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Pricing of digital services as an effectual co-creative process

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ABSTRACT

Entrepreneurs have to price their innovations under the unpredictability of customers' reactions. While predictive pricing methods are prevalent in business-to-business pricing literature, we argue for the critical importance of control-oriented pricing strategies for digital services. By applying effectuation theory, our study investigates how entrepreneurs co-create their pricing strategies for their digital services as a co-evolutionary, iterative process with their customers. We found that pricing is the co-evolutionary process where entrepreneurs learn from their interactions with customers and use this knowledge to develop and improve their pricing practices further. The findings contribute to behavioural pricing literature by explaining pricing strategy formation as a co-creative process that focuses on interactions rather than predictive actions.

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Co-creative pricing; digital services; effectuation; uncertainty

1. Introduction

Proper pricing is critical to any firm's success or failure in the market (Laatikainen and Ojala 2021). In some industries, like beverages and lodging, firms can apply causal heuristics to use existing pricing models based on well-established routines and calculations (Read et al. 2009). However, in industries where changes are fast, and markets are uncertain (Nambisan, Wright, and Feldman 2019), pricing becomes more challenging (Read et al. 2019). The digital service industry presents as one of these industries, where entrepreneurs have to adjust their offerings to meet customers' specific needs and adapt to fast changes in the environment (Nambisan 2017). In this situation, due to the novelty of new offerings, the lack of any established pricing routine, and the customers not knowing exactly what they want and how the service might bring value to them, entrepreneurs cannot rely on prediction-based pricing models. Therefore, they need to apply non-predictive logics to co-understand the mutual needs and values and co-develop pricing strategies within their network to mitigate the uncertainty of the context (Karami and Read 2021; Read et al. 2009; Wiltbank et al. 2006).

We have a meagre understanding of non-predictive logic and its implications (Nambisan 2017) in developing quality relationships for co-creating pricing strategies with other stakeholders. Scant attention to behavioural pricing is rooted in the dominant assumption that industrial customers rely on objective information and go through the causal process of decision-making (Monroe, Rikala, and Somervuori 2015). To increase our understanding of the conundrum discussed above, this study seeks to answer the following research question: How do entrepreneurs co-create their

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pricing strategies with their customers and other stakeholders in the context of digital services characterised by high uncertainty?

To address this central question, we apply the effectuation theory from entrepreneurship literature. The theory provides a framework to investigate pricing strategies of digital entrepreneurial firms working in an uncertain environment characterised by rapid changes by focusing on the logic of control and changing the focus from *resources* to the *process* of unpacking uncertainty through co-creation (Karami and Read 2021). Effectuation theory explains learning from and about other stakeholders' expectations, routines and know-how as the building blocks of strategy formation (Schweizer, Vahlne, and Johanson 2010). As such, we conceptualise the development of a pricing strategy as a learning process (Johanson and Vahlne 2006), which results in reducing perceived uncertainty and transforming existing means into successful pricing models. Our study contributes to behavioural pricing literature in the context of entrepreneurship as a less developed area in business-to-business (B2B) pricing research (Monroe, Rikala, and Somervuori 2015).

2. Uncertainty and pricing of digital services

Uncertainty has always been a focal issue in the pricing literature (e.g. Luotola et al. 2017). However, uncertainty becomes even more accentuated in the context of digital services. These services often provide unique solutions and experiences to customers (Jahanmir and Cavadas 2018), and they often substitute or complement traditional products (Yoo et al. 2012). Digital services are also convergent as they bring previously separate user experiences, products and services together, and, therefore, often require some changes in customers' existing operational routines (Ojala and Lyytinen 2022). Thus, the perceived value of a digital service for the customer becomes very subjective and difficult to quantify (Ojala and Laatikainen 2019). In many cases, there are no best pricing routines and practices of other firms that entrepreneurs could follow (Laatikainen and Ojala 2021).

When pricing digital services, entrepreneurs have to consider that digital services are reproducible, editable and generative, meaning new functionalities can be added after they are brought into use (Yoo et al. 2012). They can also cause *lock-in effects* where the customers become locked into the providers' technology by revising and adapting their routines and organisational processes to the new digital service; switching to other providers, therefore, causes additional costs (Kallinikos, Aaltonen, and Marton 2013). Digital services may also cause *network effects* meaning that every additional user can impact the value of the service for other customers (Kallinikos, Aaltonen, and Marton 2013). These factors add to the uncertainty of pricing digital services, requiring entrepreneurs to consider the long-term strategic aspects of their pricing decisions.

In general, firms may apply cost-based pricing, competition-oriented pricing, value-based pricing or a combination of these (Laatikainen and Ojala 2021). Among these, value-based pricing plays the most important role in pricing of digital services, where the most important consideration is the value that customers perceive when they use the service (Johansson et al. 2015). Value-based pricing can be seen as a co-evolutionary process where solutions are designed *with* rather than *for* customers in order to reduce uncertainty and achieve greater value (Read et al. 2019). As such, the mutual value is co-created during the process of interaction and development of the digital service.

In the pricing literature, customers' value has been defined in many different ways, including the value in use, the difference between the customers' willingness to pay and the actual price paid, the maximum amount customers would pay for an offering and the expected improvements in customer profitability (e.g. Liozu, Boland, and Perelli 2012). Besides the mitigation of different risk, customers' value might incorporate factors such as economic gains, social, quality and other benefits (Liozu, Boland, and Perelli 2012). Quantifying the customers' benefits is one of the most challenging tasks because of numerous individual, organisational and externally induced barriers (Hinterhuber 2017). In order to quantify customers' perceived value, entrepreneurs have to understand the

customers' business models and the benefits that the new service brings to their customers (Töytäri, Keränen, and Rajala 2017).

3. Uncertainty and effectual decision-making

Effectuation theory presents a cognitive framework for decision-making under uncertainty (Read et al. 2016; Sarasvathy 2001). According to the logic of control, a key concept of the theory, entrepreneurs do not rely on predicting the future; they instead rely on what they have at hand to build an effect (Sarasvathy 2001). The control-oriented logic of effectuation triggers the entrepreneur's first move, which is followed by an immediate expansion of his/her social network of relationships to access more resources (Maine, Soh, and Dos Santos 2015). By obtaining more ideas and interpretations of the situation from the self-selected stakeholders, the uncertainty of the situation gradually fades away (Karami and Read 2021). Gaining access to different types of new means, such as new ideas, skills, knowledge and connections, enable the stakeholders to make sense of the situation, which in turn increases their control over it (Kerr and Coviello 2020) and a shared imagination of a future (Sarasvathy 2002). This helps the stakeholders take some actions, see the outcomes and fine-tune their action, which results in reducing their perceived uncertainty and collectively imagine a new opportunity upon which they all can agree (Sarasvathy 2002).

Learning by doing and learning from others are key mechanisms in effectuation theory that enable the transformation of means to resources and control of uncertainty. The focal entrepreneur initially learns who should come on board and what kind of resources should be obtained. Then, learning by doing becomes an ongoing collective endeavour among all the self-selected stakeholders (Kerr and Coviello 2020). Collective learning plays two important functions: first, fine-tuning the general aspirations of the self-selected stakeholders and transforming them into an agreed-upon shared goal, and second, activating and integrating the required resources to actualise that goal (Sarasvathy 2001).

Altogether, the extant literature does not explain clearly yet how entrepreneurs address the specific pricing issues which emerge due to the specific nature of digital services and the nature of the relationship between the service provider and the user. While value-based pricing literature provides some useful insights by emphasising the importance of shared visions, relationships, trust building and differentiated offerings, there is a gap in our understanding of the formation of pricing strategy in a long-term relationship. Effectuation theory, with its focus on control through the partnership and learning in the process of co-creation, enables us to address such issues. In Table 1, the key studies in the extant literature are presented as compared to our study. As visible from the table, our study is the first study that describes pricing through the lens of effectuation theory and identifies the underlying key mechanisms of pricing strategy co-creation.

4. Methodology

In this study, we apply an exploratory multi-case study method (Yin 2009) to form in-depth understanding of how entrepreneurs co-create their pricing strategies with their customers and other stakeholders in the context of digital services characterised by high uncertainty. This approach enables to utilise empirically rich data and capture cause-and-effect relationships (Eisenhardt 1989). Further, we applied a longitudinal case study method enabling collect detailed data over time from a phenomenon that has received only meagre attention (Eisenhardt 1989; Pettigrew 1990). In our context, co-creation of entrepreneurs' pricing strategies with other stakeholders presents such a phenomenon.

By following purposeful theoretical sampling (Eisenhardt 1989), we selected four digital service providers (see Table 2) operating in B2B markets. The case firms developed digital services for different target groups. The selected firms were also small, which facilitated following the development of the firms, their activities and the pricing. All the case firms were led by a small group of

Table 1. Key studies in recent literature as compared to our study.

Study	Theory	Methodology	Key results
Luotola et al. 2017	Design thinking and actor-network theory	Action research	Certainty of the value potential is established through co-creation. Solution selling and value co-creation both require an abductive epistemology to address the uncertainty.
Laatikainen and Ojala 2021	Dynamic capabilities view	Longitudinal case study	The pricing capability of a firm can be conceptualised as a dynamic capability consisting of three operational building blocks and two dynamic capability building blocks.
Iveroth et al. 2013	Pricing literature	Collaborative research	The study proposes a taxonomy of pricing models differentiating price along five dimensions.
Johansson et al. 2015	Prior research in the strategy, marketing and pricing literature	Five essays using different methods	Value assessment and pricing capabilities provide the foundation for value creation and value appropriation in B2B markets.
Liozu, Boland, and Perelli 2012	Pricing literature and value-based pricing theory	Qualitative multi-case study	Value-based selling and the development of pricing capabilities require an understanding of customer value.
Hinterhuber 2017	Earlier research on customer value, selling and value-based pricing	Cross-sectional survey	Value quantification capabilities improve firm performance and benefit firm performance especially in stable markets
Töytäri, Keränen, and Rajala 2017	Pricing and strategic management literature, institutional theory	Qualitative case study	The study identifies 11 individually, organisationally and externally induced barriers to value-based pricing.
Liozu and Hinterhuber 2013	Resource-based theory	Three quantitative surveys	There is a positive relationship between value-based pricing and firm performance.
<i>Our study</i>	<i>Effectuation theory</i>	<i>Longitudinal multi-case study</i>	<i>Pricing is a co-evolutionary, iterative process where entrepreneurs learn from and about their customers and other important stakeholders, build trust and incite others to share knowledge and other resources. The key mechanisms are ongoing interactions and the logic of control within the value network.</i>

entrepreneurs who were closely involved in the pricing decisions. As the final sampling criteria, we selected firms with good access and pre-existing personal contacts, as recommended by Stake (1995). These relationships significantly increased the case firms' willingness to participate in the study and share information related to the pricing otherwise classified as confidential.

4.1. Data collection

The data collection included 43 in-depth interviews (8–15 interviews per case firm) that we conducted longitudinally over 7–9 years (Table 3). The interviewees varied from case-to-case based on the organisational structure of the firm. The majority of the interviewees were entrepreneurs

Table 2. Overview of the case firms.

	Year founded	Number of permanent employees	Target sector(s)	Digital service
Firm A	2006	42	Furniture chains and furniture manufacturers	A real-time visualisation platform
Firm B	1998	50	Telecom operators, component manufacturers, and service providers for telecom networks	Planning and optimisation of a service platform for telecom operators
Firm C	2011	2	Museums	A digital platform to develop media guides
Firm D	2006	38	Banks	Real-time intelligence solutions for banks

Table 3. List of informants.

Firm	Title	Number of interviews	Year(s) and duration of interviews	Total number of interviews
Firm A	Co-founder, CEO	5	2011 (1 h 10 min) 2011 (1 h 15 min) 2017 (1 h 10 min) 2018 (1 h 20 min) 2019 (1 h 20 min)	15
	Co-founder, CTO	1	2013 (1 h 5 min)	
	Co-founder, Art Director	2	2011 (50 min) 2013 (1 h 10 min)	
	Co-founder, COO	1	2013 (1 h 15 min)	
	Vice President (Sales)	1	2011 (1 h 10 min)	
	Sales Engineer	3	2015 (58 min) 2018 (54 min) 2019 (55 min)	
	Sales Manager	1	2014 (48 min)	
Firm B	Head of Sales	1	2014 (1 h 10 min)	8
	CEO	1	2011 (50 min)	
	Vice president (General management)	3	2011 (1 h) 2011 (57 min) 2013 (45 min)	
Firm C	Vice president (Sales)	4	2010 (50 min) 2013 (1 h 10 min) 2017 (45 min) 2018 (50 min)	10
	Co-founder, CEO	6	2012 (45 min) 2012 (1 h 17 min) 2013 (1 h 25 min) 2013 (47 min) 2017 (45 min) 2018 (50 min)	
Firm D	Co-founder, CTO	4	2012 (50 min) 2013 (1 h 10 min) 2017 (55 min) 2018 (1 h 10 min)	10
	Founder, CEO	6	2010 (55 min) 2010 (1 h 10 min) 2013 (1 h 10 min) 2015 (50 min) 2017 (1 h 15 min) 2018 (1 h 05 min)	
	Vice President, Services	4	2010 (40 min) 2010 (1 h 10 min) 2014 (45 min) 2018 (1 h)	
Total				43

who have been involved in establishing the firms. The interviewees were selected based on their knowledge of the firm's pricing models, its backgrounds and evolution.

The first interview round focused on general information related to the establishment of the firm, its business models and the digital service that the firm was developing. In the following interviews, we focused on the actual pricing model, stakeholders involved in the pricing process and changes/development of the pricing model. Before each interview, we tailored interview questions based on the interviewee's role and his/her involvement in the formation of the pricing strategy. All the interviews followed an open-ended structure to provide the needed flexibility and enable in-depth data collection (Darke, Shanks, and Broadbent 1998). We also used telephone and email communication with interviewees whenever needed to clarify inconsistencies or unclarities found in the interview data. After each interview, we also sent the transcripts back to the interviewees for verification and possible additional insights. In addition to these formal face-to-face interviews, we collected secondary data that consisted of case firms' webpages, social media sites, presentations, news media and advertising material. The secondary data was used to validate and triangulate the primary data from the interviews (Miles M and Huberman 1994).

4.2. Data analysis

The data analysis was conducted using inductive techniques (Eisenhardt 1989). As we had a huge amount of data collected over the ten-year period (2010–2019), we reduced the data (Miles and Huberman 1994) by synthesising the transcripts from the 43 interviews and the secondary data, as advised by Eisenhardt (1989). We first conducted a within-case analysis, where each author separately read and familiarised her/himself with the cases, and identified initial/tentative key concepts. We then discussed the similarities and differences and finalised the emerging key concepts. Then, these key concepts were used to identify important relationships in within case analysis. Based on this analysis, we developed baseline narratives of each case firm. These narratives followed the firms' chronological history and the evolution of their pricing strategies (Pettigrew 1990). This timeline helped to better identify the key concepts such as pricing strategy formation, co-creation of pricing strategy and co-learning.

We then merged the case narratives from the case firms by conducting a cross-case analysis. Based on the cross-case analysis and the timelines, three different phases emerged from the data. These phases were identified as (1) Challenges to building an initial pricing strategy under uncertainty, (2) Reducing perceived uncertainty through the logic of control and collective learning and (3) Adjusting pricing strategies as a result of collective learning for further opportunity development. These three phases are described in detail in the case findings section.

5. Case findings

In this section, we elaborate first the challenges related to the formation of the first pricing strategy. Thereafter, we discuss how mutual learning reduces uncertainty related to the pricing decision. In the end, we examine how collective learning helps adjust pricing for new markets and industry segments.

5.1. Challenges to form an initial pricing strategy under uncertainty

Firms A, B and C aimed to use value-based pricing and determine the maximum price that the customer was ready to pay. However, this was challenging, as the perceived value of the services for potential customers was completely unknown, not only for the case firms but also for the customer. As such, when faced with a lack of information and market knowledge, the initial pricing decisions were based on a trial-and-error estimation of how much customers might be willing to pay. The comment by the CEO of Firm A demonstrates the challenge of these three firms:

We tried to use information from competing products, but we realized that there were no competing products with the same functionalities ... The first price decision was based quite a lot on a gut feeling of how much they were ready to pay.

In contrast, entrepreneurs of Firm D had good knowledge of the weaknesses and pricing of competing services. In their case, the challenge was to find a plausible price level, as they could develop the service much more cost-effectively and cheaply than their competitors. Their initial aim was to apply cost-based pricing, but because the development costs were so low, they moved to value-based pricing to ensure that their pricing strategy was not impacting their customer's perception of value in any negative way. As such, against all their advantages regarding their previous experience and market-knowledge, the problem was similar to the challenges faced by firms A, B and C. The CEO of Firm D expressed this as follows:

Based on our previous knowledge, we knew that we could do this more cheaply than our competitors. If we used cost-based pricing, no-one would buy because they would suspect poor quality [because of the low price] ... So, we aimed at finding a "market" price that a customer would be willing to pay, one that didn't appear to be too cheap or too expensive.

5.2. Reducing perceived uncertainty through collective learning

Facing the unpredictability of customers' perceived value and reactions to pricing strategies, and in a struggle to better understand the potential price level, entrepreneurs were able to use their previous knowledge about the industry as an important resource for pricing decisions. This knowledge was related to both customers' business practices and technologies. For instance, in the case of Firm D, entrepreneurs had knowledge from the banking sector, which they had developed during their previous work in a bank. With this knowledge, they knew what benefits banks were looking for from a digital service, what kind of challenges they might have in adapting the new service and how much they generally budget for IT costs. Firms also tried to complete their knowledge about their customers' needs for the digital service, financial capabilities and expected price by seeking existing information about their potential customers to understand better how much customers

were able to invest in the digital services the case firms had developed. This information was acquired from publicly available sources like firms' websites, press releases, public registers, etc.

In addition, the case firms actively started developing relationships with potential customers, hoping to gain more knowledge about their needs and expectations. This enabled development of new knowledge that helped them develop their pricing strategies forward. The aim was to develop a better understanding of the service's value for customers, that is, the utility of the service to solve customers' specific problems and make customers' business more profitable. This information facilitated estimating customers' willingness to purchase the service. To reach this goal, the first step was to estimate an initial price based on the overall knowledge of the market and the potential reactions of the customers. The initial price was also a mechanism to engage the customer and trigger the customer to provide more information about their needs and challenges regarding the new service. These initial offers commonly led to negotiations with potential customers and offered valuable information and enabled the providers to learn about the potential customers' expectations. Within these negotiations, entrepreneurs sensed the customers' potential reactions to the price and developed useful knowledge about the customers' capability to pay. The CEO of Firm C explained their learning experience:

When we negotiated with representatives of potential customers, we were able to see and learn that maybe we could price this a bit higher than what we originally thought ... It is important to learn to know your customers and how much they can pay ... and how much they value the service.

In addition to business knowledge, technological knowledge was also important in estimating what kind of technical issues and needs potential customers had, what technological solutions were possible and how much those would cost. However, the main challenge was posed by the fact that customers were not clear about their needs and expectations. They needed the consultancy and knowledge of the service providers to understand better the additional value that the service might bring to them. The customers were also concerned about the reactions of their own customers to the new digital service. Furthermore, expectations and possible usage practices of the service were unstable, and the customers would change their expectations slightly as they gained more and more knowledge and advice from the service provider and other stakeholders in the market. This ongoing conversation between the parties was fuelling service providers' knowledge about the customers' concerns, benefits and requirements. Consequently, the process was enriching the understanding of both parties and reducing the degree of perceived uncertainty.

5.3. Adjusting pricing strategies as a result of collective learning

Adjusting pricing for expanding to new markets. When firms started to grow and expand their operations, new opportunities arose to engage the customers in the pricing strategy formation and adjust the pricing strategies to enter new markets. Customers in different geographical locations had different perceptions of value and price expectations, and the case firms needed to adjust their pricing strategies for these new customers. For example, customers in the US preferred shorter agreements and liked to have all the services included in the subscription fee. This diverged from the pricing strategy they had been applying in the European markets, so it required knowledge of how to make these adjustments so that the firm's business would be profitable in new markets. At this stage, the firms could apply their growing knowledge base inside the firm (understanding how much customers value the service and how much they can use their financial resources for the service) to develop their pricing for new markets.

The case firms had to apply their previously learned knowledge in their domestic and regional markets to find out how to address the new challenges in international markets. We noted that compared to the earlier pricing activities, where decisions were primarily made by entrepreneurs, they now utilised their domestic market experience and established network relationships, including teams inside and outside of the firm, to understand potential customers' perceived value and

expectations. The previous customers now had become an important source of learning and insights about new customers. Firms A, B and D, in particular, had numerous international customers, and they developed a network of their distributors, representatives and agents who had already worked with local customers in different markets. These partners provided important knowledge on different expectations of the customers and institutional differences, all of which helped them make pricing decisions. The sales manager of Firm A explained this as follows:

It was difficult to get data [for pricing] from customers. However, our partners, like those in Japan, which is one of our main markets, provide a lot of feedback related to the pricing. For instance, how we should package our service and price it for the Japanese market. I see partners as one important source of information for the pricing.

Adjusting pricing strategy to enter new industry segments. The entire experience of working with different customers in the domestic and foreign markets helped the firms expand to other segments of the market. Firm A expanded its 3D-modelling platform from the furniture industry to the renovating industry, and Firm B extended its planning and optimisation platform from the telecom industry to the defence industry. These new segments brought additional challenges to pricing, as the previous pricing methods were not applicable to the new industries. Even case firms A and B were able to use previous experiences and methods, and to some extent, they needed to relearn about the customers to find the optimal price level for the service. That is, the pricing process for these new industries started from the beginning, but the process was shorter. They had already learned that decision-making logic was useful in understanding customers, so these firms were fast and successful in their negotiations and adjustments. The vice president of sales of Firm B emphasised the critical importance of previous knowledge and learned patterns of decision-making:

The new segment brought us back to the ad-hoc [pricing]. However, now it was easier to find the right pricing than in the beginning [for the first customer segment]. The process was quite similar but shorter, the iteration was shorter, and the learning process was shorter because we knew what to do in dealing with new customers.

6. Discussion of the case findings

As revealed in this study, in the highly dynamic and changing environment of digital services with a short life cycle, pricing takes place with a limited or no possibility of predicting the market's reactions to any pricing strategy. Based on our empirical findings, we argue that entrepreneurs apply a different type of logic for unpacking perceived uncertainty of pricing new digital services. As highlighted by Firm A, by applying the effectual logic of control, entrepreneurs might find the unpredictability of the pricing situation to be a source of a new opportunity for further development of their relationships with their customers and co-creating a novel pricing strategy. In line with the effectuation literature, our findings revealed that entrepreneurs rely on their own cognitive expertise and heuristic patterns of decision-making which they have developed over the years (Read et al. 2016, 2019) in applying their existing means to start crafting their initial pricing strategies (Sarasvathy 2001). With the effectual logic of control, entrepreneurs believe that there is no best price out there waiting to be discovered. Instead, they start with their logic of affordable loss, meaning that if they fail, it is not a catastrophe (Read et al. 2009). As shown in our findings, they form an initial price to signal to the customer that they are inclined and prepared for collaboration in co-creating a mutually beneficial pricing strategy (Read et al. 2016).

P1: The effectual logic of control enables entrepreneurs to unpacking their perceived uncertainty about their customers' potential reactions by setting a tentative price.

Second, as revealed in our study, with a control-oriented mindset, the environmental uncertainty does not matter per se; what matters is the shared perception between the service provider and the client (Read et al. 2009). By using a tentative price to trigger the process of sharing information and knowledge within a network of relationships, all stakeholders share their concerns and required

benefits, which reduces the perceived risk and enables them to collaborate on the formation of a successful pricing strategy. As a result, pricing becomes an evolutionary process.

We observed that customers might face uncertainty regarding the new service's applicability and its real value to their business. Furthermore, the feasibility of proper application of the service with their existing skill sets, maintenance costs, lock-in effect and other factors might create uncertainty. On the other hand, uncertainty for the service provider might be related to potential reactions of the customers to the initial price, the profitability of the proposed price over the long term, unplanned costs of maintenance, etc. As highlighted by Firm A, the initial price was totally based on the firm's affordable loss and its understanding of the affordable price range for the customer, with no certainty about the potential reaction of the customer. Their perceived uncertainty resulted in a significantly low price for their service with a risk of being misunderstood by their customer, as a signal of lower quality. By applying the logic of control, both parties focus on those risks and concerns that they could control by collaborating with each other, which resulted in easing the difficult situation. The evolutionary process of pricing strategy formation, once started, continues over time through developing new knowledge within the network of relationships.

P2: Collaboration with customers and other important stakeholders works as a mechanism through which entrepreneurs adjust and revise their tentative pricing strategy.

Third, digital services require ongoing development to adapt to changing needs and regulations (Yoo et al. 2012; Kallinikos, Aaltonen, and Marton 2013). In this process, evolutionary relationships with customers are needed. We observed that the knowledge gained *from* and *about* the customers and other related stakeholders within the network, along with reflection on previous experience (Mintzberg and Gosling 2002) may provide more understating of any uncertainty in the existing market and pave the way to entering new industries or even new geographical markets (case B highlighted this point). Our findings revealed that although entering new markets or new industries revives the uncertainty of pricing decisions, with previous experience and trust and commitment developed with the established ties, the process of gaining new knowledge becomes significantly shorter and more efficient. As highlighted by Firm C, learning and developing new knowledge, which happens at each pricing decision, provides a ground for allaying uncertainty. The new knowledge and related intangible resources become critically important in providing a common platform for a shared understanding of the situation and collective learning among important stakeholders. This mechanism results in unpacked uncertainty and shared agreement on the value of the digital service.

P3: Collective learning enables entrepreneurs to capitalise on the value they have identified to different customers, earn further resources from their customers and adjust their pricing strategies.

7. Conclusion

7.1. Theoretical implications

This study contributes to behavioural pricing in the B2B context. While pricing of digital services plays a critical role in success of such innovations, the existing pricing theories do not capture the specific situation that digital service providers encounter when pricing their innovations. We used effectuation theory to theorise pricing as a co-creative process. We used the theory building form cases method to fill the gap in existing pricing literature. First, we theorised the role of entrepreneurial cognition and actions in unpacking uncertainty in pricing that stems from the dynamic and changing environment as well as from the special characteristics of digital services. We found that entrepreneurs use their resources at hand (skills, experiences, etc.) and apply the logic of control

to transform uncertainty into opportunity. More specifically, effectuation theory enabled us to address some serious issues in pricing of digital services for both parties, including unclear value of the new service, lock-in effects and networking effects.

Effectuation theory also enabled us to explain how the service providers also gain a better understanding of the real value of their new services by engaging the potential customers and collaborating with them in the pricing strategy formation. As such, pricing is a co-evolutionary, iterative process where entrepreneurs learn from and about their customers and other important stakeholders, build trust and incite others to share knowledge and other resources (Maine, Soh, and Dos Santos 2015; Read et al. 2019). The collective learning process leads to trust between the parties, which in turn enables them to address the concerns of the customers, and guarantees the profitability of the digital services for the service provider. The key mechanisms are ongoing interactions and collective learning that help entrepreneurs and other stakeholders within their network improve their knowledge and understanding of the market over time. As a result, the pricing strategy of digital services is iteratively co-created rather than unilaterally formulated by the entrepreneurs (Maine, Soh, and Dos Santos 2015), and these iterations get shorter and shorter due to the accumulated knowledge, trust and commitment. This finding contrast with the prevalent work that takes a predictive stance and focuses on pricing related tasks, activities and underlying resources (Dutta, Zbaracki, and Bergen 2003).

Second, we contribute to the understanding of pricing strategy formation as a co-creative strategy by focusing on interactions rather than actions (Read and Sarasvathy 2012) and emphasising the dynamics of ongoing collective learning among important stakeholders in shaping the pricing strategy. In line with Read et al. (2019), we argue that a co-evolutionary pricing strategy directs entrepreneurs' attention to value from other stakeholders and prevents entrepreneurs from either overpricing or underpricing their digital services. Although the prevalent literature has focused on funding partners, we argue for the critical importance of co-creation partners with liabilities in knowledge and expertise (Read et al. 2009), who provide timely information about themselves, their expectations, concerns, routines and other factors, and therefore help with unpacking uncertainty.

Third, with our effectual lens, we argue that entrepreneurs consider the uncertainty of pricing digital services as an opportunity to engage their customers and other relevant stakeholders in the process of pricing strategy formation to unpack the uncertainty. The engagement of key stakeholders in the pricing decisions creates a new opportunity for further learning about the processes, procedures, needs and expectations of the customers, which in turn enables service providers for further development of their offerings. Our findings add to our understanding of the process of entrepreneurial co-creation through interaction with and learning from and about the important stakeholders within their networks (Karami and Read 2021). The effectual logic of control triggers the process of collective learning and co-creation of pricing strategies. As such, we separate *predictability* from *controllability* in entrepreneurial pricing and emphasise the critical importance of the logic of control (Sarasvathy 2001; Wiltbank et al. 2006).

7.2. Practical implications

Our study has several practical implications. First, we unpack uncertainty as the most important and challenging concern for entrepreneurs in pricing their digital services. Our study has provided a practical approach and a mechanism for managing the uncertainty of pricing digital services in a collaborative way. That is, we show how long-term relationships and shared knowledge of multiple stakeholders help understand the situation and pave the way for collective learning. Second, we emphasise the role of learning from experience and learning from and about the multiple stakeholders. We advise entrepreneurs to see their market as a network of relationships among various stakeholders. With this view, entrepreneurs could take any opportunity to connect with different stakeholders to learn about their concern and expectations. Third, we accentuate how negotiations,

trust and commitment give rise to a shared understanding of the value captured through pricing. As shown in our analysis, negotiations provide an opportunity for trust-building and mutual learning. With this approach, pricing strategy formation should be considered as an open ongoing process wherein negotiation becomes a venue for collective learning.

7.3. Limitations and future research directions

We acknowledge some limitations of our study. First, the case firms operate in B2B markets. Thus, the findings of this study cannot be applied as such to B2C settings without future studies. Second, this study focuses solely on small entrepreneurial firms whose pricing practices might differ substantially from those of large enterprises due to liabilities such as limited resources, limited experience, newness and smallness. The third limitation is that our study investigated the pricing of digital services, and as such cannot be generalised to pricing in other industries. However, we have built on the concept of uncertainty and collective learning as a mechanism for co-evolutionary strategy formation that can be utilised for the same view to study other industries.

Disclosure statement

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

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