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# The pricing capability lifecycle of digital innovations

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**ABSTRACT**
The pricing capability provides a basis for firms' competitive advantage. However, to date, the literature has not investigated how this capability forms, develops, and matures. In this study, we define the pricing capability as a dynamic capability consisting of three operational building blocks (tools and data, human and relational resources, and processes, routines, and mechanisms) as well as two dynamic capability building blocks (alertness and responsiveness, and value-based strategic thinking). Furthermore, we propose the pricing capability lifecycle of digital innovations that incorporates insights of the dynamic capabilities view (DCV). Based on a longitudinal multi-case study of five firms, we found that the building blocks of pricing capability co-evolve together through the ad-hoc and advanced phases to the mature phase. The study contributes to the literature by integrating insights from DCV into the pricing of digital innovations.

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pricing capability; digital innovations; dynamic capabilities; capability lifecycle

## 1. Introduction

Digitalisation provides opportunities for firms to develop new types of services based on digital innovations. However, most of these firms operate under fast-changing market conditions, where changes in technologies, customers' demands, competitors' moves, and regulations occur quickly and are hard to predict (Ojala 2016a). One of the vital capabilities that firms need in order to survive these changes and establish appropriate value is a pricing capability, which refers to the firm's ability to price in continuously changing external and internal environments.

The pricing capability has received increasing attention recently (Falahat et al. 2020; Raja et al. 2020). Researchers have studied pricing capability as part of organisational capabilities (Dutta, Zbaracki, and Bergen 2003), market-related capabilities (Pham et al. 2017), as a standalone concept (Koufteros, Vonderembse, and Doll 2002), or together with value-based selling capabilities (Raja et al. 2020). One common aspect of recent work is defining the pricing capability based on the work by Dutta, Zbaracki, and Bergen (2003) as an operational capability that refers to routines, skills, know-how, coordination mechanisms, and complementary resources that increase a firm's performance. However, in the current study, we refer to pricing capability not only as the firms' ability to search, use, configure its resources, and organise its pricing processes, but also as their ability to achieve long-term goals and to respond to the fast changing external and internal conditions. Thus, we conceptualise the pricing capability not only as an operational capability responsible for

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making a living in the short term (Drnevich and Kriauciunas 2011), but rather as a dynamic capability responsible for strategical changes (Teece 2019; Schilke, Hu, and Helfat 2018) that evolves over time. We build on the 'drivetrain metaphor' of dynamic capabilities (Di Stefano, Peteraf, and Verona 2014) that accentuates the need for both stable and adaptive processes as well as actions at individual and organisational levels.

Dynamic capabilities cannot be easily bought or outsourced; thus, they have to be built over time (Helfat and Martin 2015). However, developing these capabilities is challenging and it requires the organisation's commitment, time, and effort (Schilke, Hu, and Helfat 2018). As argued by Schilke, Hu, and Helfat (2018, 422), there is a need for additional research on 'process-based approaches to the evolution of dynamic capabilities' and determining 'which types of dynamic capabilities are more or less heavily routinised'. Researchers have studied the lifecycle of dynamic capabilities in general (Helfat and Peteraf 2003), and, for example, in the context of digital platforms (Teece 2017). However, there is a clear gap in our knowledge about the lifecycle of pricing capability, that is, how firms form and develop their capability to price their services effectively in fast-changing conditions. This is especially important for smaller firms, as their survival in the market largely depends on their capability to price their innovations successfully (Ojala 2016b).

In this study, we are interested in pricing capability applied to digital innovations because of their unique characteristics (Cusumano, Kahl, and Suarez 2015; Makkonen and Komulainen 2018). First, digital innovations are indestructible, transmutable, and reproducible; they have network effects, and they may cause a lock-in effect (Loebbacke 2002). Second, the cost structure of digital goods and services is different from that of traditional goods that alters customers' perception of the benefits of the service (Lehmann and Buxmann 2009). Finally, digital innovations often substitute traditional products, and this has an impact on the pricing of the innovations (Cusumano, Kahl, and Suarez 2015). Thus, firms that offer digital goods and services cannot rely on the best practices of other firms operating in traditional industries when firms develop their pricing capability.

In this research, we answer the call for further research on the evolution of dynamic capabilities (Schilke, Hu, and Helfat 2018, 422) and analyse the development of the pricing capability of firms that provide digital innovation. In particular, we address the following main research question: *How do firms develop their pricing capability?* In order to answer this question, we apply a qualitative, longitudinal case method (Eisenhardt 1989; Pettigrew 1990) to investigate the evolution of five case firms' pricing capability.

## 2. Pricing capability from the perspectives of DCV

Scholars have established the pricing capability as one of firms' most important capabilities, among other organisational and marketing capabilities that lead to firm performance and competitive advantage in the market (e.g. Falahat et al. 2020). This stream of research has its roots in the resource-based view (RBV) of the firm that conceptualises the firm as a bundle of valuable, rare, inimitable, and non-substitutable resources that generate value for the organisation (Barney 1991; Wernerfelt 1984). Building on the RBV, the capability-based view (CBV) of the firm emphasises the role of capabilities in achieving the firm's goals (Teece 2019). In the CBV, capability is defined as 'a special type of resource – specifically, an organisationally embedded non-transferable firm-specific resource whose purpose is to improve the productivity of the other resources possessed by the firm' (Makadok 2001).

In the literature, different capability classifications exist (for a detailed summary, see Schilke, Hu, and Helfat 2018; Di Stefano, Peteraf, and Verona 2014). Related to value capturing, Helfat and Raubitschek (2018) find the role of integrative capabilities crucial, in addition to innovation, environmental scanning, and sensing capabilities. Furthermore, researchers agree on the distinction between ordinary and dynamic capabilities (Teece 2019; Drnevich and Kriauciunas 2011; Schilke, Hu, and Helfat 2018). Ordinary (or operational) capabilities are responsible for making a living in the short term (Drnevich and Kriauciunas 2011) while dynamic capabilities are responsible for

strategical changes (Teece 2019; Schilke, Hu, and Helfat 2018). Dynamic capabilities operate on ordinary capabilities in order to compete with environmental changes (Schilke, Hu, and Helfat 2018). These capabilities are continuously adapting and changing while building, integrating, and reconfiguring other resources (Teece, Pisano, and Shuen 1997). Dynamic capabilities can also be seen as the 'organisational drivetrain' consisting of both stable and flexible processes working simultaneously (Di Stefano, Peteraf, and Verona 2014). In this view, simple rules and complex routines are co-ordinated and adjusted flexibly in order to react to challenging environmental changes (Di Stefano, Peteraf, and Verona 2014).

Dynamic capabilities are built over time and they cannot be easily bought or outsourced without the embedding organisational unit (Helfat and Martin 2015). Thus, developing these capabilities requires the organisation's commitment, time, and effort (Schilke, Hu, and Helfat 2018). In the literature, the development of dynamic capabilities was found to go through founding, development, and maturity phases (Helfat and Peteraf 2003). Moreover, Teece (2017) investigated the lifecycle of digital platforms and the required dynamic capabilities in these phases. Platforms were found to go through the phases of birth, expansion, leadership, and self-renewal. During the platform development, high-level dynamic capabilities, such as sensing, seising, and transforming, were utilised and the role of these capabilities varied phase by phase.

The view of pricing as a capability was established by Dutta, Zbaracki, and Bergen (2003) who defined the pricing capability as a set of complex routines, skills, systems, know-how, coordination mechanisms, and complementary resources that are difficult to imitate. Based on the theoretical insights of the RBV and the CBV, a firm's pricing capability has been found to rely on (1) tangible and intangible pricing-related resources (Dutta, Zbaracki, and Bergen 2003), (2) the presence of skilled employees and their ability to develop specific pricing-related routines and assets (the micro-foundational perspective) (Hallberg 2017), and (3) the organisational routines and activities that perform specific pricing-related tasks.

Recent literature on the pricing capability of a firm focuses on the effect of pricing capabilities on firm performance (e.g. Falahat et al. 2020; Johansson et al. 2015) and studies the pricing capability in the context of value-based pricing (e.g. Töytäri, Keränen, and Rajala 2017; Raja et al. 2020). While analysing the value-based pricing (VBP) capabilities together with value-based selling (VBS) capabilities, Raja et al. (2020) found that these two capabilities continuously interplay. In their study, the authors identified the critical role of learning in the development of the VBS and VBP capabilities in the dimensions of customer identification and analysis, implementation of VBP and VBS, and verification of value.

Despite of the increasing research interest in the pricing capability and its importance, little attention has been paid to the lifecycle of a firm's pricing capability and the development of dynamic capabilities in general. Thus, there is a need for providing an understanding of the phases and transitions, as well as the needed capabilities and activities that firms undergo while developing a pricing capability and, thus, for providing qualitative insights of evolvement of an essential dynamic capability.

## 3. Research method

To better understand how firms providing digital goods and services form and develop their pricing capability, we conducted a longitudinal multi-case study (Yin 2009). We selected the exploratory approach, as it allowed us to utilise empirically rich and detailed data belonging to an understudied phenomenon (Yin 2009), and to capture cause-and-effect relations within this process (Eisenhardt 1989; Pettigrew 1990). This method also helped to establish a theoretical contribution, as the findings are deeply grounded in varied empirical sources (Eisenhardt and Graebner 2007). Together with the longitudinal aspect, a multiple-case study leads to a better and deeper understanding of organisational processes that evolve over time (Langley et al. 2013).

**Table 1.** Overview of the case firms.

| | Year founded | Year innovated | Target sector(s) | Digital innovation |
|---|---|---|---|---|
| Firm A | 2006 | 1997 | Banks | Real-time intelligence solutions for banks |
| Firm B | 2012 | 2011 | Telecom operators, Internet service providers, hospitals, airports | Digital platform for indoor positioning and for location-based services |
| Firm C | 2011 | 2010 | Museums | Digital platform to develop media guides |
| Firm D | 1998 | 1997 | Telecom operators, component manufacturers, and service providers for telecom networks | Planning and optimisation software platform for telecom operators |
| Firm E | 2006 | 2000 | Furniture chains and furniture manufacturers | Real-time visualisation platform |

We selected five high-tech firms that develop and market software-based digital innovations (see Table 1). The selection of these case firms was based on purposeful theoretical sampling, as recommended by Eisenhardt (1989), by applying multiple criteria. First, all the selected case firms developed digital innovations for different target industries. Thus, we aimed to include 'polar types' of research sites as recommended in studies of small samples (Eisenhardt 1989; Pettigrew 1990). Second, to expand the variety of the firms, we selected recently established and older firms. Third, all the case firms were small and led by a group of entrepreneurs who were closely involved in the pricing decisions. The small size of the case firms made it easier to get first-hand information related to the development of the pricing capability. Last, based on recommendations by Stake (1995), we selected firms to which we had good access and had established personal contacts. These relationships increased the firms' willingness to participate in the study and to share, in many cases, confidential information related to their pricing decisions.

### *3.1. Data collection*

We used multiple sources of information to gather data from each case firm. The main form of data collection consisted of 46 in-depth interviews conducted during a 2- to 9-year period with the main decision makers of the case firms (see Table 2). We conducted 3–11 interviews per firm, depending on the firm's size and age. In the case of Firm B, we were able to conduct only three interviews, but these interviews were in-depth and revealed important data. All interviews were recorded and transcribed.

**Table 2.** List of informants.

| Firm | Title | Number of interviews | Year(s) of interviews | Interviews total |
|---|---|---|---|---|
| Firm A | Founder, CEO | 6 | 2010, 2010, 2013, 2015, 2017, 2018 | 10 |
| | Vice President (Services) | 4 | 2010, 2010, 2014, 2018 | |
| Firm B | CEO | 1 | 2017, 2018 | 3 |
| | Founder, CTO | 2 | 2017 | |
| Firm C | Co-founder, CEO | 6 | 2012, 2012, 2013, 2013, 2017, 2018 | 10 |
| | Co-founder, CTO | 4 | 2012, 2013, 2017, 2018 | |
| Firm D | CEO | 1 | 2011 | 8 |
| | Vice President (General Management) | 3 | 2011, 2011, 2013 | |
| | Vice President (Sales) | 4 | 2010, 2013, 2017, 2018 | |
| Firm E | Co-founder, CEO | 3 | 2011, 2011, 2017, 2018, 2019 | 15 |
| | Co-founder, CTO | 1 | 2013 | |
| | Co-founder (Art Director) | 2 | 2011, 2013 | |
| | Co-founder, COO | 1 | 2013 | |
| | Vice President (Sales) | 1 | 2011 | |
| | Sales Engineer | 1 | 2015, 2018, 2019 | |
| | Sales Manager | 1 | 2014 | |
| | Head of Sales | 1 | 2014 | |
| Total | | | | 46 |

The majority of the interviewees consisted of entrepreneurs or groups of entrepreneurs who had established the firms. These interviewees were selected based on their knowledge of the firm's first pricing models and its backgrounds. The persons also provided help in identifying other relevant interviewees from the case firms, such as marketing and sales managers who also had important roles in the firm's pricing decisions.

During the first interviews, we collected general information about the firm. In addition to the actual pricing model, we collected data about the firm's history, products, customers, partners, etc., to get a comprehensive understanding of the firm and its early pricing model. As we were interested in development of their pricing capability, follow-up interviews (and the interview guide) were tailored based on previous interview(s) and to the interviewee's role in the firm and his or her involvement in pricing. By using this procedure, we were able to address the development of the pricing capability. Generally, these interviews followed an open-ended interview structure for flexibility and collection of in-depth data (Benbasat, Goldstein, and Mead 1987).

In addition to these formal interviews, the second author of the paper had several informal discussions with the case firms' managers and employees over many years. These informal discussions also provided important insights into the firm, its capabilities, markets, strategies, and reduced risk of elite bias. Furthermore, we collected several types of secondary data from the case firms. First, we actively followed the case firms' updates on their websites and social media sites, such as Facebook, Instagram, and LinkedIn. Second, we asked the case firms to share advertisement materials, presentations, and press releases. We used the collected secondary data to validate and triangulate the primary data from the interviews (Miles, Huberman, and Saldana 2014). All the inconsistencies between the interview data and the secondary data were discussed with the interviewees to eliminate possible misunderstandings and retrospective bias (Miller, Cardinal, and Glick 1997).

### *3.2. Data analysis*

In the data analysis, we applied inductive techniques (Eisenhardt 1989; Miles and Huberman 1994). First, as we had collected a huge amount of data, we reduced the data (Miles and Huberman 1994) by synthesising the transcripts from the 46 interviews and the secondary data (Eisenhardt 1989). In this phase, we developed a baseline narrative that presented the chronological history of the firms and their pricing strategies (Pettigrew 1990). This timeline helped to create a general understanding of the firms' pricing models, resources, and capabilities. Second, based on the firms' chronological history, we applied Helfat and Peteraf's (2003) 'ad-hoc', 'advanced', and 'mature' phases to code and organise the data. Third, to identify different building blocks related to pricing capabilities, we used open thematic content analysis to search the themes and patterns that emerged from the interview data (Corbin and Strauss 2014). First, we identified several important resources and capabilities needed for pricing and documented their evolution over time. In the next iterations, we grouped these into building blocks. We identified the building blocks 'tools and data', 'human and relational resources', and 'processes, routines, and mechanisms' that contained elements mentioned also in recent work (e.g. Dutta, Zbaracki, and Bergen 2003; Hallberg 2017; Hinterhuber 2017); however, we grouped these items based on their evolution and role in the lifecycle of the firm's pricing capability. Based on the data, we also identified the dynamic capability blocks 'alertness and responsiveness' and 'value-based strategic thinking' that were vital constituents of the pricing capability. After several iterations of analysis and discussions, when we were not able to find new building blocks, we had reached the level of saturation (Corbin and Strauss 2014).

In the final phase, we arranged the findings in summary tables that included evolution of the pricing capability with five different building blocks (see the online Appendix). Thereafter, we wrote findings related to each building block within each pricing capability phase. This work helped us summarise the empirical grounding (Eisenhardt and Graebner 2007).

## 4. Findings

In this section, we first describe the operational and dynamic building blocks of the pricing capability. Second, we identify the three phases of the pricing capability lifecycle as identified through the development of the building blocks. Additional information about the evolution of the pricing capability of the case firms can be found in the online Appendix.

### *4.1. Operational and dynamic building blocks of the pricing capability*

The decision makers of the case firms developed the firms' pricing capability through gaining new experiences and skills by utilising different capabilities. We grouped these capabilities into five essential components of pricing capability that clearly followed a different development curve. These building blocks had two distinct roles. First, they served as sources of new knowledge and experiences on which decision makers could rely while developing the firms' pricing capability. Second, the new knowledge was embedded in these building blocks, and thus it fostered the development of the firms' pricing capability.

The first operational building block, *Tools and data*, consists of tangible resources needed for pricing, such as hardware and software tools, market and customer data, internal documents (e.g. budget, business plan), etc. However, one of the most important resources is the firms' proprietary pricing tool. This pricing tool is a valuable and inimitable resource that assures the firms' competitive advantage in the market. Developing a pricing tool is challenging and time-consuming, and requires many other resources; thus, it can be undoubtedly considered as a key indicator of the firms' pricing capability level.

The second operational building block, *Human and relational resources*, consists of skills and competencies, as well as relational resources that are vital for pricing. For the case firms, the most important skills and competencies related to pricing are technical skills and knowledge, negotiation skills, market knowledge, analytical skills, and a risk-taking attitude. This building block includes also the relational resources related to business-to-business networks.

The third operational building block, *Processes, routines, and mechanisms,* encapsulates all pricing-related operational tasks and coordination mechanisms that are part of the pricing process. The operational activities are carried out individually or in a small group of individuals. Examples of these activities include analysing customer needs or willingness to pay, competitors, cost and profitability, negotiating, and explaining prices to customers. In contrast, the coordinating activities required cooperation at the organisational level. Examples of such activities include developing new pricing models, adjusting prices, unifying pricing across customers, etc.

In addition to the operational capability blocks, we identified two dynamic pricing capability blocks that were essential in successful pricing. The first dynamic building block, *Alertness and responsiveness,* describes the firms' active attention and readiness for fast reaction to market changes by the means of pricing. Alertness encompasses both a continuous search of new opportunities by which to grow through the means of pricing as well as the identification of the need for changes in pricing. Responsiveness, on the other hand, describes the firm's ability to act upon the opportunities related to pricing as well as to react to the necessity of changes in pricing.

In our sample, in the era of the emergence of cloud computing, the founders of case firm A identified the business opportunity of changing from a license-based pricing model to a subscription-based model while still working in another workplace. Afterwards, they actively searched for ways to improve their pricing model based on the customers' feedback and added transparency to their model. Other case firms were also continuously searching and testing new pricing models, such as usage-based pricing, subscription-based pricing, licensing, free trials, etc. Furthermore, the firms were also actively thinking about reconfiguring their pricing models based on usage statistics, costs, and feedback from customers and partners.

The second dynamic capability block, *Value-based strategic thinking,* refers to the firms' ability to understand and identify ways through which pricing can increase the firm's revenues directly and indirectly, and through which it can increase the value of customers and partners. Furthermore, it encompasses the firms' ability to transform uncertainty into competitive advantage by taking into account the risks in the pricing models. In what follows, we describe this capability block in detail.

First, value-based strategic thinking incorporates the understanding of different ways in which pricing allows the firm to capture value. As an example, pricing can be used as a means of increasing the firms' customer base through a network effect. Free trials, low prices, and short subscription periods attract customers who provide good references and spread the word. As a consequence, pricing decisions increase the firm's revenues indirectly. Furthermore, a more obvious direct impact of pricing on the firms' revenues is the use of usage-based and fix components wisely, or reaching different customer segments through bundling.

Second, decision makers think about the pricing models as a means by which to increase the customers' value. As an example, the competitive advantage of two case firms was achieved through the use of a subscription-based pricing model that was more attractive for customers because of shorter contract periods and no risks of lock-in to specific technological solutions. Furthermore, the customers' value could also be increased by using bundling and offering the customers different packages and pricing models from which to choose.

Third, value-based strategic thinking incorporates the ability to understand how the different pricing options increase the value for partner firms. As an example, revenue share as a pricing mechanism provides a constant revenue source for the partner firms while it also assures the common goal of value capturing for both the firm and the partners, thus leading to long-term benefits for both.

Another important area of value-based strategic thinking is taking into account the uncertainty in the pricing models. The case firms accentuated the importance of considering different risks, such as unexpected technical problems, delays, new customer requirements, hidden dependencies, etc. Uncertainty could be transformed into competitive advantage as well: when case firm A asked two experts from the customers to help them with the integration work, they charged an extra fee for customisation, and they promised 85% precision when giving price estimates. This pricing model ensured precision in both schedule and budget and this precision provided a competitive advantage over other firms.

### *4.2. Phases of the case firms' pricing capability lifecycle*

By analysing the longitudinal data of the case firms, we identified different development curves that the building blocks followed. These development curves had different stages that we named ad-hoc, advanced, and mature. The boundaries between the phases were not easy to identify, and the length of the transition phase varied. In some cases, the transition happened relatively fast (e.g. by hiring a pricing professional) while in other cases the transition took more time (e.g. by developing a proprietary database and pricing tool).

The first phase, the *ad-hoc pricing capability*, started when the decision makers had to price their innovation for the first time. In this phase, the pricing decisions were made in an ad-hoc manner. The decision makers used trial-and-error, brainstorming, and sense-making strategies to solve the relevant pricing issues. In this phase, the decision makers did not carry out proper customer and market analysis, cost estimation, or other operational activities. However, all the case firms emphasised the role of discussions with potential customers and other co-workers. The firms carried out negotiations with their possible customers iteratively, during which the firms clarified the requirements and the possible customers' willingness to pay. The role of discussions with other co-workers was limited to estimating the amount of work and the cost.

In time, the decision makers gained new knowledge and experience in pricing. They started to invest in pricing resources and think about pricing more consciously. Consequently, the investments

and the more organised activities led the decision makers to a more advanced pricing capability phase.

In the *advanced phase*, decision makers gained new experiences individually, and at the same time, they interacted and formed a shared understanding of pricing by integrating their experiences and knowledge. The decision makers agreed on best practices, methods, and techniques. This converted pricing from an experimental task to a routinised task in which the decision makers made choices based on the established alternative pricing model attributes and prices. However, there was a place for innovation and flexibility, which were embodied in customer-specific solutions and prices.

In the transition from the advanced phase to the next, the *mature phase*, the firms developed routines, mechanisms, and strategies, and invested in resources related to pricing. The transition happened not only by gaining more experience and knowledge but also by conscious actions to develop the firms' pricing capability and to make the pricing process smoother and more effective. Pricing-related information, know-how, and skills were institutionalised slowly, and firms entered the mature phase of the pricing capability lifecycle.

In the mature phase, the pricing capability was embedded in best practices, routines, and tools that the decision makers performed and used when pricing. The organisation leveraged the pricing capability to individuals, and thus the pricing capability did not depend solely on specific persons. Instead, it was an executable task that mainly involved the pricing model and price adjustments, refinement of pricing terms and conditions, a choice between pricing model alternatives depending on the context, and execution of the pricing strategies. In this phase, the evolution of the pricing capability happened at a slow pace. Instead of gaining new experiences and knowledge, executing and repeating established mechanisms was emphasised. However, in the digital innovations domain, the fast-changing market conditions and other external and internal factors required flexibility and fast reactions as well.

Based on our investigation, we propose a model for the evolution of pricing capability for providers of digital innovations. In this model, the building blocks of the firms' pricing capability co-evolve together through three phases, as described in detail in Table 3.

## 5. Discussion

This study found that the firms' pricing capability forms and develops through continuous learning and through incorporating the gained knowledge into the building blocks of the capability. We identified three operational building blocks (Tools and data, Human and relational resources, and Processes, routines, and mechanisms) (Dutta, Zbaracki, and Bergen 2003; Hallberg 2017; Hinterhuber 2017) and two new dynamic building blocks (Alertness and responsiveness and Value-based strategic thinking) that build up the pricing capability of a firm and act as sources for new knowledge. While the operational building blocks are in line with previous studies (Dutta, Zbaracki, and Bergen 2003; Hallberg 2017; Hinterhuber 2017), we identified two important dynamic building blocks that have not been discussed in the pricing literature.

This study answers the call for additional research on 'process-based approaches to the evolution of dynamic capabilities' (Schilke, Hu, and Helfat 2018, 422) and provides empirical results related to the evolvement of a crucial dynamic capability through the pricing capability lifecycle model. In particular, we found that a firm's pricing capability evolves through ad-hoc, advanced, and mature phases. Even though the first two phases of the pricing capability lifecycle are defined similarly to the founding and development phases of the capability lifecycle proposed by Helfat and Peteraf (2003), the definition of the mature phase differs substantially in this study. That is, we define the mature pricing capability phase as a stage when firms excel in pricing their digital innovations effectively, but, at the same time, they have the necessary flexibility to react quickly to changes. This definition is based on the characteristics of digital innovation markets, where changes happen quickly, and innovations are mainly priced based on their value for customers. In this context,

**Table 3.** The pricing capability lifecycle model of digital innovations.

| | Ad-hoc pricing capability | Advanced pricing capability | Mature pricing capability |
|---|---|---|---|
| **Tools and data:** -hardware and software tools, market and customer data, internal documents -the firm's own pricing tool | Data are searched when necessary and price calculations are done case by case. | The necessary data are collected if needed. The firm has some kind of pricing tool, but the pricing model and the prices are reviewed case by case and adjusted when necessary. | The firm has data sources for market and customer data. The firm has its own pricing tool for already priced services and is able to develop pricing tools for new services effectively. |
| **Human and relational resources:** -skills and competencies, such as technical knowledge, negotiation skills, market knowledge, analytical skills, risk-taking attitude -relational resources | There is no pricing team. Decisions related to pricing are made by the CEO or some of the board members. | The firm has the necessary skills and competencies for pricing. The firm has a pricing team, but final decisions are made by the CEO. If needed, partner firms and other actors are involved in pricing. | The pricing team is established, and pricing roles are well-defined. The team makes the pricing decisions. Relationships needed for pricing with other actors (e.g. partner firms, customers) are well developed. |
| **Processes, routines, and mechanisms:** -different pricing related operational tasks and coordination mechanisms, such as customer analysis, market analysis, cost and profitability calculations | No pricing routines and mechanisms. | There are some pricing activities (e.g. customer data analysis, cost analysis) but no formal pricing process with predefined rules and policies. | The pricing process is well-developed but enables flexibility. Pricing strategies and the pricing policy are well-defined across the customers. |
| **Alertness and responsiveness:** -search new ways to grow through new pricing models -identify the need for change in pricing -act upon the opportunities related to pricing -respond to the need of changes in pricing | Observing the new pricing opportunities and the need for changes in pricing occasionally. Prices are determined mainly intuitively. | Search for new pricing models and changes in pricing models by testing new pricing models. | Market and customer usage monitoring. Fast and effective reaction to the need for changes in pricing. |
| **Value-based strategic thinking:** -increasing the value through pricing for customers, partners, and the firm itself -transforming uncertainty into competitive advantage by taking into account the risks in the pricing | Basic understanding of the customers' value and willingness to pay. Need for lots of negotiations. Losing revenue by mistakes. Risks not adequately taken into account in the pricing. | Pricing is recognised as a means of increasing the value for customers, partners and the firm itself. Some risk factors taken into account in pricing. Open questions related to the impact of pricing on the value for the firm, customers and the partners. | Informed decisions based on customer and market knowledge. Thorough understanding of how pricing decisions influence the value for customers, partners and the revenues of the firm. Uncertainty transformed into competitive advantage. |

maturity can be seen as a state of mind of the decision makers that incorporates entrepreneurial thinking and embraces new strategies and innovativeness.

This study provides new insights to the 'drivetrain metaphor' presented as the definition of dynamic capability with five content domains in Di Stefano, Peteraf, and Verona (2014). We argue that the particular characteristics (and thus, the definition) of dynamic capability depend on the life-cycle phase on which the capability resides. As an example, in the ad-hoc phase of the pricing capability, managers develop new resources (in particular, pricing models) with which to achieve competitive advantage and earn rent. However, in the mature phase, firms have both capacities and routines by which to develop new or act upon existing resources (in particular, pricing models) in order to adapt to the changing environment and earn rent. This viewpoint also implicitly answers the question of 'which types of dynamic capabilities are more or less heavily routinised', as expressed by Schilke, Hu, and Helfat (2018, 422). We argue that the level of routinisation depends not

only on the type of the dynamic capability, but also on the lifecycle phase in which the capability resides.

Based on the findings, the firms' pricing capability develops through acquiring knowledge and experience related to pricing. In the long run, knowledge and experience accumulate over time; thus, the development curve is increasing. However, in some cases, a short decrease in the pricing capability level might happen due to the fast-changing market or other internal factors, such as if the firms enter new markets, new, substantially different functionalities should be priced, or the innovation has to be priced for new target verticals. These special cases require flexibility and creativity from the decision makers. The speed for solving these issues depends on the current level of the firms' pricing capability. These periods can be considered as more intensive development periods of the capability lifecycle; after which, the pricing capability develops further toward maturity.

## 6. Conclusions

This work contributes to the academic literature in the context of pricing capability and to the DCV literature in several ways. First, this study defines pricing capability as a dynamic capability and identifies its building blocks. In particular, in addition to the operational capability blocks, we introduce two key dynamic building blocks that, to the best of our knowledge, have not been identified yet in the pricing literature. Second, this study answers the call for additional research on the evolution of dynamic capabilities (Schilke, Hu, and Helfat 2018). That is, we propose the pricing capability lifecycle model for firms offering digital innovations based on rich longitudinal qualitative data. The model describes the phases through which the building blocks of pricing capability co-evolve, from the ad-hoc phase through the advanced phase to the maturity phase. The building blocks of the pricing capability develop at their own pace; however, the evolution of these building blocks is interrelated, and they go through the same phases and transitions. With this model, we bring the time dimension into the definition and characteristics of dynamic capabilities, by arguing that particular characteristics (e.g. the routinisation level) and the definition of the dynamic capability depend also on the lifecycle phase in which the capability resides.

The study also has several contributions to the practice. First, we provide insights for practitioners into how firms can develop their pricing capability. These insights are related to the building blocks of the pricing capability, and the way these building blocks can be developed to reach the next developmental phase. Second, the model developed in this study can be used as a development tool that decision makers can use to identify the level of their firm's pricing capability and generate ideas for developing this capability further. Third, this study cautions practitioners against introducing strict pricing routines, by emphasising that, in the fast-changing digital innovations market, reaching the mature state of pricing capability implies making a trade-off between flexibility and effectiveness. That is, we accentuate that in the digital innovations' domain, decision makers should leave space for experimenting: instead of concentrating on short-term goals by executing old pricing practices, long-term goals should also be targeted.

This work has several limitations. First, the context limits the study's generalizability. The case firms developed and marketed digital innovations, making their pricing processes different from firms operating in other sectors. Second, the case firms operated in business-to-business markets, limiting generalisation to firms acting in business-to-consumer markets where pricing processes might differ substantially. Third, we focused solely on entrepreneurial, small firms whose pricing practices might differ substantially from those of large enterprises that develop digital innovations.

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## Disclosure statement

No potential conflict of interest was reported by the author(s).

## References


Barney, J. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17 (1): 99–120.

Benbasat, I., D. K. Goldstein, and M. Mead. 1987. "The Case Research Strategy in Studies of Information Systems." *MIS Quarterly* 11 (3): 369–386.

Corbin, J., and A. Strauss. 2014. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, California: Sage.

Cusumano, M. A., S. J. Kahl, and F. F. Suarez. 2015. "Services, Industry Evolution, and the Competitive Strategies of Product Firms." *Strategic Management Journal* 36 (4): 559–575.

Di Stefano, G., M. Peteraf, and G. Verona. 2014. "The Organizational Drivetrain: A Road to Integration of Dynamic Capabilities Research." *Academy of Management Perspectives* 28 (4): 307–327.

Drnevich, P. L., and A. P. Kriauciunas. 2011. "Clarifying the Conditions and Limits of the Contributions of Ordinary and Dynamic Capabilities to Relative Firm Performance." *Strategic Management Journal* 32 (3): 254–279.

Dutta, S., M. J. Zbaracki, and M. Bergen. 2003. "Pricing Process as a Capability: A Resource-Based Perspective." *Strategic Management Journal* 24 (7): 615–630.

Eisenhardt, K. M. 1989. "Building Theories from Case Study Research." *Academy of Management Review* 14 (4): 532–550.

Eisenhardt, K. M., and M. E. Graebner. 2007. "Theory Building from Cases: Opportunities and Challenges." *Academy of Management Journal* 50 (1): 25–32.

Falahat, M., T. Ramayah, P. Soto-Acosta, and Y.-Y. Lee. 2020. "SMES Internationalization: The Role of Product Innovation, Market Intelligence, Pricing and Marketing Communication Capabilities as Drivers of SMEs' International Performance." *Technological Forecasting and Social Change* 152: 119908. doi:10.1016/j.techfore.2020.119908.

Hallberg, N. L. 2017. "The Micro-Foundations of Pricing Strategy in Industrial Markets: A Case Study in the European Packaging Industry." *Journal of Business Research* 76: 179–188.

Helfat, C. E., and J. A. Martin. 2015. "Dynamic Managerial Capabilities: Review and Assessment of Managerial Impact on Strategic Change." *Journal of Management* 41 (5): 1281–1312.

Helfat, C. E., and M. A. Peteraf. 2003. "The Dynamic Resource-Based View: Capability Lifecycles." *Strategic Management Journal* 24 (10): 997–1010.

Helfat, C. E., and R. S. Raubitschek. 2018. "Dynamic and Integrative Capabilities for Profiting from Innovation in Digital Platform-Based Ecosystems." *Research Policy* 47 (8): 1391–1399.

Hinterhuber, A. 2017. "Value Quantification Capabilities in Industrial Markets." *Journal of Business Research* 76: 163–178.

Johansson, M., J. Keränen, A. Hinterhuber, S. Liozu, and L. Andersson. 2015. "Value Assessment and Pricing Capabilities —How to Profit from Value." *Journal of Revenue and Pricing Management* 14 (3): 178–197.

Koufteros, X. A., M. A. Vonderembse, and W. J. Doll. 2002. "Integrated Product Development Practices and Competitive Capabilities: the Effects of Uncertainty, Equivocality, and Platform Strategy." *Journal of Operations Management* 20 (4): 331–355.

Langley, A. N. N., C. Smallman, H. Tsoukas, and A. H. Van de Ven. 2013. "Process Studies of Change in Organization and Management: Unveiling Temporality, Activity, and Flow." *Academy of Management Journal* 56 (1): 1–13.

Lehmann, S., and P. Buxmann. 2009. "Pricing Strategies of Software Vendors." *Business and Information Systems Engineering* 1 (6): 452–462.

Loebbacke, C. 2002. *Digital Goods: An Economic Perspective*. Encyclopedia of Information Systems, edited by H. Bidgoli. San Diego: Academic Press.

Makadok, R. 2001. "Toward a Synthesis of the Resource-Based and Dynamic-Capability Views of Rent Creation." *Strategic Management Journal* 22 (5): 387–401.

Makkonen, H., and H. Komulainen. 2018. "Explicating the Market Dimension in the Study of Digital Innovation: a Management Framework for Digital Innovation." *Technology Analysis & Strategic Management* 30 (9): 1015–1028.

Miles, M. B., and A. M. Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage Publications.

Miles, M. B., A. M. Huberman, and J. Saldana. 2014. *Qualitative Data Analysis: A Methods Sourcebook. 3rd*. Thousand Oaks, CA: Sage Publications.

Miller, C. C., L. B. Cardinal, and W. H. Glick. 1997. "Retrospective Reports in Organizational Research: A Reexamination of Recent Evidence." *Academy of Management Journal* 40 (1): 189–204.

Ojala, A. 2016a. "Business Models and Opportunity Creation: How IT Entrepreneurs Create and Develop Business Models Under Uncertainty." *Information Systems Journal* 26 (5): 451–476.

Ojala, A. 2016b. "Adjusting Software Revenue and Pricing Strategies in the Era of Cloud Computing." *Journal of Systems and Software* 122: 40–51.

Pettigrew, A. M. 1990. "Longitudinal Field Research on Change: Theory and Practice." *Organization Science* 1 (3): 267–292.

Pham, T. S. H., L. L. Monkhouse, and B. R. Barnes. 2017. "The Influence of Relational Capability and Marketing Capabilities on the Export Performance of Emerging Market Firms." *International Marketing Review* 34 (5): 606–628. doi:10.1108/IMR-07-2014-0235.

Raja, J. Z., T. Frandsen, C. Kowalkowski, and M. Jarmatz. 2020. "Learning to Discover Value: Value-Based Pricing and Selling Capabilities for Services and Solutions." *Journal of Business Research* 114: 142–159. doi:10.1016/j.jbusres.2020.03.026.

Schilke, O., S. Hu, and C. E. Helfat. 2018. "Quo Vadis, Dynamic Capabilities? A Content-Analytic Review of the Current State of Knowledge and Recommendations for Future Research." *Academy of Management Annals* 12 (1): 390–439.

Stake, R. E. 1995. *The Art of Case Study Research*. Thousand Oaks, CA: Sage Publications.

Teece, D. J. 2017. *Dynamic Capabilities and (Digital) Platform Lifecycles. Entrepreneurship, Innovation, and Platforms* 211–225. Thousand Oaks, CA: Emerald Publishing Limited.

Teece, D. J. 2019. "A Capability Theory of the Firm: An Economics and (Strategic) Management Perspective." *New Zealand Economic Papers* 53 (1): 1–43.

Teece, D. J., G. Pisano, and A. Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal* 18 (7): 509–533.

Töytäri, P., J. Keränen, and R. Rajala. 2017. "Barriers to Implementing Value-Based Pricing in Industrial Markets: A Micro-Foundations Perspective." *Journal of Business Research* 76: 237–246.

Wernerfelt, B. 1984. "A Resource-Based View of the Firm." *Strategic Management Journal* 5 (2): 171–180.

Yin, R. K. 2009. *Case Study Research: Design and Methods*. Thousand Oaks, CA: SAGE Publications.