development: **people, businesses, things, data, and cloud**. These elements encompass recent innovations such as social media, enterprise platforms, the Internet of Things, real-time analytics, and their connection through a network of services worldwide. They have started to deeply change the life of everybody all over the world.

## SYSTEMATIC APPROACH TO DIGITAL BUSINESS MODELING

To respond to the challenge that results from this development, we do not only need tools to systematically develop technology but also approaches toward systematic digital business model design. Business model innovation has become a growing topic, and methods for **business model design**, such as the business model canvas, have attracted increased attention among strategic leaders. Yet business and IT currently lack a common language to consistently discuss, analyze, and design opportunities from the digitization of business.

## MOVING TOWARD SYSTEMATIC DIGITAL BUSINESS DESIGN WITH DIGITAL VALUE DRIVERS

To complement these methodologies that address the specific challenges of digital transformation, we introduce the concept of **digital value drivers**, which illustrate the effect of digital key elements on the business model components (value proposition, customer segments, revenue streams, channels, customer relationships, key partners, key resources, key activities, and cost structure). The resulting matrix schema allows practitioners to systematically explore the influence of digital technologies on the business model – for example, by providing **illustrative examples** of the successful implementation of these value drivers in digital companies.

## MOVING TOWARD A MODELING LANGUAGE FOR DIGITAL BUSINESS

We propose a **graphical representation** for digital value drivers to make the concept applicable for actual design activities. Using this representation helps companies:

- Better understand the fundamental characteristics of digital business
- Learn about the nature and opportunities of digital technologies
- Pave the way toward successful digital transformation

Finally, we envision that **strategic intents** guiding digital transformation turn digital value drivers and business model patterns into powerful instruments to systematize digital business strategy and design.



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# 1. Overview

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Digital business is an increasingly important topic for all companies. However, business and IT lack a common language necessary to discuss, analyze, and design opportunities to take advantage of the digitization of business.

This paper defines a modeling approach for digital business that is simple, consumable, pragmatic, and easy to apply (as an analogy, think of a “business model canvas for digital business” [Osterwalder and Pigneur, 2010]).

The structure of the paper is as follows:

- Chapter 2 introduces broadly applicable business model descriptions.
- Chapter 3 defines some key terms as a foundation for the rest of the discussion and proposes a minimalistic model of digital capabilities.

- Chapter 4 suggests an approach to explore, analyze, and design the value and impact of digital capabilities on business models in a systematic way.
- Chapter 5 provides some real-world examples of companies’ digital business models, analyzed according to the proposed approach.
- Chapter 6 discusses the foundations of how to use the proposed concepts in the context of collaborative sessions and provides a research outlook.
- Chapter 7 concludes with some general ideas on the applicability of the proposed approach.

The digital economy creates a stronger bond between technological and business innovation than ever before.



## 2. Introduction to Business Modeling

A company's business model is a high-level representation of the specific manner in which the organization generates added value for its customers and sustains itself. The purpose of such representation is to illustrate the company's core business logic. It has to explain how the company succeeds in satisfying its customers' needs in comparison to other companies striving for the same goal. One of the most successful business model representations currently used is Alexander Osterwalder's "Business Model Canvas" [Osterwalder and Pigneur, 2010], which has been widely taken up by practitioners and will also be a reference point in this paper.

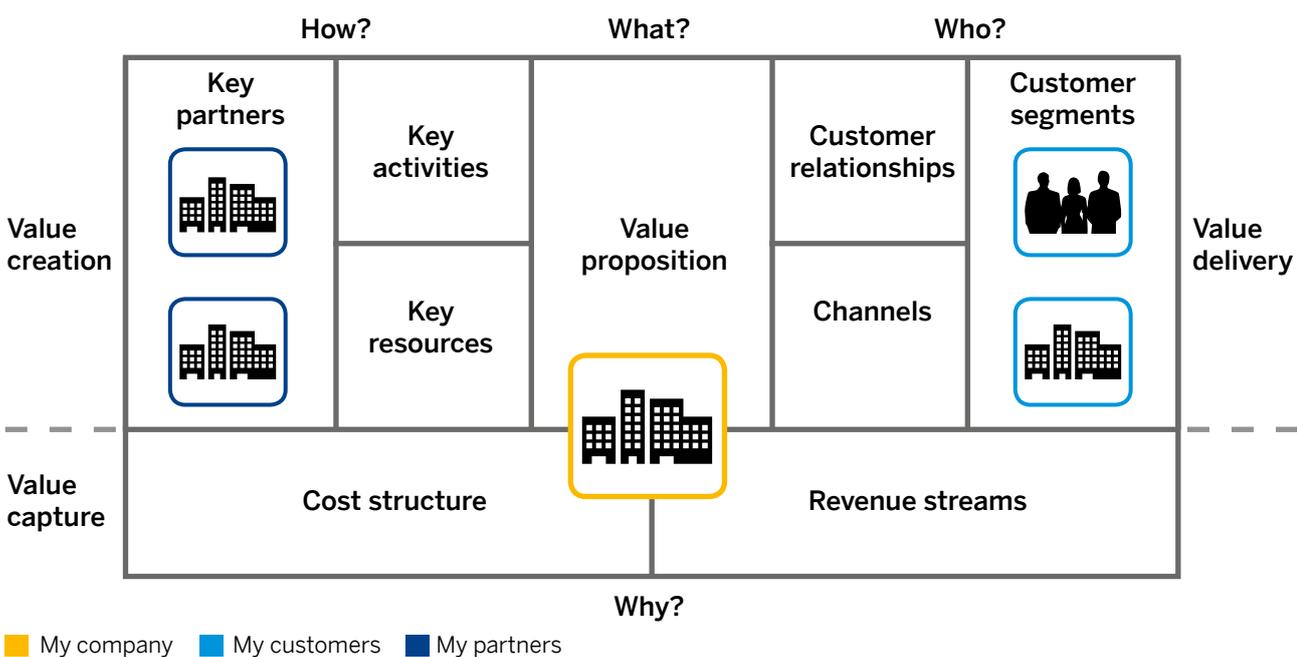
The business model canvas consists of nine components: value proposition, key activities, key resources, key partners, customer relationships, channels, customer segments, cost structure, and revenue streams.

channels, customer segments, cost structure, and revenue streams. A specific adaptation of this canvas is the **enterprise view** (see Figure 1). We will use the term business model canvas as the more general term, as we do not refer to the specific features of the enterprise view.

The key component of the enterprise view is the company's value proposition (indicated by "What?" in the figure). It joins the customer focus (indicated by "Who?") and the company focus (indicated by "How?") [Gassmann et al., 2015]. The former focus describes the value delivery and includes:

- Customer segments describing which customers are addressed by the value proposition
- Channels (for communication and delivery)
- Customer relationships describing the means by which the connection to the customers is maintained

Figure 1: Enterprise View



The latter focus describes the value generation and consists of:

- Key activities describing the essential activities in the company that generate the value proposition
- Key resources, which are the crucial resources to conduct these activities
- Key partners, which are the collaborating companies, such as suppliers that provide essential resources for the solution that do not come from the company itself

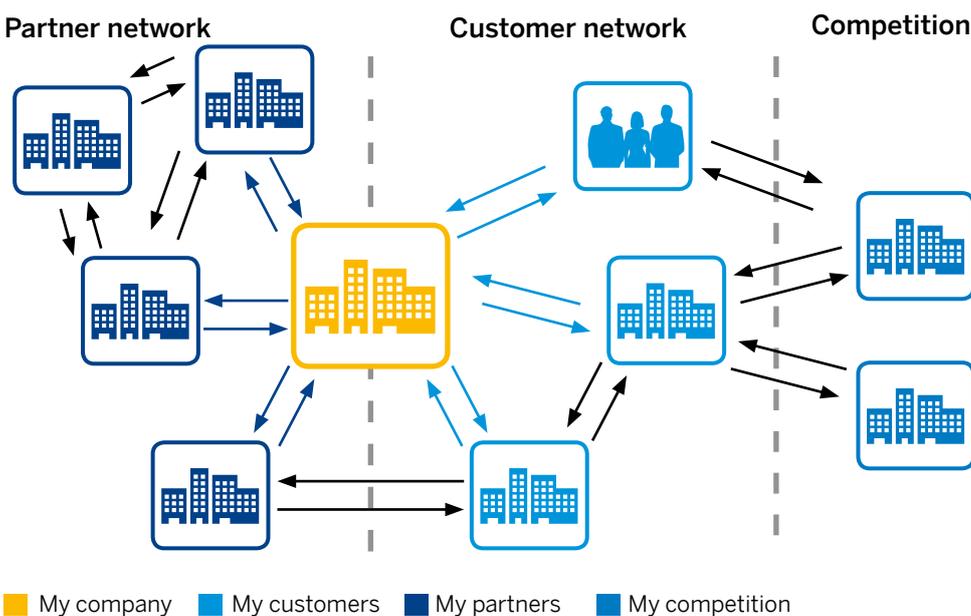
Value creation and value delivery are supplemented by value capturing, which completes the description considering costs and revenues. All components are internally related, although the respective relationships are usually not explicated for the sake of readability. In addition to the enterprise view, companies can also use the network view (see Figure 2),

which displays all partnering companies forming a sustainable business network.

These companies take part in the value exchange processes associated with the selected value generation. Both views together provide a survey of the most relevant components of a complex business.

The major purpose of the network and enterprise views is to provide a conceptual framework that allows us to talk about a company's business logic in a well-defined manner. Using the respective terminology helps us focus on the value aspects of digital transformation. In order to simplify the discussion, we will concentrate on the nine components of the enterprise view only. For a full discussion, however, we recommend using a complete representation that consists of all the elements [Osterwalder and Pigneur, 2010; Doll and Eisert, 2014].

Figure 2: Network View



### 3. Digital Key Elements

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Before we develop our approach for digital business modeling, we will introduce some basic terms.

Term	Description
Digital business	<p>While, in a nondigital business, IT's role in the business model is mainly value generation, a digital business is characterized by the fact that IT affects all business model components, including value proposition and value delivery, significantly and in an integrated way.</p> <p>In this respect, we distinguish between two different business models:</p> <ul style="list-style-type: none"> <li>• A "digital business model," in which digital technology plays a significant role in the value proposition (in particular, service portfolio or customer experience or both) in the described way</li> <li>• A "digitally enabled business model," which denotes any business model in which at least one of the components is significantly enabled by and based on digital technologies</li> </ul> <p>These definitions are not exclusive: the more business model components are based on digital technologies (that is, the more a company is digitally enabled), the more the model turns into a digital business model.</p> <p>In particular, all digital business models are also digitally enabled, but not vice versa.</p>
Digital economy	<p>A digital economy is an economy of digital businesses. Digitization affects multiple aspects of economy – for example, companies' organization and offerings, production systems and logistics, consumers' behavior and experience, labor markets, commerce and exchanges, and more.</p>
Digital capability	<p>A digital capability is the ability of digital-computing technologies to generate value for a business. We also refer to the digital capability of a company, which means the digital-computing technologies used by this company to employ digital business.</p>
Digital transformation	<p>Digitization of business is the process of transforming a business into a digital business.</p>
Digital strategy	<p>A digital strategy is the part of a company's overall strategy that aims at digital transformation.</p>

When implementing a digital strategy, companies often face the dilemma between incremental and disruptive innovation [McQuivey, 2013]. Incremental innovation follows a pragmatic approach that aims at improving existing solutions; disruptive innovation aims at developing powerful visions. To avoid this, successful digital companies aim at “innovating the adjacent possible” [McQuivey, 2013]. Although this approach also aims at incremental improvements, all of them are related to each other so that the sum of integrated innovations results in a disruptive solution.

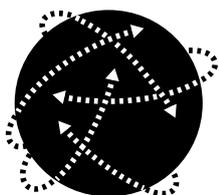
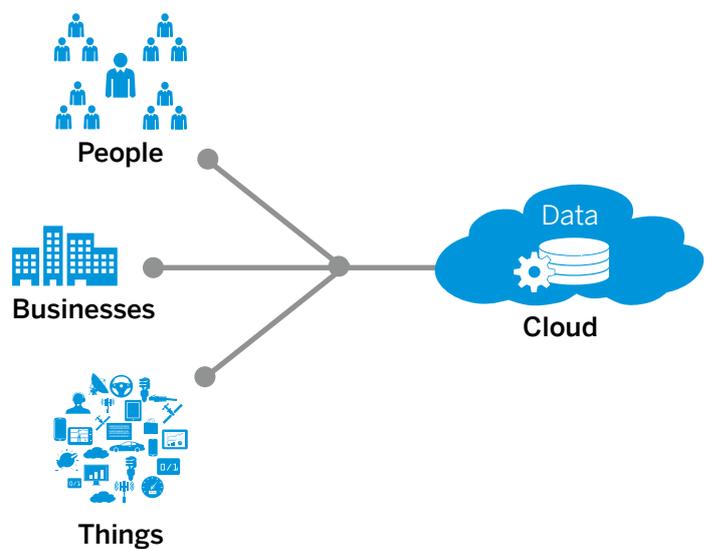
As mentioned in the “Overview” section, business and IT lack a common language that allows us to consistently discuss, analyze, and design opportunities to take advantage of digital transformation. This hampers the systematic approach toward digital innovation, so we consider it to be one of the most important obstacles for implementing a digital strategy.

On the business side, we can start from the business model canvas as an established approach to model the way an organization creates, delivers, and captures value. On the IT side, we need a similar minimalistic and yet semantically rich approach to model digital capabilities.

As a synthesis of different views that IT analysts,<sup>1</sup> vendors, and practitioners are commonly using, we will discuss, analyze, and design digital capabilities through a minimalistic, object-oriented, and functional representation based on five key elements (from now on referred to as “digital key elements” – see Figure 3):

- People
- Businesses
- Things
- Data
- Cloud

Figure 3: Digital Key Elements



Five digital key elements represent strategic hotspots: people, businesses, things, data, and cloud.

#### FOOTNOTE

1. In particular, we refer to Gartner (Nexus and digital lenses concept) and IDC (third platform concept).

These digital key elements do not regard digital capabilities from a mere technology perspective but, first of all, take a business perspective:

- **People** of the digital age are creative, informed, and knowledgeable; they are the source and the foundation of the digital economy. In our model, we use the term “people” as an abbreviation for digitally connected individuals and communities who leave their marks (data) in the digital world.

People use digital capabilities via different types of devices (desktops, laptops, smartphones, wearable devices like smart watches and e-glasses, and so on), experiencing various kinds of human-computer interactions. We look at **mobility** as a key access point to digital capabilities. Through the same devices, people digitally connect to other people. We regard **online communities** and **social networks** as digitally enabled, network-based relationships between individuals. We look at **digital social business** as value creation from human-to-human digital connections. For business modeling purposes, we sometimes refer generically to the **people** key element; however, whenever useful, we distinguish individuals from communities.

- **Businesses** in the past were self-optimizing entities in a static environment, but nowadays they are compelled to continually evolve their dynamics to regularly self-disrupt and renew themselves in a constantly changing environment. In our model, we use the term “businesses”

as an abbreviation for digitally connected businesses or groups of businesses that combine their digital capabilities to create new solutions. Businesses digitally connect to other businesses, to individuals, and to assets using different types of means – for example, the public Web, XML standards, and connectors to marketplaces.

- **Things** in the past were “dumb” objects, but now we find them increasingly becoming part of the digital world and interacting smartly with people, businesses, or other objects. In our model, we use the term “things” as an abbreviation for digitally connected objects, or **smart things**.

Smart things are typically equipped with sensors that produce data and might even have their own application logic. They also exchange data and might connect to networks. Smart things can automatically react to contexts without customer interaction. This can include customers’ smartphones insofar as they serve as smart sensors (for example, for the customer’s current location). In our model, we include robots, autonomous vehicles, drones, and so on in the category of “things.” In addition, we also consider any technologies for digital manufacturing (for example, 3D printing) that use digital information to produce physical objects as being part of this category. The **Internet of Things** enables individual physical objects to connect to and interact with other objects, people, and businesses – creating value from information exchanges. In particular, we regard **machine-to-machine (M2M)** interactions as value creation from things-to-things digital connections.

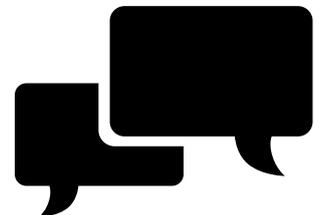


- **Data** from a technology perspective deals with records in databases and data management processes. We suggest looking at data as a business asset [van 't Spijker, 2014] that you can leverage for your business model. In our model, we use the term “data” as an abbreviation for real-time, complete, detailed, consistent, transparent, and accessible information and any algorithms employing this data for analysis, planning, and prediction – including cognitive computing. This includes sophisticated analytics procedures that process small or large amounts of data and generate consumable information. We consider **Big Data** and **smart data** as being included in the “data” category.

- **Cloud** from a technology perspective is just an infrastructure, but we suggest looking at it as a value-creating **service** type with specific characteristics:
  - A service that handles abstract resources (that is, digital content or information associated with a physical resource or product or a natively digital product)

- A service that is on demand (that is, available per request)
- A service that is scalable (up and down, depending on the demand)
- A service for which you can pay per use (that is, you can pay based on consumption)
- A ubiquitous service (that is, accessible from anywhere)

In this way the cloud becomes a service model and a logical shared environment in which people, businesses, and things connect in order to exchange and accumulate data as well as to offer and consume digital services.



Business and IT currently lack a common language to consistently discuss, analyze, and design opportunities from the digitization of business.

# 4. Connecting Business to Digital

In this section we explore the main relationships between digital key elements and the components of the business model canvas in the form of a matrix schema (see section 4.1). For each element of this schema, we provide a description and examples, followed by a series of questions that help us understand its central characteristics.

## 4.1 CONNECTING BUSINESS MODEL COMPONENTS TO DIGITAL KEY ELEMENTS THROUGH VALUE DRIVERS

In the context of business model design, we are interested in how digital capabilities generate value. In this respect, we investigate what we call digital value drivers. By this we mean specific value-generating effects that come along with digital key elements

in a business context. Moreover, we can associate value drivers with certain components of the business model canvas. We can do so through a matrix that has the business model canvas components as one dimension and the digital key elements as the other dimension while digital value drivers appear in the matrix elements (see Figure 4).

Analyzing a variety of digital-business examples, we have derived a list of digital value drivers that we have categorized according to the business model components and the digital key elements that they address. For each digital value driver, we provide key questions that one can use as a basis for collaborative sessions for designing digital and digitally enabled business models.

Figure 4: Digital-Value-Drivers Matrix Concept

					
	People	Businesses	Things	Data	Cloud
Value proposition 					
Customer segments 					
Revenue streams 					
Channels 					
Customer relationships 					
Key partners 					
Key resources 					
Key activities 					
Cost structure 					

## 4.2 VALUE PROPOSITION

In this section we describe the particular elements that a digital company can offer to improve its

customers' experiences and bring them additional value. This might include completely new solutions and also digital enhancements of existing solutions.

### Value Proposition

Digital Key Element	Value Driver	Description	Examples
Data	Accelerated decision support and value delivery	High-performance data accelerates decision support and value delivery. Data collection and processing can accelerate customer decisions along the whole customer journey, from discovering and evaluating solutions to purchasing and requesting support.	Porch offers an online platform for "home improvement" services. It features customer reports and statistical information, aggregating data on millions of home-improvement professionals and projects in the United States.
Data	Data-based solutions	Data collection and processing can be an essential component of new as well as enhanced solutions.  Information and insights that are derived from data can provide direct value to customers.	Google offers targeted ads based on sophisticated matches between user-related information, indexed Web content, and advertisers' data.  AccordantMedia delivers analytic results to its customers based on data analysis.  Data.com offers up-to-date, accurate data about companies and contacts, from names, e-mails, and phone numbers to employee counts and more.
Data	Tailored data-based customer solutions	Based on the identification of customers and their usage of data, it is possible to offer very targeted solutions that exploit the available information.	Personal medicine – for example, CancerLinQ  Custom clothing – for example, Fashionmetric



Cloud	On-demand services	Digitization moves the information-related parts of physical products to abstract resources (dematerialization). Resources and services are offered on demand, which helps balance demand and resources.	Netflix on-demand video streaming
Cloud	Integrated solutions	Cloud-based networks enable scenarios based on data sharing and composition of services.	Uber – since the locations of the customer and the driver offering transportation are known from their smartphones, the customer, driver, and Uber can work together easily, which makes the process for the customer faster and more transparent.
People	People network-based solutions	Connections between digitally connected individuals or communities or both can be leveraged to create new services.	LinkedIn has a value proposition that is based on relationships among professionals that are used to establish connections to recruiters.
People	Integrated communities	Customers have the opportunity to express their satisfaction about a product on the platform from which they bought it. By compiling various customers' experiences and viewpoints, other customers get a comprehensive overview of the product's qualities. This yields an additional value to those customers who need advice when selecting a product.	Amazon customers' product reviews and ratings provide a lot of additional information that helps other customers find a product that best serves their wishes.
Businesses	Integrated multipartner solutions	Digital networks help integrate services of different providers to improve customer solutions.	PayPal makes online payment an integrated part of online purchase processes. In this way the process becomes much faster.
Things	Smart solutions	Smart things make it easier to collect information that is necessary to provide the customer with an optimal solution.	Samsung SmartHome lets customers monitor, control, and secure their homes from anywhere.



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
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Data	Accelerated decision support and value delivery	<ul style="list-style-type: none"> <li>• Are we providing customers with all relevant information along the whole customer experience lifecycle (discovery, acquisition, implementation and usage, support, dismissal)?</li> <li>• What data do we need to improve our customer experience?</li> <li>• Which types of new decision-making processes can existing and new data enable, imagining that that data is in real time, complete, detailed, and consistent?</li> <li>• How would our business model change if – through better data – the time to execute on our customers' decisions (for example, time to create an offering, time to deliver a product or service) were virtually zero?</li> <li>• What decisions do our customers need to make to execute more quickly?</li> <li>• How might we provide customers with information that is more relevant to them?</li> <li>• How do we handle data privacy along the customer journey map?</li> </ul>
Data	Data-based solutions	<ul style="list-style-type: none"> <li>• What data do we need for our solution portfolio strategy and to support the products or services we have in mind?</li> <li>• What kind of new products or services can we imagine that are based on data that we can collect, manage, and analyze?</li> <li>• How might we turn a current product – or a part of it – into a digital service?</li> <li>• How do we handle data privacy related to data-based solutions?</li> </ul>
Data	Tailored data-based customer solutions	<ul style="list-style-type: none"> <li>• What data do we need to individualize solutions?</li> <li>• How could services or data support customers in using a solution?</li> <li>• How can we tailor customer offerings based on data?</li> </ul>
Cloud	On-demand services	<ul style="list-style-type: none"> <li>• What are the advantages of a digital service versus a nondigital service or a physical product in the context of our business?</li> <li>• What advantages do we get from on-demand provisioning of used services?</li> <li>• How might we make our digitized product scalable (up and down) depending on the demand?</li> <li>• How can the on-demand provisioning of services help mask the complexity of our solutions through technology, thus improving our customers' experiences?</li> </ul>



Cloud	Integrated solutions	<ul style="list-style-type: none"> <li>• How might we combine services to enhance our value proposition?</li> <li>• How might we leverage a common digital environment to share information and provide new types of value to stakeholders?</li> </ul>
People	People network-based solutions	<ul style="list-style-type: none"> <li>• Imagine that different groups of stakeholders are digitally connected. What kind of new products or services might we create that leverage those connections?</li> <li>• How can we enhance our value proposition by leveraging digitally connected individuals, teams, and communities?</li> </ul>
People	Integrated communities	<ul style="list-style-type: none"> <li>• How might we radically improve our solutions if we had a direct, bidirectional information channel to our end users and customers?</li> <li>• How might we radically improve our customers' experiences by leveraging digital connections to other customers or groups of stakeholders?</li> </ul>
Businesses	Integrated multipartner solutions	<ul style="list-style-type: none"> <li>• Imagine that different groups of organizations that are relevant for our business are digitally connected and can exchange information seamlessly. What kind of new product or service might we create that can leverage those connections? What value might our customers get out of it?</li> <li>• How might we improve our customers' experiences by leveraging services of information from other organizations and companies?</li> <li>• How might we radically improve our solutions if we had a direct, bidirectional information channel to other companies and organizations?</li> </ul>
Things	Smart solutions	<ul style="list-style-type: none"> <li>• Which types of smart things are relevant for our industry?</li> <li>• Which types of smart things are relevant for our business?</li> <li>• How might we leverage smart things in our products or services?</li> <li>• How might we radically improve our customer experience by leveraging smart things?</li> </ul>

Business model innovation has become a growing topic, and methods for business model design have attracted increased attention among strategic leaders.



### 4.3 CUSTOMER SEGMENTS

Customer segments describe the various groups of people or organizations that are addressed by

a business model. Such specification may be related to specific behavioral demands of the respective customers as well as to geographic segmentation.

#### Customer Segments

Digital Key Element	Value Driver	Description	Examples
Data	Microsegments	Detailed data with respect to customers and the aggregation of data on platforms enable companies to target microsegments and even individuals (segments of one). Based on the aggregation of customer data from various sources, a company can generate a profile that helps to offer an individual solution. This allows companies to extend the customer segments to those customers with very specific demands, addressing a long-tail market.	Amazon offers rare books to a very specific segment of customers interested in them.
Data	Customers with high information demands	There is a customer segment with superior information demands regarding offered products. In order to compete with traditional shops, the information provided must be of very high quality.	BASF addresses information overload problems for agronomists and growers who need to decide which kind of chemical product to use.
Cloud	Global reach by the cloud	Due to the universal availability of the Internet and the cloud, it is easy for a company to extend a digital offering to other geographic regions. Digital services can often be offered directly to customers on a global scale.	American Jeans offers jeans all over the world shipped from the United States, reaching a global market through its Internet platform.



People	Digital consumers	Any individual with a personal digital device is a potential customer. Online communities can be treated both collectively and in parts as customer segments.	City-parking payment systems are being digitized relying on a broad diffusion of smartphones.
People	Group purchase	Companies can give customers the opportunity to bundle their purchases in order to get a volume discount. In this way the companies make certain solutions attractive for customers who could not afford them before.	Alibaba allows customers to form groups that can jointly purchase certain quantities of goods, getting a better price. In this way they can address customers who rely on the cheaper price.
Businesses	Global reach by business networks	Partners in business networks are often focused on specific regions. The universality of business networks makes it possible to work with different partners in different geographic regions.	Logistics service providers offer local services to companies with a global presence.
Things	Things as customers	Smart things can autonomously ask for services – for example, based on subscription. In this way they become “customers.”	A refrigerator that is aware of its contents is able to automatically process a shopping list or even perform a purchase automatically or semiautomatically.



A company’s business model is a high-level representation of the specific manner in which it generates added value for its customers and sustains itself.

## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Microsegments	<ul style="list-style-type: none"> <li>• Which types of data might we collect about our customers?</li> <li>• How might we use that data to individualize our value proposition to specific groups of customers or, ideally, individuals?</li> <li>• How might we radically improve our customer experience by individualizing offerings based on data we collect?</li> </ul>
Data	Customers with high information demands	<ul style="list-style-type: none"> <li>• How might we use data to target customers with high information demands?</li> <li>• Could customers with high information demands be a new customer segment?</li> </ul>
Cloud	Global reach by the cloud	<ul style="list-style-type: none"> <li>• Which new customers could we reach using digital technologies – for example, cloud-based services?</li> <li>• How might we radically extend our customer base by using digital technologies – for example, cloud-based services?</li> <li>• Do we need to make any adjustment in our offering, depending on where the customer is geographically located?</li> <li>• Are there legal barriers to expanding our business into new geographic regions?</li> </ul>
People	Digital consumers	<ul style="list-style-type: none"> <li>• What kind of people might we reach with innovative personal computing, mobile, and wearable digital technologies?</li> <li>• What new information around people that are potential or actual customers might we get from digital technologies?</li> <li>• How might we extend the number of people that are potential customers by using digital technologies?</li> </ul>
People	Group purchase	<ul style="list-style-type: none"> <li>• Should we target price-sensitive customers by enabling them to form groups on a digital platform that can jointly purchase certain quantities of goods?</li> </ul>
Businesses	Global reach by business networks	<ul style="list-style-type: none"> <li>• How might we extend the number of companies that are potential customers by using digital technologies?</li> <li>• What new companies and organizations might we reach through e-marketplaces?</li> <li>• Do we need to make any adjustment to our business offering to better address the respective type of company, industry, and function?</li> <li>• What new data might we get from digital technologies about organizations that are potential or actual customers?</li> </ul>



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Things	Things as customers	<ul style="list-style-type: none"> <li>• Could smart things autonomously order a service?</li> <li>• Could we offer a suitable subscription for such service?</li> <li>• Could smart things recommend a service to a human customer?</li> <li>• How might we turn a smart thing into a “customer”?</li> </ul>
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#### 4.4 REVENUE STREAMS

Revenue streams describe what customers pay for and how. This concerns new assets that originate from using digital technologies and novel ways of pricing due to digital business.

#### Revenue Streams

Digital Key Element	Value Driver	Description	Examples
Data	Data monetization	Revenues coming from direct or indirect monetization of data. An intensive exchange of data between companies and customers – as well as among companies – opens up opportunities for generating new revenue streams by selling this data to partners, either directly or after some enrichment by intelligent data aggregation services.	The Google search business model is based on the exploitation of customer data, which allows Google to offer more-targeted advertising to customers.
Data	Adaptive pricing	Companies can analyze available information in real time to continuously adapt the price to the market situation.	Airlines adapt the prices for flight tickets based on the analysis of interested customers.
Cloud	Ubiquitous-service monetization	Worldwide revenues come from cloud-based digital services.	iTunes gets worldwide revenues from media downloads.
Cloud	Precision subscription-based pricing for digital services	Revenue streams are based on subscription pricing models for digital services.	<i>The New York Times</i> offers various subscription options, covering specific customer interests.



Cloud	Pay-per-use pricing for digital services	Revenue streams are based on pay-per-use pricing models for digital services. The price decrease that results from this can help sell services that the customer could not afford earlier.	Infrastructure-as-a-service services are paid for depending on the usage of computing resources. In this way it becomes feasible for new customer segments to use these services.
Cloud	Cloud technical infrastructure monetization	Cloud capacities that are available but not used can be offered on the market, generating new revenue streams.	Amazon Web Services is a typical example for this strategy. Cloud capacities that it does not use for regular business are offered to partners.
People	People-community monetization	Revenues come from controlling the access to digital people communities.	LinkedIn has a business model that is based mainly on the exploitation of customer data, which customers provide in exchange for access to the platform. In addition, the company offers charged communication services as part of a premium bundle.
People	Group-based pricing	An online community may allow people to pool together in order to get a higher discount.	Alibaba opens up this opportunity for its customers.
Businesses	Business-network monetization	Revenues can come from controlling the access to a digital business network. Digital business models do not allow collaboration only with companies as business partners but also with individuals.	Through its platform, Uber monetizes its connection with individual drivers as partners. Only through this digitally enabled partnering is it able to offer its services.
Things	Smart-thing monetization	Smart devices include features that allow charging a premium price.	LIFX sells Wi-Fi-enabled light bulbs at a premium price.
Things	Service monetization via smart devices	Digitally enhanced smart devices can generate new revenue streams if they make use of supplementary services.	Industrial pumps equipped with sensors trigger maintenance services.



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Data monetization	<ul style="list-style-type: none"> <li>• How might we monetize data?</li> <li>• How might we improve revenue streams based on data that is provided in real time, accurate, detailed, and complete?</li> <li>• Should we implement new pricing models based on the availability of real-time, detailed data?</li> </ul>
Data	Adaptive pricing	<ul style="list-style-type: none"> <li>• On what data do we base the adaptation of prices?</li> <li>• How do we avoid annoying customers through adaptive pricing?</li> <li>• How can we ensure pricing transparency?</li> </ul>
Cloud	Ubiquitous-service monetization	<ul style="list-style-type: none"> <li>• How might digital services help us to monetize our solutions worldwide?</li> <li>• How might we use digital services to scale our business?</li> <li>• How might digital services help us to cross-sell and up-sell, thus indirectly generating additional business?</li> </ul>
Cloud	Precision subscription-based pricing for digital services	<ul style="list-style-type: none"> <li>• What advantage would subscription-based pricing bring to our customers?</li> <li>• Could and should we establish a subscription-pricing model for one or more components in our value proposition?</li> <li>• What are the parameters of a subscription-pricing model (frequency of payment, service-level agreement, and so on) for our offering?</li> <li>• Can we offer special subscriptions that optimally address our customers' needs?</li> </ul>
Cloud	Pay-per-use pricing for digital services	<ul style="list-style-type: none"> <li>• What advantage would pay-per-use pricing bring to our customers?</li> <li>• Could and should we establish a pay-per-use pricing model for one or more components in our value proposition?</li> <li>• For which resources could and should customers pay to use?</li> <li>• What does or would the pay-per-use payment curve (price, resource consumption) look like?</li> </ul>
Cloud	Cloud technical-infrastructure monetization	<ul style="list-style-type: none"> <li>• Do we have unused IT capacities that can be offered to customers?</li> <li>• Should we offer cloud capacities to partners if these are not used for regular business?</li> </ul>



People	People-community monetization	<ul style="list-style-type: none"> <li>• What is the value of a digital connection between two or more individuals or groups or communities?</li> <li>• How might we monetize connections between individuals or between groups?</li> <li>• How might we monetize the collaboration among individuals and groups that a digital platform can enable?</li> <li>• Which pricing models are suitable for capturing value from people-to-people connections enabled by digital technologies?</li> </ul>
People	Group-based pricing	<ul style="list-style-type: none"> <li>• Can we enable groups of people to perform group purchases and create new revenue streams?</li> <li>• Should we have a specific pricing model for group purchases?</li> </ul>
Businesses	Business-network monetization	<ul style="list-style-type: none"> <li>• What is the value of a digital connection between two or more organizations or businesses?</li> <li>• How might we monetize connections between companies or organizations or between clusters of companies or organizations?</li> <li>• How might we monetize the collaboration among companies and groups of companies that a digital platform can enable?</li> <li>• Which pricing models are suitable for capturing value from business-to-business (B2B) connections enabled by digital technologies?</li> </ul>
Things	Smart-thing monetization	<ul style="list-style-type: none"> <li>• How can we monetize smart things?</li> <li>• Which pricing models can support the monetization of smart things?</li> </ul>
Things	Service monetization through smart devices	<ul style="list-style-type: none"> <li>• How can smart things drive new revenues through interactions with users?</li> <li>• Can we directly or indirectly monetize the connection and interaction between smart things and people?</li> <li>• How might we monetize connections between our B2B customers' businesses and smart things?</li> <li>• How might we monetize connections between our partners' businesses and smart things?</li> <li>• Which pricing models are suitable for capturing value from the connections between smart things and our own business, our B2B customers, or our partners?</li> </ul>



## 4.5 CHANNELS

Channels describe how customer segments are reached. This includes digital communication, interaction, and delivery channels.

### Channels

Digital Key Element	Value Driver	Description	Examples
Data	Customized channels	Channels to communicate with customers and to promote, sell, and deliver products or services can be customized based on data and digital technologies.	Retail Web sites adapt content as a reaction to a user's previous navigation.
Cloud	Ubiquitous access	Organizations can expose, communicate, and deliver their value propositions regardless of customer locations and time of day. The integration capabilities (together with mobile access) allow companies to establish channels to customers at any time and place.	Customers have mobile access to home banking services.
Cloud	Platform channel	The platform is a cloud-based channel that provides customers with access to services and products from various sources and information to decide on a purchase.	eBay provides a platform that offers customers a variety of products offered by a large number of providers. The additional information it provides helps the customer to select the right product.
People	Digital access points as a channel	Customer channels can be enriched and enhanced by using modern human-computer interfaces.	Smartphones act as a channel to the customers.



People	Community-specific advertising and information	By collaborating with different communities or people platforms, companies can adapt their communication to an individual community, making use of community-specific information.	LinkedIn collaborates with companies that offer their services to the LinkedIn community, making use of profiles that are available there – for example, for recruiting.
Businesses	Access to customers through a platform	Digital business networks (for examples, electronic marketplaces) give companies access to a customer pool.	E-marketplaces for B2B e-commerce
Things	Internet of Things as an indirect channel to people and businesses	Smart things owned or used by customers can be leveraged as channels to communicate, sell products and services, and deliver products and services to customers.	<p>Connected cars approaching a gas station receive offers from merchants.</p> <p>An industrial smart pump recommends maintenance services to operators.</p>
Things	Things-to-things communication	Smart things become more independent from their users by exchanging data between themselves. New relations and value-adding scenarios are established.	A self-supplying fridge establishes a direct channel between the device and the service provider. The customer only monitors the process.

Digital capabilities go beyond a mere technology perspective toward a business perspective.



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Customized channels	<ul style="list-style-type: none"> <li>• How might we customize our communication channels to customers based on data and digital technologies?</li> <li>• What data would we need to customize our channels to customers?</li> <li>• How could sales channels adapt in real time to serve customers better?</li> <li>• What data and prerequisites do we need to set up channels that are able to adapt when responding to customer behavior and needs?</li> </ul>
Cloud	Ubiquitous access	<ul style="list-style-type: none"> <li>• How might we digitize our communication channels to communicate better with our customers regardless of their location and the time of day?</li> <li>• How might we use digital technologies to allow customers to discover, evaluate, and buy our products or services from any place and at any time?</li> <li>• How might we use digital technologies to deliver our products or services more efficiently or effectively or both?</li> </ul>
Cloud	Platform channel	<ul style="list-style-type: none"> <li>• How might we use a digital platform as a channel to one or more customer segments?</li> </ul>
People	Digital access points as a channel	<ul style="list-style-type: none"> <li>• How might we use personal devices to enrich and enhance our communication, sales, or delivery channels to customers?</li> <li>• How might we use augmented reality technologies to enrich and enhance our communication, sales, or delivery channels to customers?</li> </ul>
People	Community-specific advertising and information	<ul style="list-style-type: none"> <li>• How can we use the specific profile and interests of a specific network of people to address them in the most effective way?</li> <li>• Does the network provide data that helps us adapt our communication?</li> </ul>
Businesses	Access to customers via a platform	<ul style="list-style-type: none"> <li>• How might we use business networks (for example, electronic marketplaces) to reach out to new customers (companies and organizations)?</li> <li>• How might we use business networks (for example, electronic marketplaces) to sell our products or services?</li> <li>• How might we use business networks to deliver our products or services?</li> </ul>

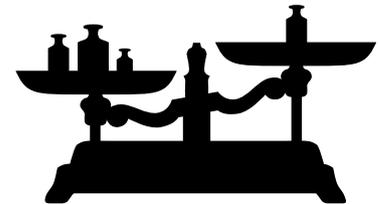


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Things	Internet of Things as an indirect channel to people and businesses	<ul style="list-style-type: none"><li>• How might we take advantage of the Internet of Things as a channel to business-to-consumer (B2C) or B2B customers?</li><li>• How might we use smart things owned or used by customers as a channel to communicate with them?</li></ul>
Things	Things-to-things communication	<ul style="list-style-type: none"><li>• How can we reach new customers based on semiautonomous or autonomous data exchange between smart things?</li><li>• Can we directly connect smart things to digital services, having them order services semiautomatically while the owners or users just monitor the process?</li><li>• How might we leverage M2M scenarios to reach customers?</li></ul>

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People are the source and the foundation of the digital economy.



#### 4.6 CUSTOMER RELATIONSHIPS

Customer relationships describe how digital technologies are used to establish or maintain relationships with customers.

##### Customer Relationships

Digital Key Element	Value Driver	Description	Examples
Data	Better knowledge of customers	There is value that comes from having greater knowledge about actual and potential customers, which is a result of data collection and analysis.	Amazon's recommendation system, which is based on previous purchases and generally available data, motivates customers to return to the company's Web site.
Cloud	Digital assistance	This is the ability to support customers through digital means along the customer experience.	Digitized customer service and support helps retain customers and attracts them to the company Web site for up-selling.
Cloud	Networked customer relationships	Due to integration provided by the cloud, companies can share their customer profiles. In this way they get a more detailed picture of their customers and customers get easier access to a solution, since a company might already have access to the data it needs.	Star Alliance airlines manage customer profiles across different companies via Star Alliance and the Miles & More program.



People	Social network–based customer relationships	Closer digital interaction with customers and customer communities allows companies to get a better understanding of their needs and establish a better relationship with them. Social networks can be used in B2C or B2B2C relationships to increase customer intimacy or understand end-user needs better. Social networks can be used to acquire new customers, decrease churn rate, and increase customer satisfaction.	Software communities provide customers with information directly from experts and give them the opportunity to share experiences with other customers.
Businesses	Business network–based customer relationships	Business networks can be used in B2B relationships to increase customer intimacy, understand customer needs better, acquire new customers, decrease churn rate, and increase customer satisfaction. Digital business allows companies to extensively integrate their solution. For the customer, however, only one company establishes the communication to the customer and becomes a trusted provider.	Airbnb bundles a number of services, but the customer only deals with Airbnb. This makes the relationship much easier than dealing with all service providers individually.  Amazon provides a trusted platform offering products from various partners.
Things	Door-opener devices	By using certain smart devices, customers establish a relationship with a company and get access to additional services offered by this company. A smart device can ease customers' access to services that are designed specifically for this device. Such binding to the device encourages customers to first inspect the company's offerings and not buy competitors' solutions.	Apple provides smart devices that take advantage of services offered by Apple itself – for example, by better integration compared to other providers' services. By using suitable user interfaces, they make it quite easy for customers to purchase these services even though they might not have purchased such services before.



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Better knowledge of customer	<ul style="list-style-type: none"> <li>• What data might we use to know customers better?</li> <li>• How might we collect and process data that helps us to improve customer intimacy?</li> <li>• How might we manage data about customer experience and use it to retain existing customers?</li> <li>• How might we collect data on prospects to turn them into customers?</li> <li>• How might we analyze data to decrease churn rate?</li> <li>• How might we analyze data to improve our value proposition over time?</li> </ul>
Cloud	Digital assistance	<ul style="list-style-type: none"> <li>• How might we use digital technologies to assist customers along the whole lifecycle of our relationship with them?</li> <li>• How might we improve customer satisfaction, using modern IT and communication technologies?</li> <li>• Would our customers need any kind of “digital assistant” in any phase of the customer journey?</li> </ul>
Cloud	Networked customer relationships	<ul style="list-style-type: none"> <li>• How might we best share customer data across companies that are part of an alliance?</li> <li>• How can we make data sharing transparent to customers to ensure their acceptance?</li> <li>• How can such a network improve the customer experience and intensify the connection?</li> </ul>
People	Social network-based customer relationships	<ul style="list-style-type: none"> <li>• How might we use social networks along the customer experience lifecycle?</li> <li>• How might we use social networks in B2C or B2B2C relationships to increase customer intimacy or understand end-user needs better?</li> <li>• How might we use social networks to acquire new customers?</li> <li>• How might we use social networks in existing B2C relationships to decrease churn rate?</li> <li>• How might we use social networks in existing B2C relationships to increase customer satisfaction?</li> </ul>

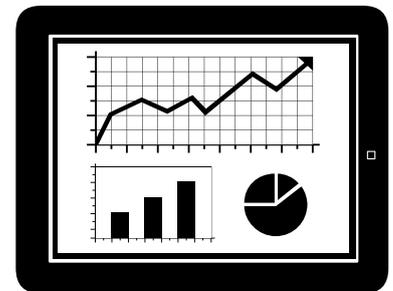


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Businesses	Business network-based customer relationships	<ul style="list-style-type: none"><li>• How might we use business networks (for example, electronic marketplaces) to increase customer intimacy in B2B relationships?</li><li>• How might we use business networks to acquire new customers?</li><li>• How might we use business networks in existing B2B relationships to decrease churn rate?</li><li>• How might we use business networks in existing B2B relationships to improve customer satisfaction?</li></ul>
Things	Door-opener devices	<ul style="list-style-type: none"><li>• How might we acquire new customers based on smart things they own or use?</li><li>• How might we acquire new customers by offering them services through their preferred smart devices?</li></ul>

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A digital business is characterized by the fact that IT affects all business model components.



#### 4.7 KEY PARTNERS

Key partners are those organizations with which a company collaborates to realize its business goals. In this way the company complements the capabilities of its own organization.

#### Key Partners

Digital Key Element	Value Driver	Description	Examples
Data	Data and content providers	Partners might totally or partially collect, aggregate, analyze, and elaborate on data to support a company's own value generation or delivery.	Nielsen and Bloomberg provide useful business data.  E-book authors provide content for publishers' platforms.
Cloud	Cloud providers	Infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS) providers are potential new partners.  Third-party digital services can be integrated into a company's own offering to customers.	Cloud service providers such as Amazon, Microsoft, and IBM
People	Community providers (social networks as partners)	Community providers maintain communities for general or specific purposes that they make available to their partners.	Facebook established a large community that provides an access point for its partners.
Businesses	Business platform providers	They provide platforms for companies to establish relationships and build up partnerships or supplier networks or both.	SAP Ariba offers AribaWeb, an open source framework for rich Internet applications.
Businesses	Connected partners	Partners are connected via a digital platform, providing physical products or services or both.	Suppliers of materials connected via SAP Ariba



Businesses	Crowd partners	Individuals provide assets (for example, content or services) that are uniformly offered via a common platform.	Uber's drivers; Airbnb's hosts (physical service)
Things	Internet-of-Things partners	These are hardware, software, and service partners for the Internet of Things.	Internet of Things platform providers, smart-device producers, and so on

### Related Key Questions

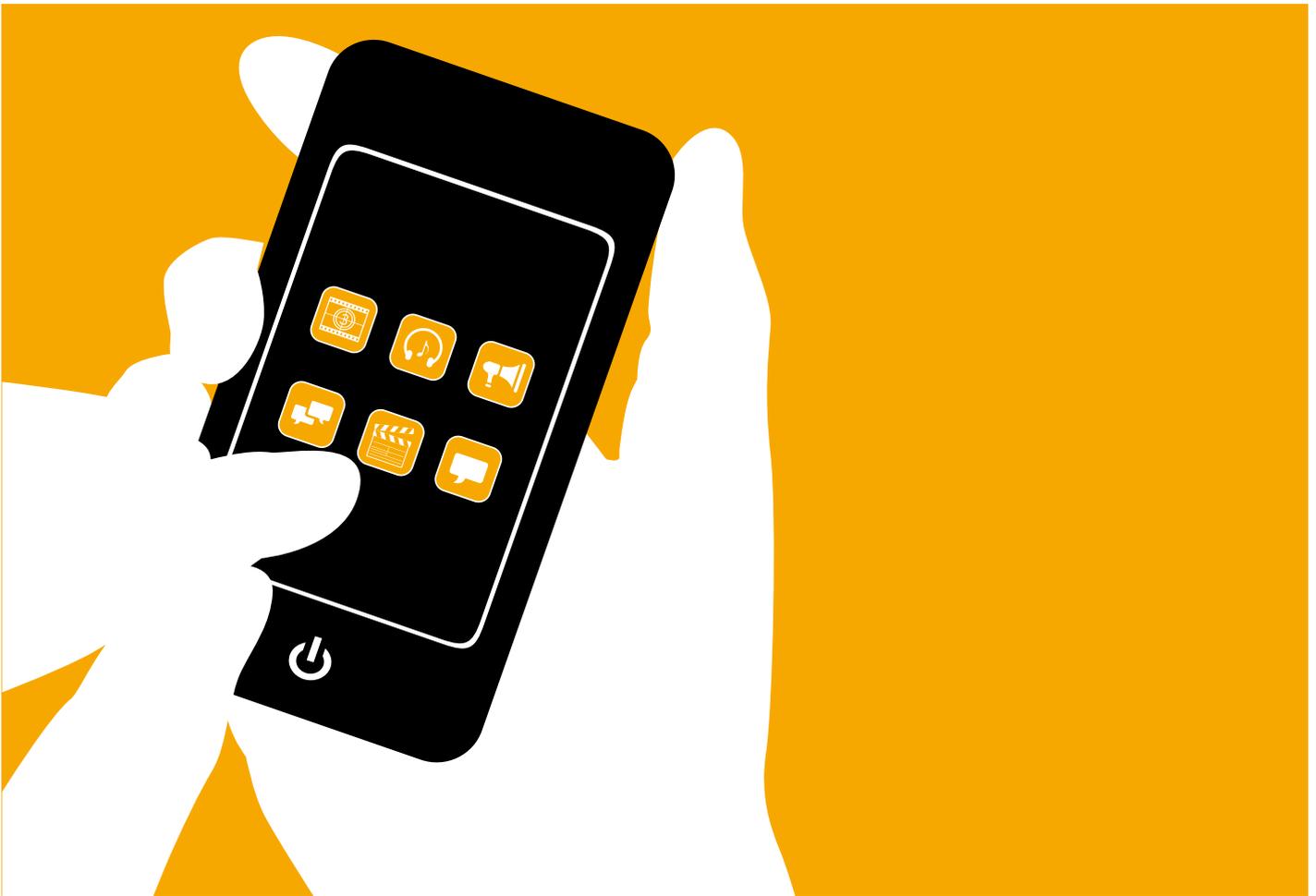
Digital Key Element	Value Driver	Key Questions
Data	Data and content providers	<ul style="list-style-type: none"> <li>• Do we own all the data we need to create, deliver, and capture value, or do we need partners to get access to this data?</li> <li>• What data providers does our business model require?</li> <li>• Which digital content providers does our business model require?</li> <li>• Do we need to establish new partnerships to manage data or digital content that is critical for our business model?</li> </ul>
Cloud	Cloud providers	<ul style="list-style-type: none"> <li>• Should we run our digital services on our own infrastructure or rely on third parties?</li> <li>• Do we need to integrate third-party services in our offering to customers?</li> <li>• Do we need any cloud (IaaS, SaaS, PaaS) providers as partners?</li> </ul>
People	Community providers (social networks as partners)	<ul style="list-style-type: none"> <li>• Should we establish a new partnership with a specific social network to run our business model?</li> <li>• Do we need services from a specific social network to run our business model successfully?</li> <li>• Is there content created in the context of a third-party social network that is essential or important to run our business model successfully?</li> </ul>
Businesses	Business platform providers	<ul style="list-style-type: none"> <li>• How might we create value by connecting dynamically identified partners and suppliers on demand through a digital marketplace?</li> <li>• Should we build a digital platform to connect with partners or partner with a business platform provider?</li> </ul>



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Businesses	Connected partners	<ul style="list-style-type: none"><li>• Which partners should we connect to our business?</li><li>• How might we use digital technologies to enhance the connection to our partners?</li><li>• How can their products and services, which are complementary to our offerings, enrich our value proposition?</li></ul>
Businesses	Crowd partners	<ul style="list-style-type: none"><li>• Are there groups of individuals who own assets that we can uniformly offer via a common platform?</li><li>• How do we identify and address them?</li><li>• What type of agreement should we set up with them?</li></ul>
Things	Internet-of-Things partners	<ul style="list-style-type: none"><li>• Do we need hardware, software, or service partners to create value from the Internet of Things as part of our business model?</li></ul>

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### 4.8 KEY RESOURCES

Key resources describe digital assets that companies use to realize their digital business. Such

resources can also be offered to partners if they are not used exclusively. This particularly concerns the shared use of data.

#### Key Resources

Digital Key Element	Value Driver	Description	Examples
Data	Data as a resource	Access to relevant real-time, detailed, high-quality data is an asset to leverage for a company's own use or for a partner business.  Ownership of or exclusive access to specific data can be a decisive competitive advantage.	Data collected from retailers regarding individual purchases
Data	Data scientists	Data scientists are key assets for exploiting Big Data.	Bank of America hires data scientists to focus on, for example, client attrition, offers, rewards, risk, and fraud models for high-net-worth clients.
Cloud	Digital platforms as a resource	Control of a digital platform can be used to aggregate tangible (for example, financial, material) and intangible (for example, knowledge, content, intellectual property [IP]) resources and provides preferred access to customers.	E-commerce platforms, e-learning platforms
Cloud	Digital platforms' application programming interfaces (APIs)	A digital platform's APIs are a resource to leverage a digital platform in a company's own business model.	Facebook, LinkedIn, and Amazon offer Web services to use their data and services.



Cloud	Elastic digital resources	Virtually unlimited computing resources (power, storage, and so on) that are sourced from cloud providers in combination with specific, sophisticated algorithms represent a business resource.	Microsoft Windows Azure
People	Controlling the access to a network of people as a resource	People that are digitally connected can be leveraged as a resource – for example, if the access to these people can be offered to other companies.	Professionals registered in LinkedIn are a resource for LinkedIn value proposition to professionals, recruiters, and advertisers.
Businesses	Controlling the access to a network of businesses as a resource	Physical assets, IP, financial resources, workforce training, and contingent workforces sourced from digitally connected organizations via business networks can dynamically enhance a company's own resources. Digital enables "hybrid resources" as combinations of a company's own and digitally sourced resources.	SAP Ariba, SAP Fieldglass
Things	Network of things as a resource	Putting sensors, communication lines, and actuators in existing assets and devices turns physical objects into data sources that can be used in a company's own business model.	Tires with sensors are a resource for Michelin's fleet solutions.  TomTom employs a traffic observation network.
Things	Smart-thing intellectual property rights (IPR)	IPR for technologies related to smart devices are a valuable resource to ensure a company's own competitive advantage.	Google and Samsung vie with each other regarding patents for Google Glass-style devices.



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Data as resources	<ul style="list-style-type: none"> <li>• Which types of data might we use as a new resource to build an innovative business model?</li> <li>• Imagine that critical data that runs our business was available without any latency – what new business models could we build based on this data?</li> <li>• Imagine that data that runs our business was available at the finest level – what new business models could we build based on this data and information?</li> <li>• Do we need data scientists as part of our staff?</li> </ul>
Data	Data scientists	<ul style="list-style-type: none"> <li>• For what data might we need data scientists to conduct analysis?</li> <li>• Are such data scientists part of our staff?</li> </ul>
Cloud	Digital platforms as resource connectors and aggregators	<ul style="list-style-type: none"> <li>• How might we create value by aggregating resources (through a digital platform)?</li> <li>• How might we scale access to nondigital resources through a digital platform?</li> <li>• How might we aggregate digital resources required for our business model?</li> </ul>
Cloud	Elastic digital resources	<ul style="list-style-type: none"> <li>• Do we need on-demand, virtually unlimited computing resources to support our digital services?</li> <li>• Which new, special, and potentially sophisticated algorithms might we need and use in our business model?</li> </ul>
Cloud	Digital platforms' APIs	<ul style="list-style-type: none"> <li>• Which digital platforms' APIs should we use as a resource?</li> <li>• Should we expose our resources via APIs?</li> </ul>
People	Controlling the access to a network of people as a resource	<ul style="list-style-type: none"> <li>• Do we need to create our own digital community or make use of a third-party community?</li> <li>• Who might be interested in having access to our network of people?</li> <li>• What resources do we need for that?</li> </ul>



Businesses	Controlling the access to a network of businesses as a resource	<ul style="list-style-type: none"> <li>• Which types of resources (for example, physical goods, IP, financial resources) are critical for our business model?</li> <li>• How might we establish a digitally enabled business network for specific kinds of resources?</li> </ul>
Things	Network of things as a resource	<ul style="list-style-type: none"> <li>• Which types of smart things could become a resource for our business model?</li> <li>• How might we improve asset management by using digital technologies?</li> </ul>
Things	Smart-thing IPR	<ul style="list-style-type: none"> <li>• Which features of our smart devices make the offered solution unique and can be protected?</li> <li>• Which features can be protected and are the most valuable ones with respect to possible service-based revenue streams?</li> <li>• Which parts of the solution should not be protected – for example, for the sake of efficient partnering?</li> </ul>

#### 4.9 KEY ACTIVITIES

Key activities describe what companies do in order to realize their value proposition using their key resources.

##### Key Activities

Digital Key Element	Value Driver	Description	Examples
Data	Data management	This covers data management activities and processes.	Creation of custom algorithms for predictive analytics
Cloud	Cloud-based process execution	This is the execution of IT-enabled processes, potentially outsourcing part of the processes.	Cloud-based enterprise resource planning



People	E-community orchestration and management	<p>Taking care of individuals as well as entire communities has become a key activity in the digital economy.</p> <p>Processes and activities that enable interaction and collaboration between individuals and groups can be critical for a company's own digital business model.</p>	A key activity of Facebook is to keep people on its platform – for example, providing interesting information or encouraging data provision.
Businesses	B2B digitized processes	Processes and activities that enable interaction and collaboration between companies and organizations can be critical for a company's own digital business model.	Design, implementation, management, and operations of B2B networks
Things	Things-to-people digitized processes	Processes and activities that enable interaction and collaboration between individuals and groups can be critical for a company's own digital business model.	Design, implementation, and operations of easy software maintenance processes for smart personal devices – for example, Apple's automatic update of software for apps
Things	Things-to-businesses digitized processes	Processes and activities that enable interaction of smart things with business processes can be critical for a company's own digital business model.	Design, implementation, and operations of maintenance processes for connected industrial assets
Things	Things-to-things digitized processes	Processes and activities that enable interaction between smart things and M2M processes can be critical for a company's own digital business model.	Design and implementation of industry- and company-specific M2M applications



## Related Key Questions

Digital Key Element	Value Driver	Key Questions
Data	Data management	<ul style="list-style-type: none"> <li>• Should we establish our own dedicated processes for data management?</li> <li>• Which new activities do we need to organize around data analysis?</li> </ul>
Cloud	Cloud-based process execution	<ul style="list-style-type: none"> <li>• Should we manage or outsource all or part of our IT infrastructure to run processes that support our business model?</li> <li>• Which activities do we need to structure the digital platform and to support our business model?</li> </ul>
People	E-community orchestration and management	<ul style="list-style-type: none"> <li>• Should we structure specific activities that support interaction and collaboration between people (for example, customers, employees, suppliers) that are critical for our business model?</li> <li>• Which processes do we need to set up to support interactions between individuals or communities or both that are critical for our business model?</li> </ul>
Businesses	B2B digitized processes	<ul style="list-style-type: none"> <li>• Should we structure specific activities that support interaction between companies and organizations that participate in our business model?</li> <li>• Which processes do we need to set up to support interactions between companies and organizations that are critical for our business model?</li> </ul>
Things	Things-to-people digitized processes	<ul style="list-style-type: none"> <li>• Should we structure specific activities that support interaction between people (for example, customers, employees, and suppliers) and smart things that are critical for our business model?</li> <li>• Which processes do we need to set up to support interactions between people and smart things that are critical for our business model?</li> </ul>
Things	Things-to-businesses digitized processes	<ul style="list-style-type: none"> <li>• Which processes do we need to set up to support digital management of assets?</li> </ul>
Things	Things-to-things digitized processes	<ul style="list-style-type: none"> <li>• Should we establish an M2M center of excellence?</li> <li>• Should we structure activities and set up processes that support interactions between smart things that are critical for our business model?</li> </ul>



#### 4.10 COST STRUCTURE

Cost structure refers to the main costs of specific digital features that result from key activities or the maintenance of channels and customer relationships.

#### Cost Structure

Digital Key Element	Value Driver	Description	Examples
Data	Business transparency –based cost optimization	Real-time, complete, and detailed data make the business transparent and give insights that are critical to optimize costs.	Supply chain network optimization
Data	Prediction-based cost optimization	The ability to make business-related predictions based on data offers opportunities to optimize costs.	Cost optimization based on predictive maintenance
Data	Cost reduction by using public data	Much data is available free on the Internet. Using Big Data technologies to use this saves considerable costs.	Yasni aggregates search results from external sources and thus provides a metasearch engine.
Cloud	Lower marginal costs of digital assets	Costs are optimized due to the fact that digital content has a low marginal cost for reproduction and delivery.	E-books versus paper books Video streaming versus DVDs
Cloud	Costs of digital platform	These are costs to set up and run a digital platform that supports a company's own digital business model.	Fixed and operating costs for digital platforms
Cloud	Cost reduction by pay per use	Using pay-per-use services can lower operational costs considerably.	Use of cloud providers  Electric cars rented online with smartphones and paid for based on driving hours



People	People-network effect	Many online communities and people networks have the potential for economies of scale. In most cases, the marginal cost of adding one more user or customer to a people network is close to zero.	Fixed costs per Facebook or Twitter user decrease with the number of users.
Businesses	Business-network effect	Many business networks have the potential for economies of scale. In most cases, the marginal cost of adding one more partner to a business network is close to zero.	Fixed costs per supplier decrease with the number of suppliers.
Businesses	Cost reduction by digital make-or-buy flexibility	The use of digital services makes it easier to collaborate with other companies. This simplifies make-or-buy decisions and the process of finding the most cost-effective way of operation.	Business process outsourcing
Things	Smart automation	Smart devices can help to save time and effort – for example, if they transfer data instead of employees collecting this data.	The Los Angeles Department of Water and Power uses smart metering to reduce costs.

**Related Key Questions**

Digital Key Element	Value Driver	Key Questions
Data	Business transparency –based cost optimization	<ul style="list-style-type: none"> <li>• What data gives insights that help decrease costs?</li> <li>• How might we optimize costs based on real-time, complete, and detailed data on all aspects of our business?</li> </ul>
Data	Prediction-based cost optimization	<ul style="list-style-type: none"> <li>• Which types of analytical predictions could help us decrease costs?</li> <li>• How might we optimize costs based on the ability to make business-related predictions based on real-time, complete, consistent, and detailed data?</li> </ul>



Data	Cost reduction by using public data	<ul style="list-style-type: none"> <li>• How might we use free public data in our business model?</li> <li>• Which relevant data sources can be accessed for free?</li> </ul>
Cloud	Lower marginal costs of digital assets	<ul style="list-style-type: none"> <li>• How can we use lower marginal costs of digital products and services compared to physical solutions to increase profits?</li> <li>• How do the costs to create and deliver digital assets, which are part of our value proposition, affect our cost structure?</li> </ul>
Cloud	Costs of digital platform	<ul style="list-style-type: none"> <li>• Which types of costs do we need to consider for the setup and operation of a digital platform that enables our business?</li> <li>• What does the distribution of costs along the time axis look like?</li> </ul>
Cloud	Cost reduction by pay per use	<ul style="list-style-type: none"> <li>• What is the pricing model for digital services that we need to acquire from third parties?</li> <li>• Might we pay depending on the usage of the digital resources (for example, contents, software) that we acquire?</li> </ul>
People	People-network effect	<ul style="list-style-type: none"> <li>• Is there any economy of scale with the increase in the number of individuals or groups connected to a network that is part of our business model and generates costs?</li> <li>• What does the curve (number of users, cost per user) look like?</li> </ul>
Businesses	Business-network effect	<ul style="list-style-type: none"> <li>• Is there any economy of scale with the increase in the number of companies or organizations connected to a network that is part of our business model and generates costs?</li> <li>• What does the curve (number of connected businesses, cost per connected business) look like?</li> </ul>
Businesses	Cost reduction by digital make-or-buy flexibility	<ul style="list-style-type: none"> <li>• Should we use digital technologies to outsource new business processes?</li> <li>• What would the impact of digital-based business process outsourcing look like?</li> </ul>
Things	Smart automation	<ul style="list-style-type: none"> <li>• How might the Internet of Things and the usage of smart things help decrease costs?</li> <li>• How might we improve cost tracking and predictability based on the Internet of Things and the usage of smart things?</li> <li>• How might we change our cost structure by using data coming from smart things?</li> </ul>



#### 4.11 SYNOPSIS OF DIGITAL VALUE DRIVERS

The following table shows a synopsis of the digital value drivers.

##### Digital Value Drivers

Business Model Component	Data	Cloud	People	Businesses	Things
<b>Value proposition</b>	Accelerated decision support and value delivery  Data-based solutions  Tailored data-based customer solutions	On-demand services  Integrated solutions	People network-based solutions  Integrated communities	Integrated multipartner solutions	Smart solutions
<b>Customer segments</b>	Microsegments  Customers with high information demands	Global reach by the cloud	Digital consumers  Group purchase	Global reach by business networks	Things as customers



<b>Revenue streams</b>	Data monetization	Ubiquitous-service monetization	People-community monetization	Business-network monetization	Smart-thing monetization
	Adaptive pricing	Precision subscription-based pricing for digital services	Group-based pricing		Service monetization via smart devices
		Pay-per-use pricing for digital services			
		Cloud technical infrastructure monetization			
<b>Channels</b>	Customized channels	Ubiquitous access	Digital access points as a channel	Access to customers via a platform	Internet of Things as an indirect channel to people and businesses
		Platform channel	Community-specific advertising and information		Things-to-things communication
<b>Customer relationships</b>	Better knowledge of customer	Digital assistance Networked customer relationships	Social network-based customer relationships	Business network-based customer relationships	Door-opener devices
<b>Key partners</b>	Data and content providers	Cloud providers	Community providers (social networks as partners)	Business platform providers	Internet-of-Things partners
				Connected partners	
				Crowd partners	



<b>Key resources</b>	Data as resources  Data scientists	Digital platforms as resource connectors and aggregators  Elastic digital resources  Digital platforms' API	Controlling the access to a network of people as a resource	Controlling the access to a network of businesses as a resource	Network of things as a resource  Smart-thing IPR
<b>Key activities</b>	Data management	Cloud-based process execution	E-community orchestration and management	B2B digitized processes	Things-to-people digitized processes  Things-to-businesses digitized processes  Things-to-things digitized processes
<b>Cost structure</b>	Business transparency-based cost optimization  Prediction-based cost optimization  Cost reduction by using public data	Lower marginal costs of digital assets  Costs of digital platform  Cost reduction by pay per use	People-network effect	Business-network effect  Cost reduction by digital make-or-buy flexibility	Smart automation



#### 4.12 CONNECTIONS BETWEEN DIGITAL VALUE DRIVERS

Finally, we have to point out that there is a multitude of relationships between value drivers. Most of them are cause-effect relations. For example, if one of the key activities consists of the analysis of customer data, it means that this customer data must be available. This means that they either come from a data provider that is a key partner or that they are a key resource owned by the

company itself. Both alternatives describe a relation between two value drivers respectively. These relationships become particularly apparent when we go to company examples implementing these value drivers. In Section 5.2 we will show how relationships can be made explicit.

By pointing out relationships, it becomes apparent how digital technology is connecting value drivers and how the different key elements play together.



# 5. Graphical Representation and Examples

In this section we start with the introduction of a graphical representation of value drivers reflecting the matrix schema presented in Section 4.11. Such representation will allow us to systematically show the influence of digital technology in the business model canvas. This graphical representation also depicts the relationships between value drivers as a central element of understanding dependencies. How relationships can be made visible is described in Section 5.2. The purpose of the following description is to show a path for applying the developed concepts in a practical way. Although we can only provide a first idea, this description might be helpful to understand the usefulness of value drivers for practical design.

## 5.1 GRAPHICAL REPRESENTATION OF DIGITAL VALUE DRIVERS

For use in collaborative sessions, we can apply graphical “tiles” to visually represent digital value drivers in a particular business model canvas component. For this purpose, we suggest new icons for digital key elements.

Figure 5 shows how to use these icons as graphical “tiles” to represent a digital value driver (the example shows “global reach,” which is a digital value driver in the intersection of **cloud with customer segments**).

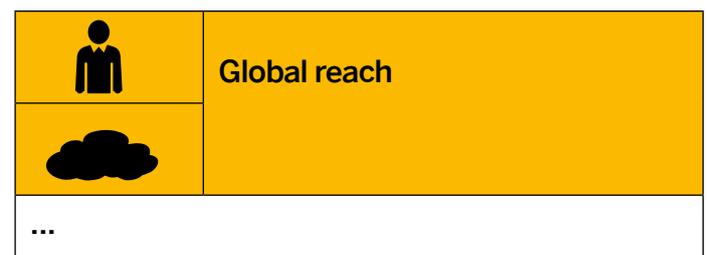
Standard icons for business model components:<sup>2</sup>

Business Model Canvas Component	Icon
Value proposition	
Customer segments	
Revenue streams	
Channels	
Customer relationships	
Key partners	
Key resources	
Key activities	
Cost structure	

Icons for digital key elements:

Digital Key Element	Icon
Data	
Cloud	
People	
Businesses	
Things	

Figure 5: Example of Using Icons as Graphical “Tiles”



### FOOTNOTE

2. See [www.businessmodelgeneration.com](http://www.businessmodelgeneration.com).

We recommend creating printed cards to display these tiles, the respective value driver descriptions, and corresponding key questions, which can be

used in collaborative design-thinking workshops. Figure 6 shows a prototype of such a card.

**Figure 6: Concept for Digital Value Driver Cards (Gamification Approach for Digital Business Modeling)**



## 5.2 EXAMPLES

Let's look at some real cases of digital business and use the identified digital value drivers to point out the ways in which digital technology supports business model innovation. To this end we provide representations for the following digital businesses:

- Amazon
- Netflix
- LinkedIn
- Airbnb

These examples illustrate how the introduction of value drivers strengthens the expressiveness of business model representations and illustrates the influence of digital capacities.

### 5.2.1 Amazon

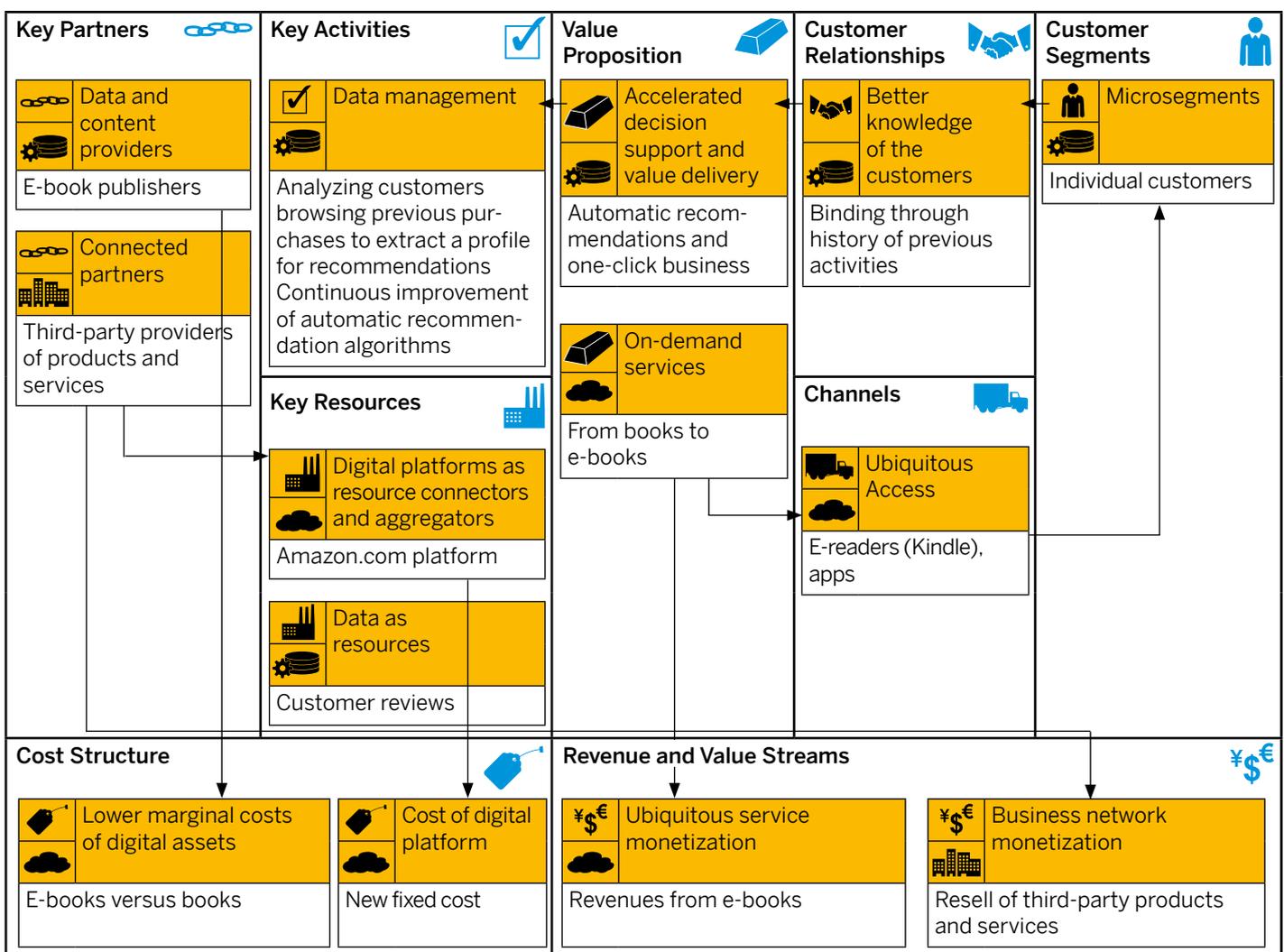
Figure 7 shows the key features of Amazon's ([www.amazon.com](http://www.amazon.com)) digital business model (with a focus on e-books and related third-party services) using the proposed digital value drivers.

Figure 7: Key Features of Amazon's Digital Business Model

Key Partners 	Key Activities 	Value Proposition 	Customer Relationships 	Customer Segments 
 Data and content providers E-book publishers   Connected partners Third-party providers of products and services	 Data management  Analyzing customers browsing previous purchases to extract a profile for recommendations Continuous improvement of automatic recommendation algorithms  <b>Key Resources </b>  Digital platforms as resource connectors and aggregators Amazon.com platform   Data as resources  Customer reviews	 Accelerated decision support and value delivery  Automatic recommendations and one-click business   On-demand services  From books to e-books	 Better knowledge of the customers  Binding through history of previous activities  <b>Channels </b>  Ubiquitous Access  E-readers (Kindle), apps	 Microsegments  Individual customers
<b>Cost Structure </b>  Lower marginal costs of digital assets  E-books versus books   Cost of digital platform  New fixed cost		<b>Revenue and Value Streams </b>  Ubiquitous service monetization  Revenues from e-books   Business network monetization  Resell of third-party products and services		

We can highlight the key relationships between digital value drivers, revealing the logic of the digital business model (see Figure 8).

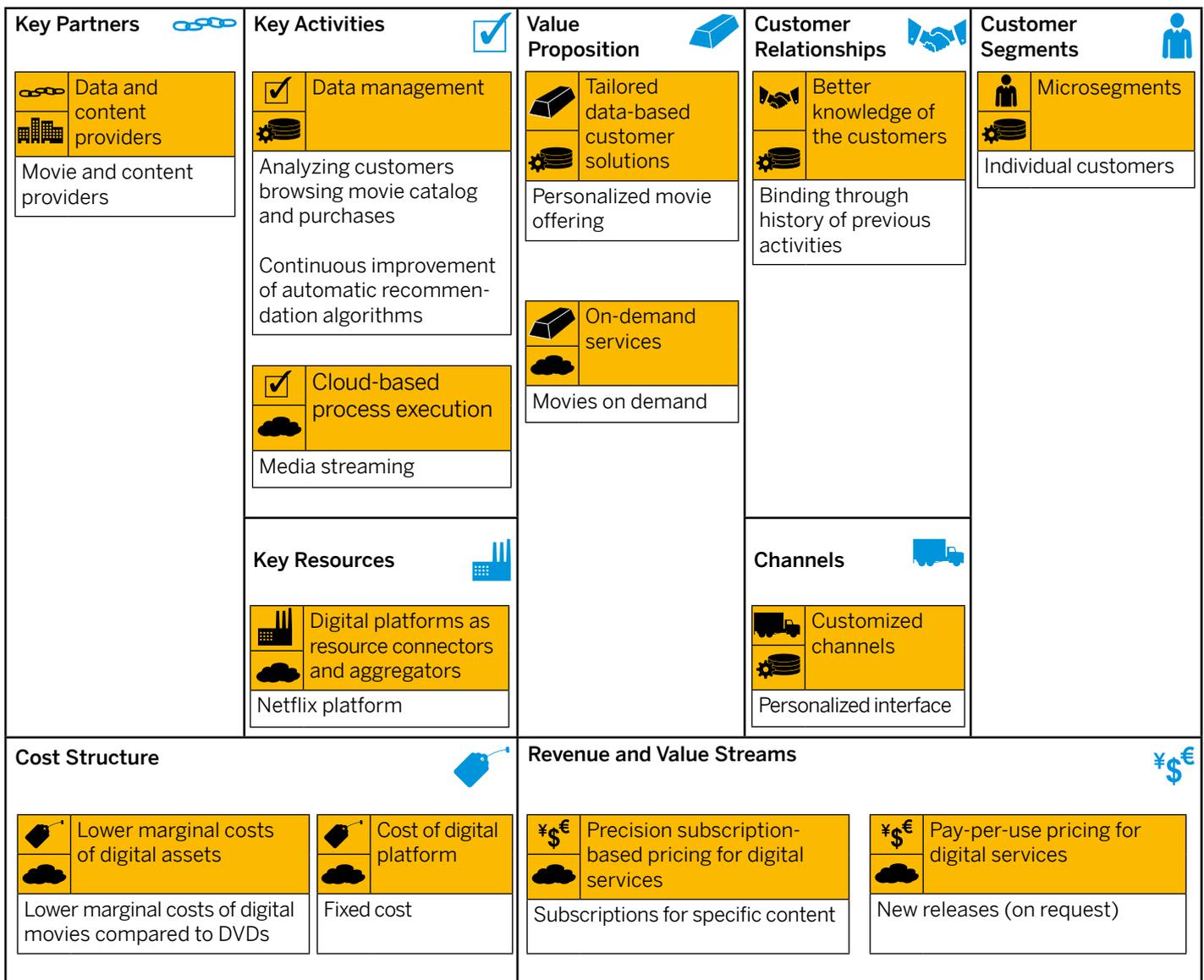
Figure 8: Key Relationships Between Amazon's Digital Business Drivers



### 5.2.2 Netflix

Netflix ([www.netflix.com](http://www.netflix.com)) is a provider of on-demand Internet streaming media. Figure 9 shows Netflix’s digital business model using the proposed digital value drivers.

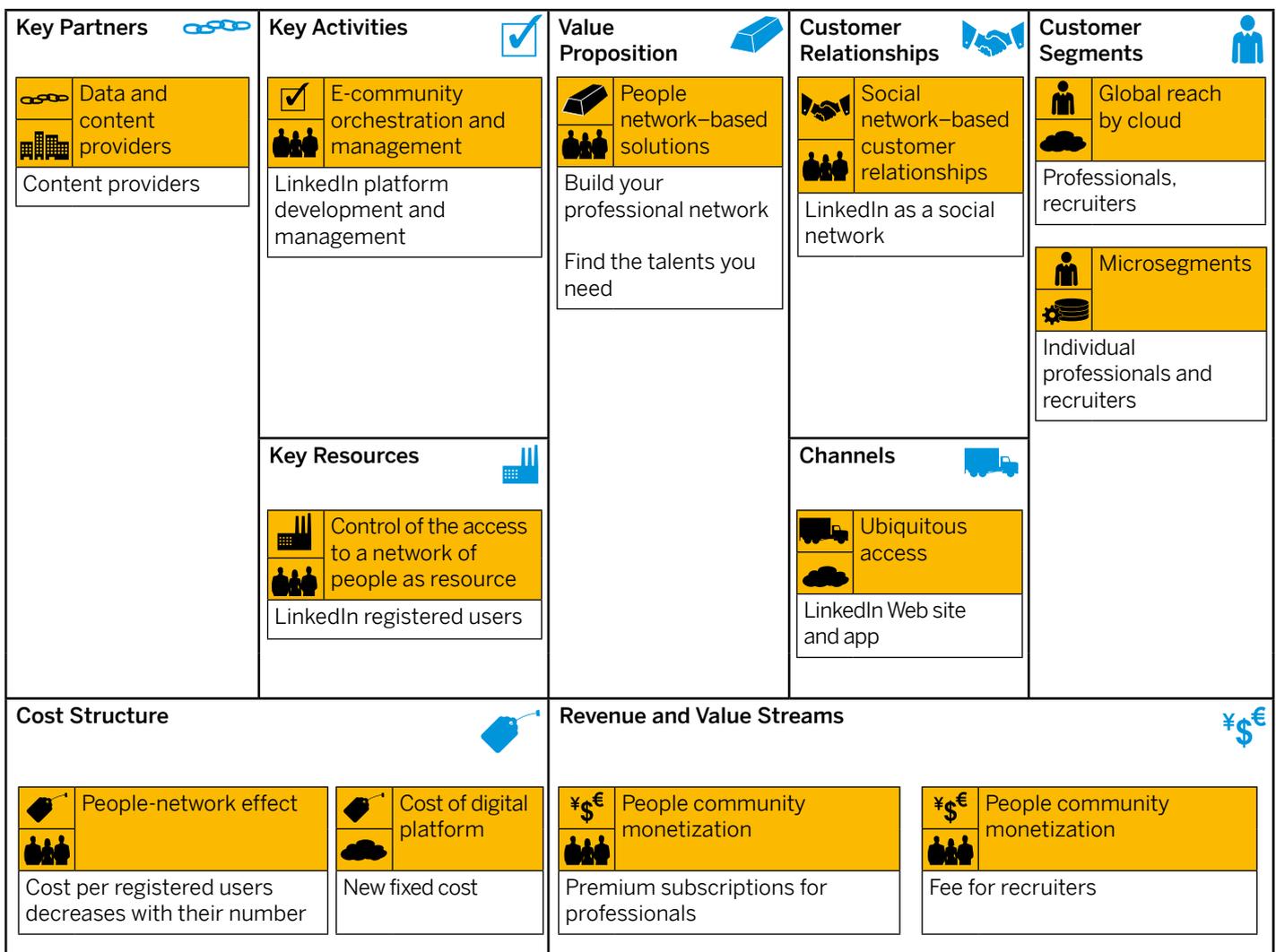
**Figure 9: Netflix’s Digital Business Model Using Proposed Digital Value Drivers**



### 5.2.3 LinkedIn

LinkedIn ([www.linkedin.com](http://www.linkedin.com)) is a social-networking service for professionals. Figure 10 shows LinkedIn’s digital business model using the proposed digital value drivers.

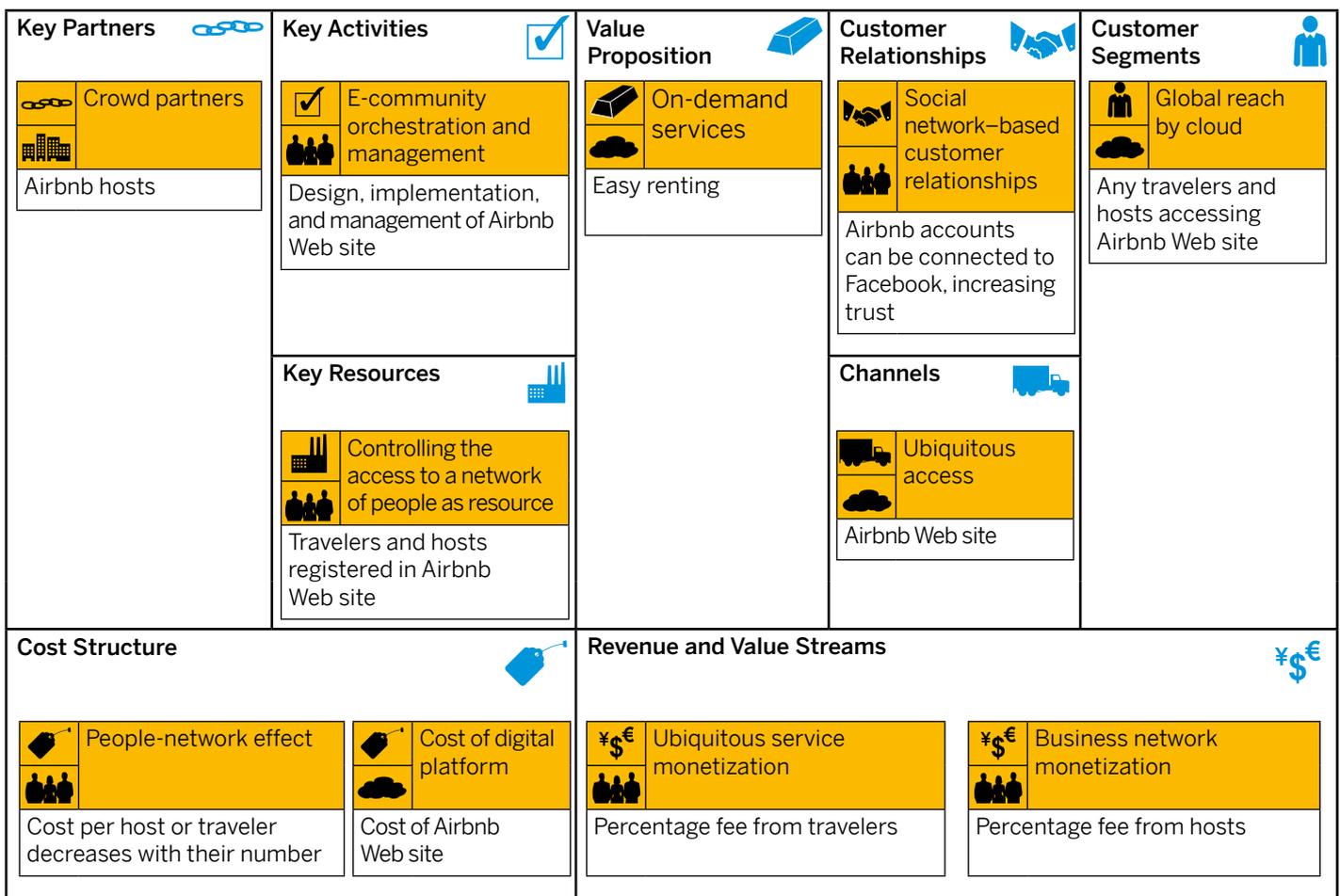
Figure 10: LinkedIn’s Digital Business Model Using Proposed Digital Value Drivers



### 5.2.4 Airbnb

Airbnb ([www.airbnb.com](http://www.airbnb.com)) is a platform that connects travelers and hosts. Figure 11 shows Airbnb's digital business model using the proposed digital value drivers.

Figure 11: Airbnb's Digital Business Model Using Proposed Digital Value Drivers



# 6. Collaborative Digital Business Design and Outlook

The purpose of this paper is not only to determine the structural elements of digital business models but also to provide structured foundations for the practice of collaborative digital-business design.

To this end we suggest applying the previously described digital value drivers in combination with the “Business Model Design and Innovation (BMDI)” methodology. It is a methodology used to systematically fathom opportunities and possible designs for new business models [Doll and Eisert, 2014]. The BMDI methodology is inspired by design thinking and used in collaborative sessions. It is often embedded in projects that use lean startup concepts and agile methods (see Figure 12).

## 6.1 BUSINESS MODEL DESIGN AND INNOVATION

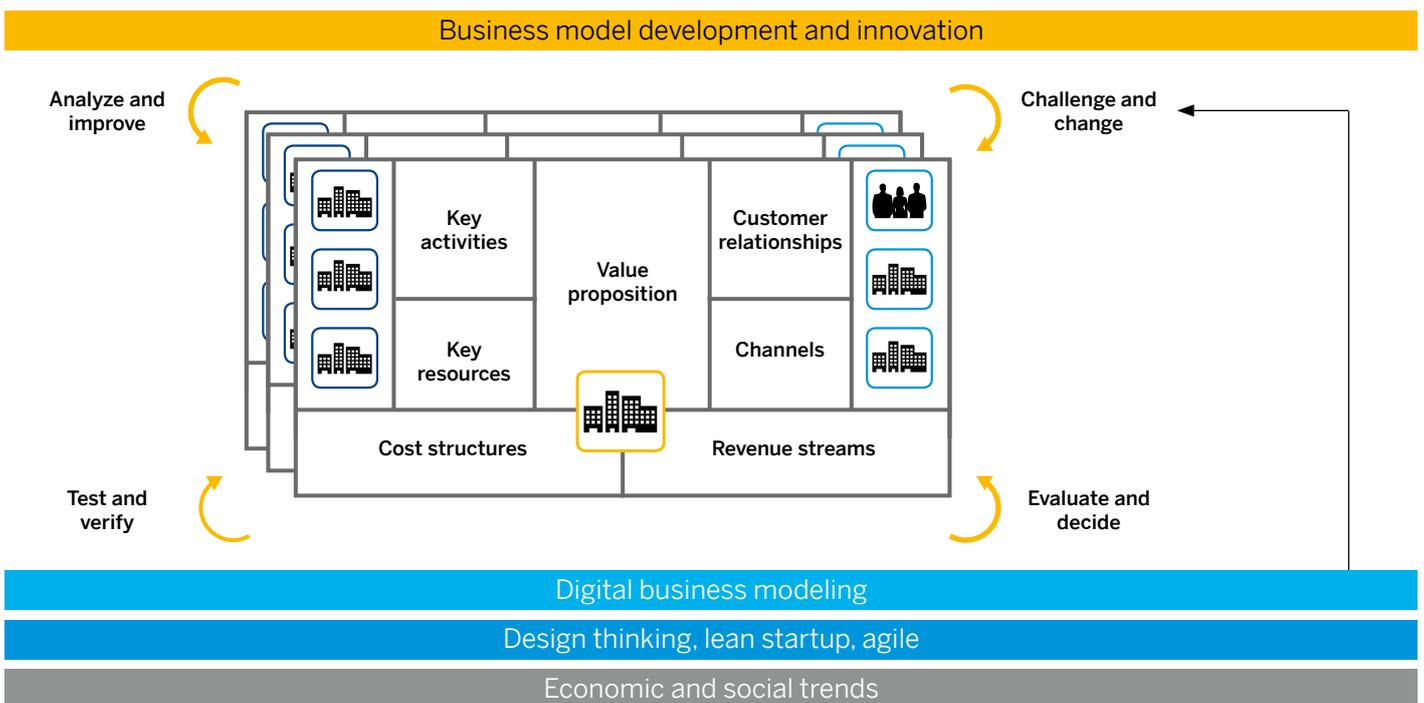
The BMDI methodology has been applied in various business model innovation projects.

BMDI provides a multistep procedure that starts with a recapitulation of the central features of the existing business model. This step determines the baseline for the following procedure. The results of this recapitulation are summarized in Section 2 as enterprise and network views.

Advancing from this baseline, there are four further steps:

- Analyze and improve
- Challenge and change
- Test and verify
- Evaluate and decide

**Figure 12: Digital Business Modeling in the Context of a Business Model Design and Innovation Methodological Flow (Concept)**



The order of these stages is not strict, and individual steps may be rearranged or iteratively repeated. In the following section, we will briefly introduce the steps and consider to which degree they may already take digital value drivers into account.

In the **analyze and improve** step, the current situation of the company is investigated in detail. This includes the business environment and particularly the market trends. For example, such analysis can cover the following aspects:

- Detailed analysis of customers (for example, identifying goals that customers want to achieve), in order to improve the value proposition
- Analysis of competitors' value propositions and identification of the characteristics of these that can be used to improve a company's own value proposition
- Analysis of partnering options and possible improvements of key activities or additionally required resources

The main purpose of this step is to familiarize oneself with the company's own business model and to gather obvious opportunities. This can also include the possible introduction of digital value drivers – for example, if existing services can be replaced by digital services.

The **challenge and change** step starts with the identification of current opportunities or threats that challenge the current business model. This is the step in which we can focus primarily on digital challenges and opportunities. It includes an inspection of the respective market, including digital business initiatives of competitors and changing customer expectations in the digital economy.

Based on the results, a design challenge is formulated, which might be inspired by certain strategic intents but should definitely be related to digital business. Although there is a selection of different ideation methods to devise a selection of business model alternatives, we propose using digital value drivers as “micropatterns” to ensure a focus on digital business.

The **test and verify** step aims at the consolidation of the elaborated designs. Since each design is based on several assumptions, it is necessary to identify, test, and validate them at an early stage. Typical assumptions concern customer demands or their willingness to pay for certain solutions. Therefore, the risks related to these assumptions must be made transparent and ways should be explored as to how they could be tested and in which sequence (see [Ries, 2011] for how such assumptions can be validated). Typical elements of a validation are the “build-measure-learn” cycle and the “MVP (minimum viable product)” concept. As a result of such tests, assumptions might be dropped so that alternative designs can be developed that take these results into account.

In the **evaluate and decide** step, one has to determine which design options are most promising. The selected options will then be further evaluated qualitatively and quantitatively. Such evaluation is typically based on two dimensions: impact versus ease of implementation. The impact factor describes the relevance of the potential effects of a certain design implementation, while the ease factor points at the possible barriers (for example, related costs, internal resistance). Optionally, a business case can be calculated. The evaluation should be performed by suitable experts for the relevant areas.



The fundamental principle of the approach is to first open up the solution space to allow session participants to create a large number of ideas. This happens mainly during the challenge and change step. The following steps then focus on the convergence of ideas in terms of feasibility and effectiveness. The central challenge for digital business model design consists of keeping the focus on the opportunities that relate to digital technologies. Here digital value drivers can play a decisive role, in particular if participants can use the value drivers as (graphical) building blocks for designing their enterprise views. We will elaborate on this approach in more detail in the following section.

## 6.2 EXPLORING THE DIGITAL-VALUE-DRIVERS MATRIX

The digital-value-drivers matrix concept, introduced in Section 4.1, represents a design space

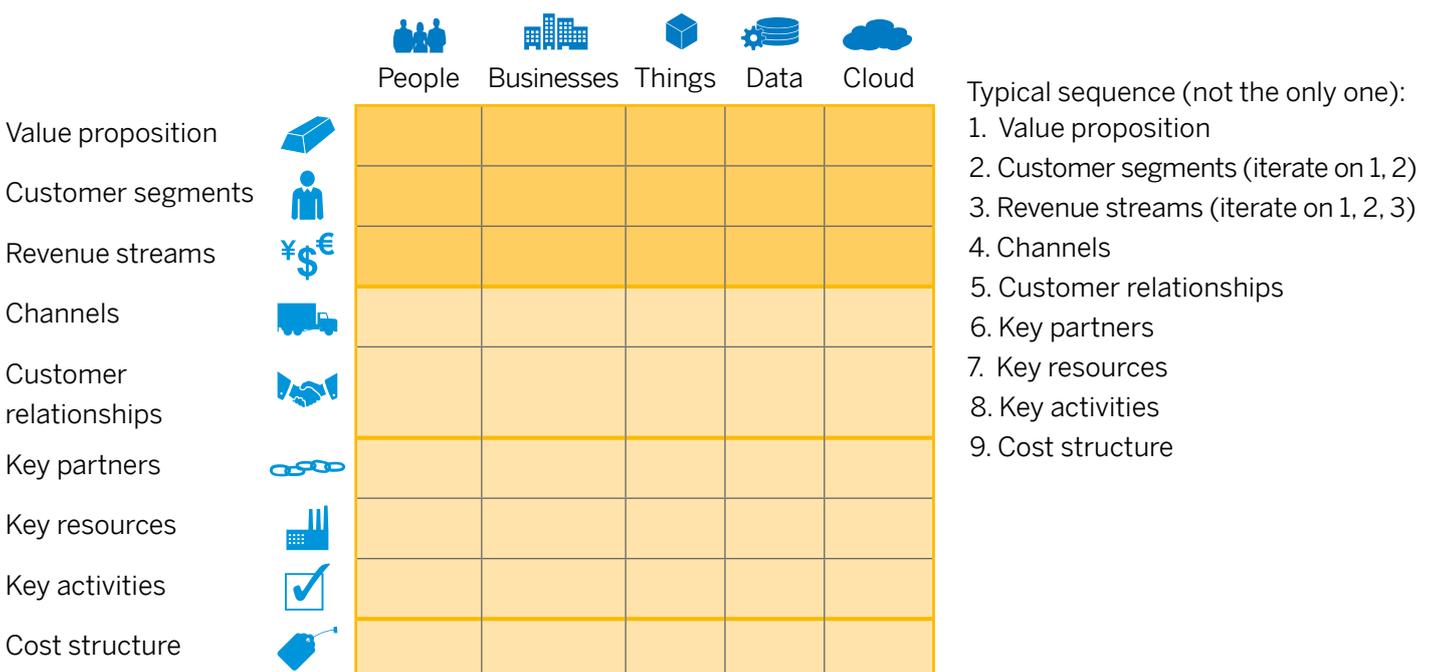
for digital business. Value drivers serve as components in this design and are used mainly in the challenge and change phase of the BMDI methodology. Generally, there are multiple ways to explore the design space, as we outline in the following section.

### 6.2.1 Exploring the Digital-Value-Drivers Matrix by Business Model Canvas Components

One way to explore the digital-value-drivers matrix is with a row-by-row procedure – that is, by business model canvas components according to specific sequences (see Figure 13).

The advantage of this approach is that it brings to the fore a business-driven and (in the indicated sequence) customer-centric perspective. Of course, other sequences are also possible (see, for example, Business Model Generation by Osterwalder and Pigneur, 2010).

**Figure 13: Exploration of the Digital-Value-Drivers Matrix by Rows (Business Model Canvas Components)**

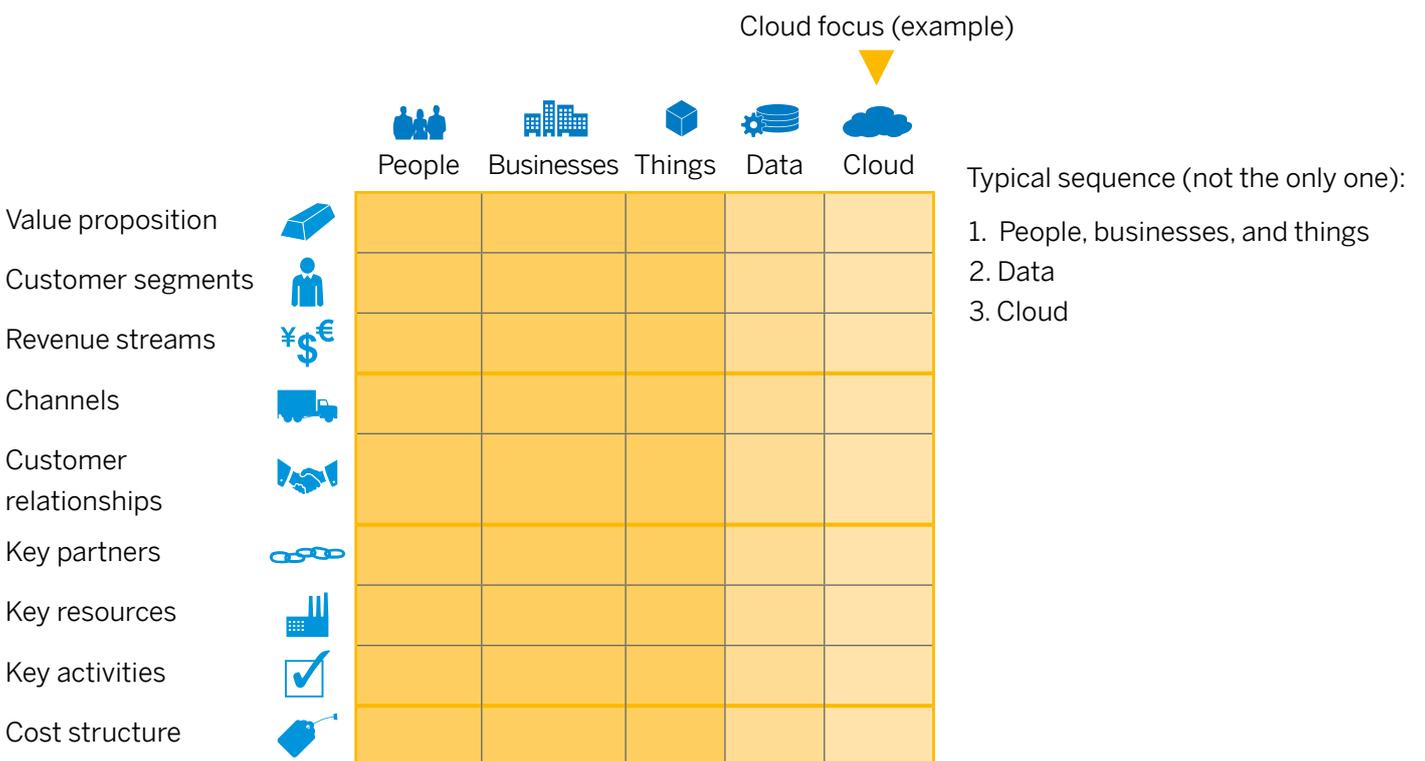


### 6.2.2 Exploring the Digital-Value-Drivers Matrix by Digital Key Elements

For a technology-driven approach, we can also focus on one specific digital key element (for example, the cloud) and consider the corresponding digital value drivers by business model component according to the previously described sequence (see Figure 14). In case we want to

explore multiple digital key elements, we can start with people or businesses or things or a combination of them (contextualizing those for your specific business). We could then potentially consider data (think of data generated and used by those key elements) and finally the cloud (think of digital services that can be built based on data and connections).

**Figure 14: Exploration of the Digital-Value-Drivers Matrix by Columns (Digital Key Elements)**



### 6.3 ASSOCIATING DIGITAL VALUE DRIVERS WITH STRATEGIC INTENTS

Organizations that want to explore the opportunities offered by digital technologies for designing or redesigning their business face the challenge that there is a plethora of possible directions to go. However, it is not efficient to take a random way into the digital economy. In fact, it is important to develop a consequent digital strategy guided by implicit or explicit strategic intents adapted to the context in which the required business model

analysis and design take place. In this section, we describe strategic intents that typically stand behind digital business modeling efforts. Strategic intents describe a well-defined direction of development into the digital economy selected in accordance with the specific conditions of the respective company that wants to go this way into the future.

The following table gives an overview of strategic intents and points to the respective business model components that are mainly affected by them.

#### Strategic Intents That Typically Stand Behind Digital Business Modeling Efforts

Strategic Intent	Business Model Components in Focus	Description of Strategic Intent	Impact
Expand business from product to services (“servitization”)	All components, starting from the value proposition	The company intends to move from products to services. These services can either be directly related to products or add value by building on other services.	This expansion consists of directly replacing tangible products by virtual products or creating digital supplements when things become smart and accessible to digital services.
Simplify solutions to improve the customer experience	Value proposition, in particular the customer experience	The company intends to simplify the customer experience with the rationale of attracting more customers and increase customer satisfaction.	Complexity can be masked by a variety of different means, such as retrieving required information from the public Web (rather than from the customer) or by using analytical services.  Communities, customer profiles, public information, or customer devices are possible data sources. The respective services are also supported by collaborating with companies that provide complementary services or required data.



Global reach	Customer segments, channels	The company intends to reach customers in all geographic areas around the world.	Global reach is attained mainly via global access to a network. Global reach is also realized by cooperating with different local partners in the network.
Mass customization	Customer segments, channels	The company intends to identify and profile individual customers and their particular needs to offer individualized solutions.	Digital technology supports the tailoring of customer-adapted solutions through the flexibility of the employed digital services. The partial yet detailed information about customers (available via the network) helps achieve this goal.
Improved customer acquisition and retention	Customer relationships	The company intends to improve customer retention.	Communities give new access to potential customers. The information available in the communities helps to address these in a more targeted way. Free provision of services is another way to get in contact with potential customers. Customers become bound to a company via any elaborate profiles they provide due to the costs of setting up similar profiles with other companies.
Intensified customer involvement	Customer relationships	The company intends to create a more intensive interaction with the customer – for example, exploring how customers use products and services as a way to improve them and the customer experience or using the data for other purposes.	A better digital connection to customers (as individuals or via communities) and to smart products provides better and more detailed information about their use of the offered solution or about observed barriers. Servitization supports this process.



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Leveraging partner ecosystems	Partnerships	The company intends to form business networks – for example, to better focus on its core competencies.	Due to the tighter integration of companies through a network, one can achieve a more suitable distribution of tasks between partnering companies. This opens up opportunities for smarter outsourcing and local collaboration.
Exploitation of new resources	Resources	The company intends to explore the usage of new types of resources (including digital content, digital technologies, digital services, and so on) as a source of value for its existing business and as a means to expand it.	The expansion of digital business results in the availability of a significantly higher amount of data, which might be used for new or improved solutions or can be sold to partners for direct use or further aggregation.

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Things are no longer “dumb” objects but smartly interact with people, businesses, or other objects.

In fact, we can explore the digital-value-drivers matrix based on selected strategic intents, focusing on the affected business model components and implementing digital key elements (see Figure 15).

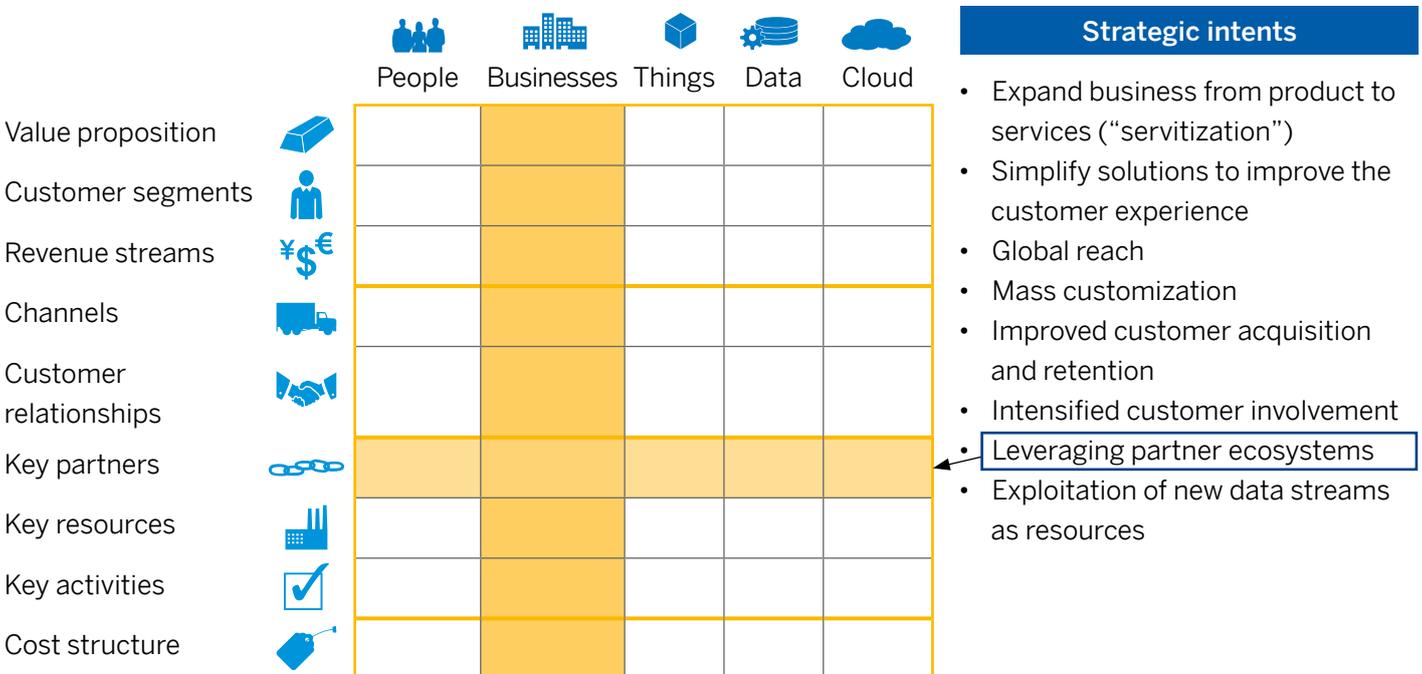
### 6.4 PATTERN-BASED APPROACH TO DIGITAL BUSINESS STRATEGY AND DESIGN

Business model patterns have become quite popular for the purpose of business model (re-)design [Gassmann et al., 2014]. They follow a design method introduced by Christopher Alexander [Alexander et al., 1977] and describe specific design ideas substantiated by examples of companies that successfully implemented these ideas.

Such patterns are usually applied in the challenge and change phase of BMDI to stimulate the generation of new business model ideas. The advantage of pattern use consists in their footing on concrete examples and their suggestive power. In particular, the examples often support the uptake and transfer to other contexts.

Although patterns are an important tool for business model design, strategic intents and value drivers provide a necessary complement – they address two blind spots of business model patterns.

**Figure 15: Exploration of the Digital-Value-Drivers Matrix with a Focus Based on Strategic Intents**



One blind spot is the question of how we can combine design ideas to strengthen their effect (for example, by synergies). The best way to do this is by streamlining patterns toward a common goal. Strategic intents provide a common direction of development that opens up opportunities for synergies. This is crucial for digital business models in particular, as we can learn from the examples of successful digital companies, such as Google, that use their digital value drivers in a well-orchestrated way to maximize the effect.

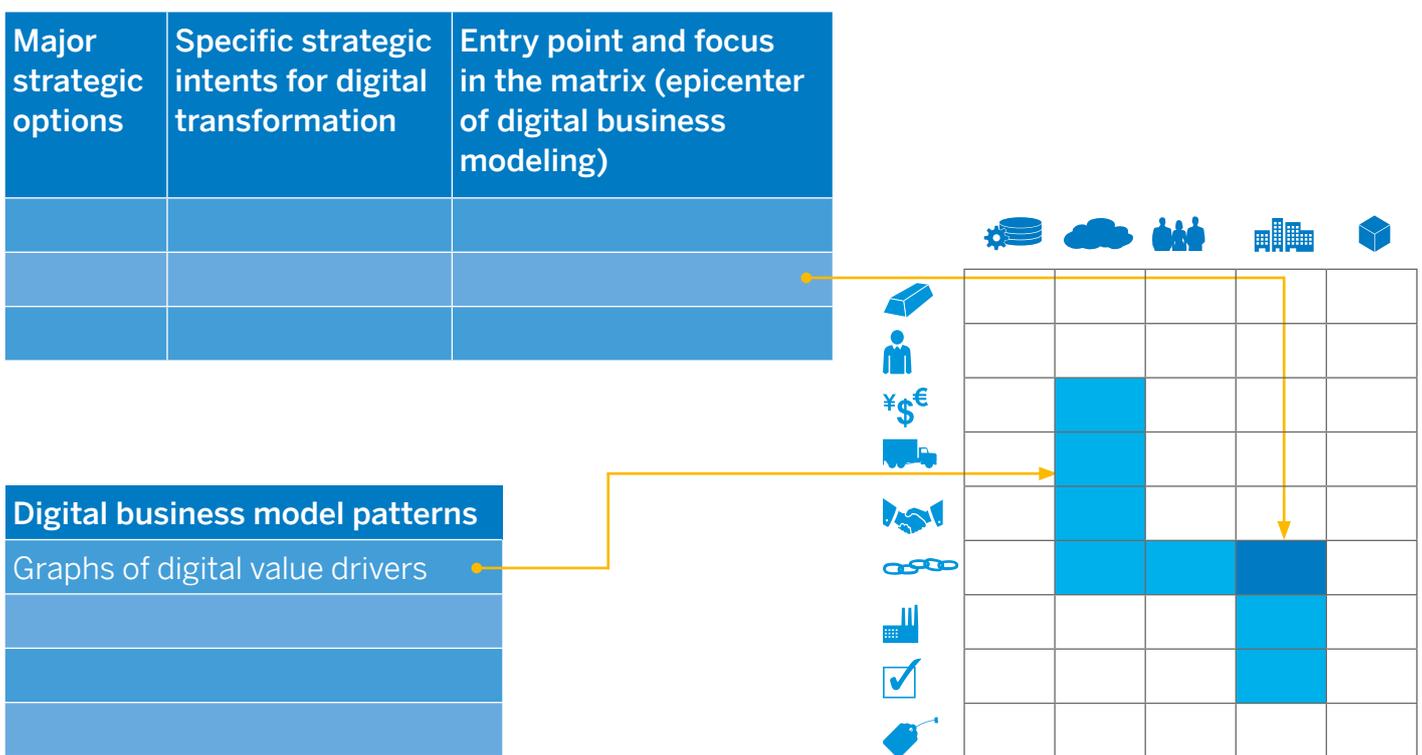
The second blind spot is the particular employment of technology that affects the business model. Patterns give examples of successful business model change, but, particularly with respect to the utilization of technologies, it often requires certain

reflection to realize what effect a new technology actually has. In this respect, digital value drivers point at the specific lever that this technology provides.

Based on the above, we envision two lines of research (see Figure 16):

- Anchor strategic intents for digital transformation to strategic frameworks – for example, value disciplines (product leadership, customer intimacy, and operational excellence [Treacy and Wiersema, 1993]).
- Develop digital value patterns that span across and are composed of multiple digital value drivers. As a recurring configuration of digital value drivers, those patterns will represent clear “archetypes” of digital business.

Figure 16: Outlook for Future Research



Regarding the practical use, we envision how the different concepts can be used independently yet synergistically. A possible order could be:

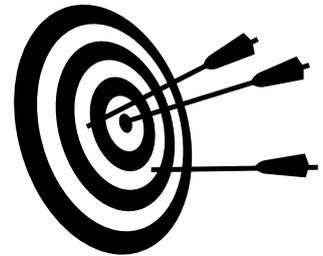
1. Use of digital patterns as inspirational examples and as the first access point to produce initial ideas and then select certain areas for further analysis
2. Reflection on strategic intents to cluster the design ideas and streamline them with respect to possible synergies
3. Use of digital value drivers to clarify the way in which technology is employed to implement digital business model ideas

This is not a strict order and might depend on the starting point of a collaborative digital business

design session. For example, if you already have ideas about a future digital business model, you can start with the digital value drivers to explore possible implementations and get deeper insight into possible synergies. Alternatively, you may start with the selection of a strategic intent to streamline idea generation, in particular under the conditions of a limited time frame.

The advantage of this threefold approach is that it keeps the focus on the digital transformation of the business model, while other generic business model patterns only concern business model design in general. The advantage of the approach is to open up the space for possible solutions but in a focused way.

Digital business disperses the boundaries between companies and to consumers.



## 7. Conclusion

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The concepts and related methodological approach proposed in this paper sprung from the need for a systematic approach to digital business model design. Although BMDI provides a powerful methodology, an extension is required that focuses on digital technologies. The proposed approach addresses questions such as the following:

- How can we reimagine our business in an increasingly digital world?
- How can we design a digital business model for our company?

In this paper we have dealt with only some of the relevant questions regarding the redesign of a business model toward digital. There are other topics that we could only touch on and still have to be addressed:

- A digital business framework provides customers with the technological foundation to master the challenges of the new digital world. An in-memory computing platform helps manage business processes as is necessary for digital business, connecting powerful analytical capabilities with enhanced customer, workforce, and partner engagement in order to cope with current digital challenges. The presented digital business modeling approach helps to make faster use of

this framework, since technology and business transformation go hand in hand. However, a more detailed description of the interconnection of both sides would be helpful to show the strengths of both strands integrated.

- A second question concerns the interplay of strategy and digitization. Digital transformation cannot be done in a random way but needs a well-defined strategy. This requires a solid elaboration of strategic goals that aim at digital transformation. Our considerations of strategic intents can be regarded as a step in this direction but is still in its infancy. Some investigation has already been conducted to explore the question of how to lead digital transformation (for example [Westerman et al., 2014]), but the discussion has just started.
- We have already considered the relationships between digital value drivers in the proposed graphical representation (Section 5), but a thorough investigation of these relationships is still due. There is a high variability in how one can combine different value drivers, but obviously some connections are stronger than others. For the current approach, it was sufficient to simply note these relationships, but a better understanding of them will further strengthen the methodology.

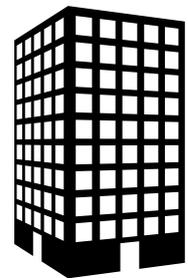


- There is also the question of how to optimally integrate the digital business model procedure developed here into existing design approaches. We have already sketched a straightforward way of how this could work, but the approach requires more practical application and validation. In fact, the digital-value-driver concept provides a more fine-grained supplement of existing patterns and allows for a more detailed investigation of implementation opportunities. But we need to investigate further about how exactly both concepts can be combined in practice to optimize the effect.
- All industries have their particular flavor of digital transformation. For example, in the energy sector, digitization goes hand in hand with the decentralization of energy production and has

to be regarded as an important driver of this development. We can make similar observations for other utilities and industrial sectors. In this respect we expect that specific industry conditions lead to some novel business model innovations that might also give insight into new value drivers that can be transferred to other industries. We also expect to see patterns of how digitization drives companies to overcome industry boundaries.

Considering the increasing importance of digital business models for modern enterprises, we also think that the concepts proposed here can help leverage future corporate management research, since digital transformation will fundamentally change our thinking about how to run a business.

Digital transformation will fundamentally change our thinking about how to run a business.



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