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Business model adaptation for realized international scaling of born-digitals

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ABSTRACT

This study examines the process and mechanisms of realized international scaling of born-digital firms through the business model lens. In an explorative multiple-case study of Finnish firms in cultural industries, it finds that born-digital firms adapt their business models through an iterative process to achieve practically scaled operations. The research unpacks the mechanisms guiding the process of business model adaptation and highlights the role of dynamic capabilities in their employment. The findings extend existing theorizing on scaling by offering a conceptualization of realized international digital scaling and the role of the business model in its implementation.

1. Introduction

Scaling is increasingly considered a key strategic objective of digital firms across the globe (Financial Times, 2021; Sullivan, 2016). The importance of this real-word phenomenon has attracted the interest of scholars in international business (IB) and entrepreneurship (IE) fields, leading to increased efforts to develop its theoretical foundations (Giustiziero et al., 2021; Reuber et al., 2021; Shepherd & Patzelt, 2022).

International scaling is related to topics that have already been studied in extant literature, such as the expansion of high growth ventures (Duruflé, Hellmann & Wilson, 2017; Rasmussen et al., 2018), internationalization of lean entrepreneurial firms (Autio & Zander, 2016), and the speedy expansion of born-global firms (Hennart, 2014). Yet only recently have works initiated a dialogue on *international digital scaling as a phenomenon* that has unique mechanisms, challenges, and organizational context condition (Piaskowska et al., 2021; Tippmann et al., 2022b). Digital technologies have triggered unprecedented possibilities for international scalable expansion by decreasing transportation and production costs and developing platforms enabling instant global expansion and connectivity (Adner et al., 2019; Autio et al., 2018). Born-digital firms, or firms that are fully digital from their inception (Monaghan et al., 2020) are assumed to be readily scalable due to their ability to achieve economies of scale in core business processes. In other words, digital firms are believed to have scalability that depicts "how the value derived from a firm's resource bundle in a focal activity changes as the size of the bundle increases" (Giustiziero et al., 2022: 2). Yet, despite the enabling power of digital affordances, and global "by default" mindset of born digital firms (Birkinshaw, 2022), some studies highlight that digitalization does not automatically guarantee occurrence of scaling and there is a variation amongst digital firms in achieving wide international presences (Stallkamp et al., 2022). There are also indications of organizational challenges associated with international scaling. While young firms often struggle with managing the organizational design during the scaling process (DeSantola et al., 2022), MNEs experience pressures of conflicting strategic demands in implementation of replicable innovation scaling strategy (Tippmann et al., 2022b). The extensive evidence also indicates that many digital firms fail to scale (Gulati & DeSantola, 2016; Kutcher et al., 2014; Scale-Up Europe, 2016).

This discussion highlights that scalability enabled by digital technological affordances *in itself* does not allow firms to succeed in achieving scale in their international operations. I argue that there is a need to introduce a concept of 'realized scaling' (achieved scaling) and clarify how it is distinct from related and broadly used scalability concept (potential scaling) in a digital setting. I aim to develop a theoretical explanation of the realized scaling through the lenses of a business model and dynamic approaches (Teece, 2010, 2018). The business model concept is shown to be relevant for understanding of scaling (Tippmann, Ambos, Del Giudice, Monaghan and Ringov, 2022a) as well as for rapid international expansion of born-global firms (Hennart, 2014, 2021) and global strategy (Tallman et al., 2018). Thus, in this study I aim to (1) delineate the concept of realized international digital scaling, and (2) elaborate how born digital firms with scalable business model (potential scalability) achieve realized international scaling.

To shed light on these questions, I conduct a multiple-case study of six Finnish born-digital firms from two sectors in cultural industries -

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namely, digital education and mobile games - and employ a processual approach that incorporates time, dynamism, and longitudinal observations (Welch & Paavilainen-Mäntymäki, 2014). The choice of firms was made based on a theoretical sampling technique to select cases with common antecedents, such as national and industry background (Eisenhardt, 2021). However, differences across case firms also allowed strengthening theory building (Eisenhardt, 2021). Following a longitudinal research design, I collected empirical evidence at different points in time through personal interviews, observations, offerings' testing sessions, and secondary sources. The cultural industries represent an apt research context because they have recently undergone significant transformation triggered by digital technologies and their global revenues have been rapidly growing during the past decade (Wang et al., 2020). In addition, while IB research in this field is mostly based on sectors such as music and movies (Wang et al., 2020), other contexts such as education and mobile games are significantly less explored.

This research makes several important contributions to scaling and business model literature. First, it develops a conceptualization of born-digital firms' realized scaling as an achievement of *exponential growth of revenue with an incremental increase in costs.* This highlights the importance of dedicating attention to succeeding in an actual value capture manifested in the revenue generation (Stallkamp et al., 2022) in addition to a successful value creation enabled by firms' digital resource bundle (e.g. Giustiziero et al., 2021). This definition further enhances conceptual clarity in scaling research, - in particularly in setting of digital international scaling, joining in effort with other works in this special issue (Tippmann et al., 2022a). Second, this research shows how born-digital firms achieve realized international scaling through an iterative process of business model adaptation during the scaling phase. This process is dynamic in nature and steered by mechanisms such as data-driven decision-making, marketing, direct user interactions, localization, investment, and entrepreneurial persistence. These findings reflect the prominent role of dynamic capabilities in achieving realized digital scaling and resonates with argument that scaling involves the navigation of tensions (Tippmann et al., 2022a). Third, this research extends business model literature by developing an empirically based framework of business model execution to achieve international scaling. The framework fleshes out how firms apply the highest order of dynamic adaptation capabilities, or the ability to transform and refine the business model, in business model execution during international scaling. They enrich knowledge about the process and implications of business model implementation, shedding light on the implications of dynamic capabilities in business model research (Teece, 2018). These insights also contribute to dialogue about the explanatory power of the business model versus entrepreneurial approach of the speed of international expansion (Hennart, 2014; Hennart et al., 2021). Born-digital firms' transformation capabilities are vital in adapting their initial business model that is scalable because of its digital features. A scalable business model in the start-up phase is necessary but not sufficient for achieving realized international scaling by born-digital firms. This leads to the conclusion that the business model and entrepreneurship explanations are complementary rather than competing in explaining digital international scaling.

2. Theoretical background

2.1. International digital scaling and born-digital firms

International scaling has increasingly become an important strategic objective of digital ventures across the globe, and it has also begun gaining the attention of the academic community (Piaskowska et al., 2021; Reuber et al., 2021). Working in a phenomenological field (Liesch et al., 2011), IB scholars are interested in both describing and explaining new phenomena as they emerge. Understanding scaling is theoretically intriguing. The key attributes of scaling - namely, growth and speed - are not new in IB literature. Scaling is closely associated with high growth (Demir et al., 2017), scale-ups (Coviello, 2020; DeSantola & Gulati, 2017) and accelerated internationalization (Autio & Zander, 2016). Economies of scale were recognized as one of the key reasons for international expansion (Dunning, 1980). Yet only recently have IB scholars begun to develop conceptual foundations of the international digital scaling phenomenon per se (Giustiziero et al., 2022; Tippmaan et al., 2022a). In their editorials, Reuber et al. (2021) initiate a conversation on scaling in the multinational enterprise context, while Shepherd and Patzelt (2022) propose a scaling research framework in the IE field. Empirical studies highlight that digital international scaling has unique goals, mechanisms, and challenges (Huang et al., 2017; Piaskowska et al., 2021). It appears to be timely to extend this discussion to those digital firms that rely on digital tools from inception to create and distribute their offerings labelled as 'born digitals' (Monaghan et al., 2020). Birkinshaw (2022) highlights that distinctive feature of these firms is "global by default" mindset. Indeed, since born-digital firms have digital elements built into their business models creating vast opportunities for rapid and cost-efficient global expansion, they are believed to be readily scalable (Autio & Zander, 2016; Monaghan et al., 2020). These firms can instantaneously expand via digital platforms and markets and do so with a low cost per additional user (Shaheer, 2020). Digital market owners, such as Apple and Google, can perform many functions on behalf of born-digital firms, such as billing, marketing, and technological integration with platform partners, that allow for their lean operations (Mihailova, Liesch, & Rose, 2016). The digital business model enables born-digital firms to benefit from high degrees of connectivity and flexibility that foster their international expansion (Adner et al., 2019; Nambisan, 2017). Digital firms can rapidly increase their user base by relying on data-driven operations, possibilities for instant release of their offerings, and swift transformation of the offering value (Huang et al., 2017).

This discussion indicates the concept of scalability of digital firms is widely used in the current literature understood as "how the value derived from a firm's resource bundle in a focal activity changes as the size of the bundle increases" (Guistiziero et al., 2022:2) and implies potential digital scaling. Yet, some studies discuss that although digital technologies allow for rapid making digital offerings availability fast worldwide, it does not automatically result in their adoption by users (Shaheer & Li, 2020). Tippamann et al. (2022b) describe global scaling of MNEs as a paradox requiring navigating conflicting demands. They suggest that digital firms must mobilize a number of mechanisms to satisfy these demands that are (1) top-down replication; (2) bottom-up entrepreneurial orientation; and (3) replicable innovation generation. Stallkamp et al. (2022) draws attention to persistent challenges that impede the internationalization of digital ventures and highlight that despite the 'scale free nature' of digital resources, there is a significant variation in firms' speed and scope of international expansion. There is also extensive evidence showing failure of many born-digital firms to practically scale (Coutu, 2014; Kutcher et al., 2014).

I argue that conceptual clarity on what constitutes actual scaling of born digital firms needs to be developed further. This paper attempts to do so by introducing a concept of 'realized scaling' (achieved scaling) and show how it is distinct from related and broadly used scalability concept (potential scaling) in a digital setting. Moreover, understanding of mechanisms of international scaling is still incomplete in the setting of born digital firms. Huang et al. (2017) stress a need to zoom in on the mechanisms underpinning digital scaling and to examine how managers can navigate them in practice. The international dimension of scaling is another aspect that deserves further attention (Tippmann et al., 2022a). While research often studies scaling in a global context (Huang et al., 2017; Piaskowska et al., 2021; Tippmann et al., 2022b), the discussion about assumptions underlying the outcomes of international digital scaling requires further attention (Stallkamp et al., 2022; Tippmann et al., 2022a). The current study aims to enrich scaling literature by (1) delineating the concept of realized international digital scaling, and (2) theorizing how born digital firms with scalable business model

(potential scalability) achieve realized international scaling.

2.2. Business model and dynamic capabilities

The business model approach has recently gained the attention of IB scholars. Hennart (2014) highlights its explanatory power and suggests that it affects the speed of internationalization of born-digital ventures. Tallman et al. (2018) demonstrates the relevance of the business model for understanding global competition in MNE setting. Scaling research refers to the business model as an analytical instrument for understanding the facets of scaling and its underlying logic for different types of firms (Monaghan et al., 2020; Reuber et al., 2021; Tippmann et al., 2022a). One of the most broadly used definitions of the business model comes from Teece (2010, p. 172), who describes it as "the design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit". Teece's conceptualization of the business model is relevant for understanding realized scaling, as it shows how value creation, delivery, and capture elements of born-digital firms' business model are executed during the implementation of international scaling.

Use of the business model lens for understanding the process of realized international scaling, - focus of this study, can offer valuable insights to business model literature. While this literature has extensively studied designs, typologies, and the performance implications of business models (Zott et al., 2011), it has been less concerned with causal explanations and specific details of these models' development and execution process, both empirically and theoretically (Dunford et al., 2010). Teece (2018) emphasizes that the design and operation of the business model depend on firms' dynamic capabilities, which are essential for the crafting, refinement, implementation, and transformation of the business model. Dynamic capabilities refer to higher-order capabilities, including sensing, seizing, and transforming competences (Teece, 2018). They are associated with firms' ability to design the original model and replace and recombine elements of the existing model over time (Teece, 2018). However, most of the work on dynamic capabilities and business models has been conceptual. Teece (2018) stresses the need for empirical studies to explore how dynamic capabilities shape the process of business model development and adaptation during the execution phase. Recent studies have begun to address this call by examining the dynamic process of business model development during the start-up phase (McDonald & Eisenhardt, 2020; Snihur & Zott, 2020), and development of replicable innovation strategy of scaling digital MNEs that requires ongoing revisions to the global business model to be replicated globally to be able to sustain MNEs' competitiveness (Tippmann et al., 2022b).

Yet, largely research on business model adaptation, defined as alterations to the architecture of the business model elements, has mostly been static, analysing antecedents and outcomes of business model adaptation (Foss & Saebi, 2018). By examining the process and mechanisms of business model execution during the actual scaling phase, the current study aims to enrich the knowledge on the business model and dynamic capabilities.

2.3. Business model execution and adaptation in digital setting

Examination of the business model execution process is particularly relevant in a digital setting. Attributes of digital technologies, such as generativity, reprogrammability, connectivity, and aggregation, allow digital firms to modify the value proposition, delivery, and capturing of their offerings on the basis of interactions with users (Adner et al., 2019; Moreau et al., 2018). Machine learning algorithms offer digital firms unprecedented opportunities to get insights about user preferences and quickly develop ideas for offerings' improvements (Chalmers et al., 2021). As all digital offerings have some degree of novelty rooted in their design, features, and digital form of delivery, their actual value can only be revealed after users have time to experience the digital offering. Digital firms lack sufficient *ex ante* knowledge about which offering characteristics will appeal to users and lead to adoption (Kriz & Welch, 2018). For these reasons, digital firms often develop offerings without having full knowledge about the 'best' version during their start-up phase (Huang et al., 2017). Instead, they rely on insights from user interactions on the release of new versions, upgrades, and added functionalities to better address user needs during their operational phase. Shaheer et al., (2020) provide an example of digital game developers that release 'good enough versions', with the aim to continuously update them by monitoring user feedback. In cultural industries, intrinsic attributes of cultural content, such as the capacity to entertain, are difficult to parameterize because they are experiential and subjective (Vendrell-Herrero et al., 2018). The creative nature of digital offering and perception bias make it even more difficult to predict the actual value for target users than in other digital segments (Vendrell-Herrero et al., 2018).

This discussion suggests that digital firms must continuously adapt their operations by refining elements of their offerings' value proposition, delivery, and capture to address users' needs and expectations. Therefore, examination of the process and mechanisms of business model execution and adaptation during realized international scaling of born-digital firms represents a theoretically promising and practically important research avenue.

3. Method

3.1. Research design and empirical setting

This research uses an exploratory multiple-case study design with the objective to build theory about a novel and significant phenomenon of realized digital international scaling and its process (Eisenhardt, 1989; Monaghan et al., 2020). It follows a longitudinal approach, which implies reliance on data collected at more than one point in time (Welch & Paavilainen-Mäntymäki, 2014) to be able to fully conceptualize the realized scaling process (Eisenhardt, 2021). That is, the reliance on methodologies that capture multiple time points allows developing process-related theorizing (Blazejewski, 2011).

The empirical setting of the study is Finnish born-digital firms from cultural industries. Cultural industries are defined as "organizations that produce and distribute cultural goods with substantive symbolic, aesthetic, or artistic value" (Wang et al., 2020, p. 665). The reason for choosing this context is that cultural industries are amongst the fastest-growing sectors in terms of revenue, employment, and global trade (UNESCO, 2016) and have undergone rapid digital transformation. They have not appeared extensively as a research setting and thus can shed more light on basic demographics of born-digital firms. The study focuses on two sectors of cultural industries: digital education and mobile games. Finland represents an appropriate geographic setting for exploring firms from these sectors for several reasons. It is a world leader in information technology development and children's education and has witnessed the notable growth of entrepreneurial digital firms in mobile gaming and digital education (Niipola, 2014; Staff, 2020). In the mobile game sector, Finnish firms are over-represented amongst the firms that have gained dominance in the global mobile gaming industry. The firms Supercell and Rovio have become well-recognized across the globe, and their business performance represents remarkable success (Guardian, 2014; Rovio Press Release, 2014). Similarly, the education technology sector has attracted many entrepreneurs given Finland's reputation for providing the best world education (ExEdu, 2021).

3.2. Case firms and research process

The choice of the case firms was guided by the objective to investigate the process of realized international scaling of born-digital firms.

Table 1
Case firms' description.

Case	Sector and product	Founding year	Number of countries	Interviewee	Scaling scope
A	B2C Language leaning application for children	2018	0	CEO, co-founders	None
B	B2B/B2G E-platform for acquisition and use of digital materials in educational sector	2010	2	CEO	Domestic scaling and pilot projects in international scaling
C	B2C Language learning application, English mastering application for adults	2010	150	Head of Talent	Operations in 150 countries. International scaling from the inception.
D	B2B/B2G University developed digital learning app for Mathematics	2019	25	CEO	Operations in about 20 countries. Initially domestic scaling, followed by international scaling via partners' network.
E	B2C Online shooter games for mobile phones	2012	Worldwide	CEO	First offering was globally scaled (100,000 downloads within a first day of launched).
F	B2C Online tycoon games for mobile	2017	Worldwide	CEO	Global scaling shortly after inception (after few failed attempts).

The selection was based on the theoretical sampling approach to choose cases whose similarities and differences could strengthen theory building. Case design followed the logic of including born-digital firms with common antecedents (Eisenhardt, 2021). These antecedents were the national origin and industry of operations (Finnish digital cultural industries) and the clear intention to achieve international scale. This allowed 'controlling' for alternative explanations associated with cultural and industry differences (Eisenhardt, 2021). Yet the goal of the case selection was to achieve reasonable variation amongst cases by including firms from both (1) digital education and mobile gaming industry sectors and (2) business-to-consumer (B2C) and business-to-business (B2B) business segments. Effort was made to ensure that there was variance in the scope and speed of realized international scaling and the types of business models of case firms, thus enabling a better assessment for cross-case differences.

The research process was implemented in two phases. During the first phase, the operations of a selected case firm in the B2C digital education sector were followed over a two-year period. Access was granted to this newly established firm with clear objectives to scale internationally. However, after initiating the scaling process, this case firm failed to achieve realized scaling and was shuttered shortly after the market launch of its offering. The second phase focused on identifying additional cases with a common national and sectoral background that had achieved a realized scale in their operations. Five born-digital case firms were selected according to the theoretical sampling criteria. As an outcome of this process, six case firms were studied overall. Table 1 provides a description of the case firms.

3.2.1. Data collection

The first phase of the research began in 2018. Data were collected over the two-year period from 2018 to 2020, which accounted for the initiation, development, and termination stages of the case firm. The most important data came from personal interviews with the founder and co-founders of the firm who were its full-time employees. The main source of interview data was based on reflections of the founder who had a vision for the firm's offering and was leading the firm's operations. Insights from other co-founders complemented and enriched the data collected from the founder. Table 2 shows details of the conducted interviews.

In total, 21 interviews were conducted during the longitudinal study. The average duration of the interviews was approximately 40–45 min. The interviews focused on the operational and strategic matters related to the offering's development, preparation and implementation of launch, scaling strategy, relationships with partners and investors, and team dynamics over time. Examples of these topics are available in Table 2.

In addition to the interviews, I attended internal team meetings and discussions with investors held over Zoom to verify and deepen understanding of matters related to the interview topics. The notes from the meetings' observations were documented. In addition, I tested a demo version of the firm's offering to gain a better understanding of the appeal of the offering, the interface usability, and the effectiveness of implemented updates in the offering features. Thus, the research process relied on data triangulation to ensure the validity and reliability of the study (Miles et al., 2013).

The second phase of the research began in late 2020 after the end of the first longitudinal case research. Extensive secondary data were collected on five other case firms from available public sources, such as company websites, industry forums, and news releases. This was followed by in-depth, semi-structured interviews in each of the five case firms in January-March 2021 (see Table 2). The respondents were selected on the basis of their knowledgeability of and accessibility to their past and current international operations. The interviews were conducted in English and transcribed shortly after the interviews, the duration of which spanned 55–90 min. The objective of the interviews was to collect the process data over multiple rather than a single point in time (Welch & Paavilainen-Mäntymäki, 2014).

The interview guide was developed before the interviews and included three sections with open-ended questions to navigate the discussion. The first section focused on questions related to the entrepreneurs and why they had established their firms. These questions were followed by a discussion about the features of the offering, its value, and target segment. The second and most extensive section covered questions about the firms' past and current operations, focusing on the details of the process of international scaling and its scope. The third section included questions related to the capabilities of the founders and employees and their role in the firms' international scaling. All the interviews were conducted in English, recorded, and then transcribed.

Secondary data sources were systematically collected during the second phase of the study. The data included material from firms' official websites, marketing material, press releases, press interviews, reports of public talks and speeches made by the heads of the companies, and internal reports. In addition, industry and daily media was carefully examined to better understand the concepts and relationships described by the interviewees (e.g. App Annie, 2021; AppsFlyer, 2020). This secondary data shed light on the various aspects of firms' operations before and during their international scaling. Altogether, the empirical data comprised 26 interviews, notes from the meetings' observations, and secondary material about the companies and respective industry sectors.

Table 2
Interview data from longitudinal case.

	Timing of interviews	Time	Examples of topics discussed
Firm A			
Founder, CEO	Jan, 2018	0:45	Offering idea, firms' objectives, global customer segment
	May 2018	0:43	Key milestones in offering development
	Aug,2018	0:30	Key milestones in offering development
	Dec, 2018	0:35	Talent search and acquisition, offering features, seed grant acquisition
	March 2019	0:38	Process of offering development, market prospects, and platform partners' relationships
	June 2019	0:41	Target customer segments, offering discoverability
	Oct, 2019	0:31	Investor relations, preliminary launch plans
	Jan, 2020	0:45	The development of plans, the pitch structure and appeal to investors
	May 2020	0:42	Implementation of testing, user feedback, strategies for the soft launch
	July 2020	0.37	Feedback from customer test group, process of soft launch, securing feedback from platform owners, investors relations
	Sep, 2020	0:48	The outcomes of soft launch and key KPI, negotiations with investors, market launch strategy, fundraising activities.
	Nov, 2020	0:55	Reflection on failure to secure investments and poor KPIs during the market launch. Plans for venture terminations
Co-founder, front-end developer	June 2020	0:46	Offering features, important competences for offering development, offering testing requirements
	Oct, 2020	0:44	Feedback on KPIs during market launch, issues with offering features
Co-founder back-end developer	Aug, 2020	0:47	Offering features, important competences for offering development, relationships with platforms' owners
	Oct, 2020	0:35	Feedback on KPIs during market launch, issues with offering features
Co-founder, Product development officer	June 2020	0:57	Offering features and the target customer segment, testing and initial expansion, role of investments for offering development
	Nov, 2020	1:20	Feedback from market launch, features updates, localization
	Jan, 2021	0:43	Offering performance failure, decision-making challenges, and potential road map ahead if venture were not terminated
Designer	May 2020	0:51	Offering features and attractiveness, the vision for the main launch, and additional updates to be made and added after the launch
Board Member	Oct, 2020	0:55	Offering appeal and target segment, scale of expansion, capabilities of founder and co-founding team, investments opportunities
Firm B	Feb, 2021	1:30	
CEO			Offering appeal, target customer segments, initiation of international expansion and its objectives, current scope and logic
Firm C	Feb, 2021	1:05	of operations, operational challenges, decision-making practices, future expansion strategies
head of talent			
Firm D	Feb, 2021	0:55	
CEO			
Firm E	March 2021	0:50	
CEO			
Firm F	March 2021	1:05	
CEO			

3.3. Data analysis

Data analysis began by synthetizing evidence from the first case interviews, observation notes, and secondary data. To do this, the thematic analysis procedure (Patton, 2002) was followed, which included three steps. The first step consisted of qualitative content analysis, which involves identifying and coding raw data (Corbin & Strauss, 2014). Open coding was applied while proceeding sentence by sentence or paragraph by paragraph to generate emergent topics (Charmaz, 2006). A case history of the first case was created by (1) outlining the main phases in firm development, including inception, product development, market launch, and scaling (failure) phase, (2) identifying elements of firm's business model, and (3) important business processes and mechanisms mobilized at each of the phases. This approach helped uncover the ontology behind this firm's operations and meaning of scaling, key considerations, and emerging challenges at each phase and insights into the reasons behind its failure to achieve scaled operations and its termination.

In the analysis of the other five case firms added during the second phase of the research, I followed the thematic analysis that emerged from the first case (Corbin & Strauss, 2014) and distinguished themes related to their scaling phase, including firms' business model elements, meaning and objectives of scaling, initiation of practical scaling, the ongoing scaling and its mechanisms, and external pressures inhibiting scaling. This was followed by a cross-case comparison and identification of the emerging patterns and relationships. Finally, the findings were compared with the first case to draw conclusions based on the differences in scaling processes and mechanisms across case firms.

3.4. Data validity

Data validity was addressed in three ways. First, triangulation was ensured by integrating insights from the interview data with observation, offerings' testing sessions, and secondary sources. Second, interviews were structured using non-directive questions focused on events (Huber & Power, 1985). Specifically, informants were asked to describe significant elements of the firms' operations that they had personally experienced in the past or were currently experiencing. To improve accuracy, leading questions and speculative questions were avoided. Third, in the first case, internal and external informants from different functions and levels (CEO, chief product officer, lead developers, and board members) were interviewed to gain a relatively bias-free understanding of the events.

4. Findings

4.1. Case firm A: vignette

4.1.1. Firm creation and initial business model

Firm A's establishment was driven by the founder's vision for the offering - a gamified application for children to learn vocabulary. His experience in digital marketing and management as well as personal international background led to the creation of the idea for the offering. He believed that competitive strength came from the novelty of the business model design of a unique offering delivering value (1) for children (users) via a gamified application to expand language vocabulary that shows progress in learning by an integrated reward system and (2) for parents (customers) through the provision of customized feedback about the progress in their children's learning and indications

for rewarding them on the basis of the results. The monetization model was a monthly subscription for up to four users and all available languages. The founder described his idea as follows:

I thought of it as Netflix for learning languages. Once you have subscribed, you can choose any language for any member of the family. (Founder of firm A)

The founder believed that his business model was novel, but simple and effective. The aspiration was to scale fast from the very beginning by growing a customer base internationally using a subscription model for revenue generation. The market opportunity was judged as untapped, with other language-learning applications being more complex in use and lacking monitoring tools (e.g. Duolingo). The preliminary feedback on the offering acquired from business and personal network was highly positive:

I would definitely get this application for my kids. It will be great to be able to see what and how they learn and have a good reason to get them a treat every now and then. (Founder's business partner)

The offering development required a home office and a small team of experienced developers. The development process took only several months and was driven primarily by the founder's vision; this allowed for extremely lean operations with low fixed costs. The offering had been intended for launch in a large number of foreign markets and was translated into many languages by using a core code for the master language without localizing content. As the back-end developer of firm A explained:

Our offering is a language app for kids anywhere in the world with a simple user interface. No matter which language one wants to learn or improve, they can use the application. (Back-end developer of firm A)

The test launch was implemented in the home market (Finland) in July 2020, and its key performance indicators (KPIs) showed promising results. Qualitative user feedback was not collected because the team believed that only hard data were truly reliable. The team had only reached out to platform developers (Apple and Google) for the assessment of the offering. During the test launch, several issues were discovered, and data from a larger user base were required to solve them. Therefore, the firm decided to prepare for market launch in both Finland and Sweden shortly after the test launch, at which point securing investments became the main strategic priority. Venture capital was expected to support operations for the first year, providing the opportunity to finance user acquisition campaigns and work on offering optimization. The goal was to quickly launch with more languages such as Russian, Italian, German, and French to the markets where they are taught or learned.

4.1.2. Business model adaptation pressures

After the market launch in September 2020, the data analytics revealed that the offering was not good enough for scaling and that the business model required further modifications. Further feedback from Apple and Google also indicated a need for improvements. As the founder described:

We did have a good product, but it wasn't good enough for the market. We saw that there were engagement and retention issues which we hadn't seen directly in the soft launch. (Founder of firm A)

User data were required for insights into the direction of the offering features' modification, adjustments in the target segments, and pricing model, which in turn required financial capital. Yet investments were not secured, which prevented paid user acquisition. Although the team was developing various options for minor and major changes, the founder was not willing to deviate from the initially envisioned offering and the business model. This resulted in frustration in the team and a lack of a clear future roadmap. Without investments and availability of large user data, the founder was rather pessimistic about the outcomes and was not willing to pursue the adaptation process. In November 2020, the decision to terminate the firm was made jointly with the team.

4.2. Born-digital firms' international realized scaling: cross-case evidence

The respondents largely perceive scaling as the logic behind their firms' expansion. They noted that the key characteristic of their firms' offerings is scalability enabled by the digital elements. As the CEO of firm D explained:

We are offering them [users] this scalable digital product that they can then provide to any school. (CEO of firm D)

Similarly, the head of talent from firm C mentioned scalability as strategically important for a viable business:

I mean, scalability and expertise especially digital marketing, paid acquisition … that's a critical competence. (Head of talent of firm C)

There are two aspects that respondents seemed to associate with achieving practically scaled operations. The first is an expectation of a significant increase in revenues from existing and new customers/users. The mere expansion to the digital market - for example, by making the offering available in app stores - does not exemplify practical scaling because it does not automatically imply that customers will discover and pay for the firm's offering. To achieve scaled operations, firms must acquire paying users. The objective of user acquisition is to ensure that the offering will be discovered by users and will satisfy their expectations so they will be willing to pay for its use. As the CEO of firm B explained:

We charge by users. So we have fixed price per user. And then we have, in addition … we take a commission from the purchases made within our platform. (CEO of firm B)

The firms also highlighted the importance of user retention by making offerings appealing to a specific target customer segment. As CEO of firm F noted:

The game needs to offer meaningful, deep content or experience for several months. In addition … if those things happen, then the game can be super big and keep our players interested. (CEO of firm F)

Second, it appears that firms intend to manage the scaling process by relying on simple governance mechanisms and maintaining relatively low costs. Two main sources of costs are associated with realized scaling: costs of new user acquisition and costs required for organizational operations and expansion to manage the growth in the user base. The predictability of the costs differs across cases. For example, cases A, C, E, and F, which operate in the B2C sector, have digital tools to assess the costs of paid user acquisition and can also grow organically at zero extra costs. The rule of paid user acquisition is that new users are acquired only when they are expected to generate higher revenue than the costs of their acquisition. In case firms B and D, which operate in the B2B sector, the user acquisition costs are less predictable and are associated with finding large international customers via partner networks. The CEO of firm D elaborated:

We have no limits to scale fast, our offering is entirely digital. We need only to find good partners, the more the merrier. (CEO of firm D)

Growth in the number of users results in a relatively low increase in organizational expenses to cover and hire a few employees to manage user interactions and product development. As the CEO of firm E mentioned:

If we scale big, we'll need a couple more people to run user feedback and also a few more developers to focus on the next product so we can keep our competitive edge.

(CEO of firm E)

The respondents did not appear to perceive significant organizational growth as a concern when scaling operations. On the contrary, reliance on digital means in production, distribution, and adaptations of the offering in response to customer feedback and market pressures was stressed by the case firms as a reason for maintaining lean operations. For example, case firm F in the B2C sector reached hundreds of thousands of users across the globe and managed to maintain its small size. The CEO mentioned:

We are continuously updating the first game and developing new ones, but our team has always been 10 to 14 people, including

developers and business people. (CEO of firm F)

The B2B firms indicated that managing the extension of a network of partners becomes more complex when scaling operations. Yet they perceive it to be manageable because many elements can be governed efficiently through digital tools. Overall, respondents indicated that the meaning and purpose of achieve scaled operations is to fulfil the 'big dreams' of founders and expectations of investors:

We do both, so we want to increase the percentage of spending users, but we also want to grow the audience 20 times bigger than what it is now. (CEO of firm D)

All the case firms perceived scaled operations as a raison d'être aimed to generate a strong cash flow to support and develop firms' operations further. As the CEO of firm B indicated:

Every company that is dependant on the scalable growth, such as ours, aims to expand payable user base … because we only have that yearly fee, per user, which means that the more users we have, the more income we will have, and the stronger cash flow.

(CEO of firm B)

The head of talent of firm C also explained:

If we are to survive, we need to succeed in scaling. (Head of talent of firm C)

As this quote indicates, realized scaling is essential for survival because revenue is required for born-digital firms' continuous innovative activities, which are vital for maintaining their competitiveness. The fast pace of technological change, customer preferences, and rivalry landscape in the global digital market space push born-digital firms to continuously update their offerings and adjust to market signals, as the CEO of firm B explained:

> There is always some kind of new innovation, there are some new companies coming to the market, there are a lot of new e-learning materials entering the market. So we kind of, like, need to know everything. Since the market is so complex, or our platform is so tied up to these different kinds of innovations and new things. And we have to keep up, otherwise we fall. (CEO of firm B)

An ability to practically scale to generate high revenues is also a key indicator guiding venture capitalists' decision to invest. For example, founder of case firm A mentioned a lack of convincing evidence for prospective realized scaling as one of the reasons for the failure to acquire venture capital that led to its termination.

In summary, achieving scaled operations, or the exponential growth of revenue while maintaining a significantly lower increase in organizational costs, is the main goal of born-digital firms. The reliance on digital elements in all aspects of operations is the main enabler of such scaling in both B2B and B2C segments.

4.3. Initial business model in the pre-scaling phase

The scaling intent as a raison d'être of born-digital firms is reflected in their initial business model. All business model elements, value creation, delivery, and capturing are designed to allow for achieving international scale. Notably, born-digital firms view the concept of the business model at the offering level rather than at the firm level. Digital firms might have several offerings (e.g. case firm C) when they have their own business model in terms of how value is created, delivered, and captured. As Table 1 shows, the business models of the case firms vary in terms of the type of business segment (e.g. B2B, B2C), value creation model (e.g. subscription, premium, free-to-play), and delivery model (e.g. app stores, partner network, websites). These business models fully support the pursuit of an international scale of operations. The digital nature of the business model elements is a crucial enabler of perceived scaling prospects. As the CEO of firm D noted:

All of this would be completely impossible unless it was completely digital…. The platform itself, the digital learning tool, has zero physical components. So everything is done to a network device. (CEO of firm D)

4.4. Adaptation of initial business model during the international scaling phase

As the empirical findings indicate, having a business model design that supports the intended scaling is essential but not sufficient by itself for the actual achievement of scaled operations. The discussion of case firm A illustrates this well. While its initial digital business model was intended to reach international scale and the prospects of anticipated scaling were supported by internal and external parties before market launch, the realized scale was not achieved. Next, I discuss the (1) rationales for adaptation of an initial business model and its implications for achieving realized scaling, and (2) mechanisms mobilized during the adaptation process.

4.4.1. Adaptation outcomes of business model at the international scaling phase

After offerings are launched in the market, firms can obtain user data that signal performance indicators, such as download rates, retention rates, lifetime value, number of organic installs, conversion rate, and qualitative user feedback. While the range of KPIs might vary across B2C and B2B firms, their objective is to reveal the offering's actual performance after its market launch. KPIs also pinpoint issues with different elements of an offering's business model and indicate directions for their adaptation. Table 3 offers insights into adaptations that the case firms have undertaken in their business model during international scaling phase.

One reason for adaptation is the uncertainty associated with the actual appeal of a digital offering to users. For example, the superior features of the digital offerings of case firms C, E, and F proved challenging for the firms to estimate users' perceptions of the offering beforehand as well as the optimal target segment for the offering. As such, user data analytics was the main source for informed decision-making for improvements. As two respondents explained:

We just launched it globally, then started to see where the game appeals. (CEO of firm E)

Post-launch data analysis is at the heart of what we required to scale. It showed us that our offering has a misfit with the segment which were aiming at. All follow up decisions were made based on the user data. (CEO of firm F)

These reflections show that data analytics provides indicators about the offering's appeal to a particular customer segment. Similarly, firm A envisioned its offering to be novel and attractive to users (children) and customers (parents); yet the market launch data revealed that its value was not perceived in the expected way. As the founder mentioned:

We have had downloads, but extremely low retention for our application. It became obvious that it was not as appealing as we thought it would be. (Founder of firm A)

Similarly, firm C faced a need to reconfigure its value-capturing elements. As its head of talent explained:

We realized we need different sales models, different pricing models, different subscription and discount models. (Head of talent of firm C)

The CEO of firm B in the B2B segment mentioned issues with its monetization model discovered in the initial phase of scaling. Addressing the localization pressures also appeared to be challenging for firms in both segments. As the CEO reflected:

When entering first foreign markets, I learned was that you never go there alone. (CEO of firm B)

The speed of adaptation appears to differ across B2C (cases A, C, E, and F) and B2B (cases B and D) business models. The reason for this is that B2C firms can reach users directly via digital channels whereas B2B firms must negotiate first with business partners and customers about the purchase of their offerings and only then establish a digital presence. Therefore, B2B firms have a longer period of user acquisition due to the existence of the 'offline to online' period. For example, firm D relies on its network partners to deal with schools, and firm B negotiates case by case with municipalities, schools, and the government for the sale of its

Table 3
Business model adaptation outcomes.

Segment	Firm/ sector	Factors driving reconfiguration	Business model adaptations	Illustrative quotes
B2C	A/ EdTech	-Low level of KPIs (low number of downloads & retention rate) - Misfit of monetization model -Low degree of localization	-Value proposition* (offering features and interface) -Value capturing* (pricing model) (*would have been required if firm had succeeded)	*We had some downloads, but extremely low retention rate. It became obvious that it was not as appealing as we thought it would be.* (CEO of firm A)
	C/ EdTech	Low level of KPIs (number of new users, retention rate)	-Value capturing (sales and pricing models)	*We realized we need different sales models, different pricing models, tdifferent subscription and discount models.* (Head of talent, firm C)
	E/ Game	Limited understanding about offering performance on some of the markets	-Value proposition: target markets -Value proposition: offering features	*We just launched it globally, and then started to see where the game appeals.* (CEO of firm E)
	F/ Game	-Low level of some KPI (low number of downloads & conversion rate)	-Value proposition (misfit with the target segment) -Value capturing: monetization model at the different foreign markets -Value delivery: change from the publisher to own distribution	*Since our game has a hybrid monetization model, it was beneficial to learn that in such markets as India ad focused in-game monetization model can be the key for revenue generation as Indian players are inclined to watch rewarded ads. In contrast, players from the United States have a lower inclination to watch ads in games, which means that focus would need to be on in-app purchase monetization for these users.* (CEO of firm F)
B2B	B/ EdTech	Misfit in expectations about operating model in foreign markets	-Value delivery: partners and direct contacts -Value capturing: pricing model (context-specific)	*When entering first foreign markets, I learned was that you never go there alone.* (CEO of firm B)
	D/ EdTech	Need for further customization	-Value creation: customization of user experience	*Another important task for us is about learning analytics after the launch, meaning that when we are observing everything that the kids are doing. Then we can improve customization of learning experience of each student.* (CEO of firm D)

offering. The international context in which cultural and institutional differences affect localization requirements is particularly challenging. B2B firms have fewer direct customers, whereas B2C firms' user base can be increased more effortlessly through digital markets. For example, firm E's offering has been downloaded 90 million times, whereas firm B, though founded in 2010, currently has only 200,000 users. As the CEO of firm B explained:

So we are actually working through a network of partners that help us find this local understanding, the business cultural language, of course, and working through our partners; then we have been able to see that the product is actually very relevant in any country. (CEO of firm B)

4.4.2. Mechanisms of the business model adaptation during international scaling phase

The assessment of the issues inhibiting actual scaling and implementation of business model adaptation takes place through several interrelated mechanisms. These are summarized in Table 4 and supported with illustrative quotes.

Data-driven decision-making based on data analytics appears to be the main mechanism that guides reconfigurations of business model elements during the active scaling phase. Case firms engage in multiple rounds of user data analyses to be able to make decisions about the optimization of offerings' market performance. User data provide signals about the most valuable (as well as problematic) features of the offerings, the effectiveness of the monetization model, and delivery channels. As the respondents explained:

So, we are using these digital tools to kind of make it transparent for everybody in the team about what are the most important things that we should be focusing on right now. (CEO of firm B)

I think we are working in a more agile way and in a more data-driven way. So that's how we currently updating the product, like based on continuous AB testing and iteration and, customer feedback and customer behaviour. So, we follow the data and make decisions based on that. (Head of Talent of firm C)

Furthermore, firms use data analytics to identify the bottlenecks experienced by users and the directions on how to address them. As the CEO of firm E explained:

There are so many ways to approach the problem, we can look at the data. And already in the data, there are millions of possibilities, which we look at, then we can ask for fellow game developers to take a look at the problem and give their opinion. (CEO of firm E)

The assessment of fit between the offering and target user segment is another area in which decisions are made largely based on data analytics:

Post-launch data analysis is at the heart of what we required to scale. It showed us that our offering has a misfit with the segment which were aiming at. All follow up decisions were made based on the user data. (CEO of firm F)

Marketing activities are often discussed in close connection with user data analytics because they lead to data acquisition. In digital marketing, users are acquired through non-organic installs. 'App install ad spend' is a sub-category of mobile marketing related to the money invested to drive users to app stores to download an app (AppsFlyer, 2020). The quality of data analytics is directly related to the size of the data, with a larger amount enabling more reliable conclusions to be drawn. The front-end developer from case A explained that a lack of hard data led to the failure of the venture:

And when you can't have hard data to illustrate where the problem is, it is very much, like, going on manual of data, a small amount of it. When you have a large dataset, and know where the problem is, then you can find anecdotal evidence for what could be that specific problem. But reverse engineering starting from the anecdotal evidence and seeing what the problem in my experience tends not to work very well. (Front-end developer of firm A)

The head of talent of firm C also noted:

I think it's mostly hard data that we look at. We are not, like, so active in organic social media. We do advertise a lot and rely on paid user acquisition. (Head of Talent of firm C)

As Table 4 shows, the case firms in both B2C and B2 sectors have the same objective of their marketing operations - user acquisition - but they differ in the means by which they carry out those operations. The former rely solely on digital marketing, while the latter use mostly traditional B2B marketing approaches. In digital marketing, the success of user acquisition largely depends on the availability of a sufficient budget that can be used for acquiring new users, paying for mobile attribution, optimizing the app store, and advertising on social media.

Table 4
Mechanisms of scaling.

Mechanisms of scaling	Case-specific examples	Case firms	Illustrative quotes
Data-driven decision-making based on data analytics	Focus of analytics:	**B2C**	*I think what we look most is the data. So like what gets people? What gets the users to purchase? What gets them*
Means of data acquisitions	- Learning about user behaviour	**B2B**	*to continue? Where? And why do they drop out or quit using the service? I think it's mostly the hard data that we*
	- Bottlenecks	A	*look at when we try to scale big.*
	- Monitoring changes	B	(Head of talent, firm C)
	- Guidance for offering updates	C	*We have some inbuilt measures that we follow as well. How many users there are, how many active users we have.*
	- Target market decisions	D	*Then we can also check on the sales, and how much would there be per student purchases per student and things*
		E	*like this, that we follow when making decisions about next steps.*
		F	(CEO of firm B)
	Digital marketing:	**B2C**	
	- User acquisition	A	*I think it's mostly hard data that we look at. We are not, like, so active in organic social media. We do advertise*
	- Mobile attribution	C	*a lot and rely on paid user acquisition.*
	- App store optimization	E	(Head of talent, firm C)
		F	
	Non-digital marketing and sales:	**B2B**	*Our team was attending bet one, which is one of the biggest education exhibitions in, in Britain. And they were*
	- Sales (B2B)	B	*there. And when they were meeting different kinds of companies and people all over the world.*
	- Partner network & word of mouth	D	(CEO of firm B)
			- Weconduct distribution via local partners who are responsible for overlooking all operational matters. Unfortunately,
			it takes time to find good partners, but once we have at least one in the new country, then we move faster.
			(CEO of firm D)
	Direct interaction with user and platform owners:		*We are working in a more agile way and in a more data-driven way. This is how we currently updating the products, like*
	- User feedback and behaviour	**B2C**	*based on continuous AB testing and iteration and, customer feedback and customer behaviour. So, we follow the data*
	- Communities of users	**B2B**	*and make decisions based on that.*
	-Platform owners	A	(Head of talent, firm C)
		B	*We do keep very close touch with our customers, and eager to know their feedback, suggestions for improvements.*
		C	*They often have very good ideas as they are the ones who use our product.*
		D	(CEO of firm B)
		E	*We have ongoing interaction with our user community because it is extremely important to address their concerns and*
		F	*questions as they come. They have also good comments about game mechanics and other things, for example live ops.*
		B2C	*So they like show us what works, what doesn't and we try to fix it quickly.*
		E	(CEO of firm E)
		F	*We continuously seek feedback from Apple and Google. Some of it is helpful, some not so much, but it is important to show*
		B2C	*that we take it seriously if we want them to feature our offering.*
		A	(CEO of firm A)
		E	
		F	
Localization	Moderate localization:		*Localization of input language helps us to scale fast. For example, the Spanish app is spreading faster in Latin American*
	- Translation of interface	**B2C**	*countries and now we are willing to translate into more languages in the future.*
	- Live ops	C	(Head of talent, firm C)
	- Gradual increase in degree of localization	E	*As [the] scale grows with adding more countries, we keep localizing in that order . . . So we have translation [into the]*
	- Reliance on partners	F	*most important languages . . . English, of course, and then Russian and Portuguese for Brazilian players.*
			(CEO of firm E)
			We do digital content, or blog posts, and all kinds of things … we tried to do those together with partners, so that they are
			maximally relevant to different countries.
			(CEO of firm F)
	Extensive localization	**B2B**	*We find a partner in the new country, we localize the content jointly. The local guidance is important to make it right.*
	- Translation of interface and adaptation of content	B	(CEO of firm B).
		D	

(*continued on next page*)

Table 4 (*continued*)

Mechanisms of scaling	Case-specific examples		Case firms	Illustrative quotes
Investments	-	Own capital/venture capital	**B2C**	*salaries and external investments to fuel the development and the growth*
			B2B	(Head of Talent, firm C).
			A	*Our KPI reflected that we need to change a lot of elements in our application. In our team, we now have different visions that are*
			B	*different from my initial idea. But the problem is that without strong user data we can't know for sure, and without investments*
			C	*we have no money to do it.*
			D	(CEO of firm A)
			E	
			F	
Entrepreneurial persistence	- Continuouseffort of owners towards firms' development		**B2C**	*They [founders] have this passion and the will to make it big, I mean, they could probably find an easier job somewhere else, but*
			B2B	*they want to try this, you know, until the end.*
			B	(CEO of firm B)
			C	
			D	
			EF	

User interaction is another mechanism assisting in actual scaling. It helps improve the offerings' value based on direct user feedback and address users' concerns in a timely manner. As the head of talent of firm C reflected:

We have collected customer feedback and develop the platform or the service based on that. But I think what we look for most is the data. So, like, what gets the people? What gets the users to purchase? What gets them to continue? Where? And why do they drop out or quit using the service? (Head of Talent of firm C)

Similarly, firms in the B2B sector continuously analyse user feedback for further improvement. As the CEO of firm B explained:

> We do keep very close touch with our customers, and eager to know their feedback, suggestions for improvements. They often have very good ideas as they are the ones who use our product.(CEO of firm B)

Only case firms E and F have used communities of users, which appear to be common in the mobile gaming sector.

Partnerships with other companies are important for achieving scaled operations. While B2B firms extensively rely on external partners for international sales and localization of their offerings, B2C firms have used partnerships with eco-system partners and platform owners largely for attaining a better market position in the digital market. The CEO of firm D mentioned:

We do digital content, or blog posts, and all kinds of things … we tried to do those together with partners, so that they are maximally relevant to different countries. (CEO of firm D)

In B2C, cooperation with platform partners such as Apple and Google can be important, though not always useful in terms of value of feedback. As the founder of firm A mentioned:

We continuously seek feedback from Apple and Google. Some of it is helpful, some not so much, but it is important to show that we take it seriously if we want them to feature our offering. (Founder of firm A)

In terms of *localization*, many respondents stressed that the skilful adaptation of the digital offering to language and cultural aspects while expanding to different locations allowed their firms to scale faster. For example, the head of talent of firm C explained:

Localization of input language helps us to scale fast. For example, the Spanish app is spreading faster in Latin American countries and now we are willing to translate into more languages in the future. (Head of Talent of firm C)

Yet several firms view their offering as standard with minimal requirements for localization. This shows that the requirements for the extent of localization are offering-specific and that estimating them in order to scale is important. Some offerings require a mere translation of the interface, while others necessitate a full range of cultural adaptations of their content and interface. An example of the former is an offering of case firm E, whose localization included only the translation of the game language and running the live ops, which was mentioned by the CEO:

We translate the game, but we don't have any country-specific features because shooter games are something so similar. But we run country-specific live ops, for example for Chinese New Year, they trigger downloads for a few days. (CEO of firm E)

By contrast, in firm D, localization took place at three levels, as the CEO explained:

So, first is the user interface language. I mean, that's really the next couple of days, the language. But then our content library is a completely different thing. It's more than 200,000 tasks that cover the entire weekly programmes from grades one to nine … the amount of exercises in this content library means that it's not trivial to translate … teachers are adopting it much faster when a natural language version is available … the third level is curriculum adaptation … Estonian translators are looking at the lesson plans, and they are at that point looking at 'Okay, this exercise should be on that grade'.(CEO of firm D)

While localization adaptations are implemented more easily for digital than physical offerings, they differ in the amount of time and

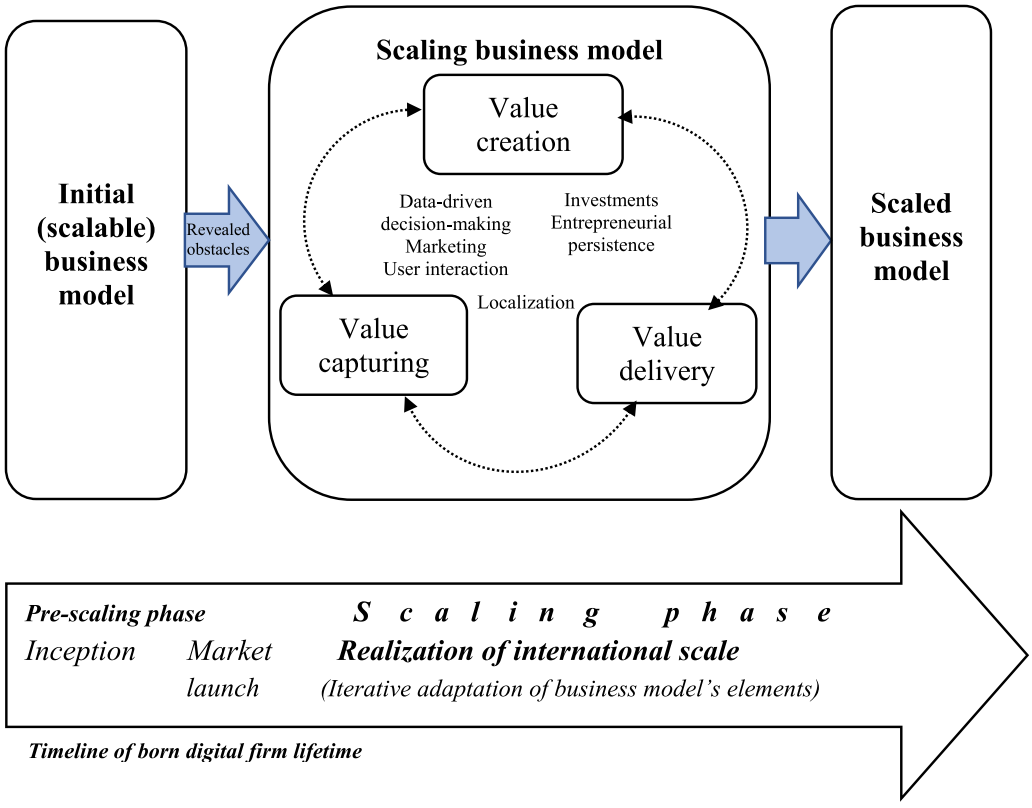

Fig. 1. Empirically based framework.

resources employed. The failure to accurately evaluate the extent of required localization can be detrimental to the success of a firm, as in case firm A. In that particular case, the firm's chief product officer had a strong belief in the need for profound localization and expressed that the mistake in this respect had a serious impact on the success of scaling.

With regards to *entrepreneurial persistence and financial resources*, the case firms strongly agreed that the reconfiguration process is highly intense and demanding. Its implementation requires persistence and high competence from an entrepreneurial team, and it takes place under fierce competitive pressures of a rapidly changing global digital market, as the CEO of firm B mentioned:

They [founders] have this passion and the will to make it big, I mean, they could probably find an easier job somewhere else, but they want to try this, you know, until the end. (CEO of firm B)

The respondents indicated that they had to work incredibly hard and fast in undertaking continuous iterations to optimize offerings' features and ensuring the effectiveness of the overall business model. In contrast with the attitude of the owner of firm B mentioned previously, the founder of firm A expressed a lack of willingness to undergo a process of improvements after receiving poor KPI during market launch:

Our KPI reflected that we need to change a lot of elements in our application. In our team, we now have different visions that are different from my initial idea. But the problem is that without strong user data we can't know for sure, and without investments we have no money to do it. So, the excitement is no longer there and it is better just to end things. (Founder of firm A)

This quote also illustrates that the other reason for the firm's termination was the unavailability of investment funds. Indeed, all case firms indicated that financial resources are essential for undertaking the scaling process. The firms whose founders have largely relied only on their own funds have indicated that it slowed down the speed of scaling. For example, the user acquisition budget is directly related to available financial capital, which in turn affects the number of acquired users. In addition, hiring top talent in the field is costly. As the CEO of firm F explained:

When your firm doesn't have the funding to pay talent, and when there is no budget for user acquisition, then there is not much one can do. (CEO of firm F)

Thus, both the ability to secure financial support and the persistence in offering a business model reconfiguration are important driving mechanisms of scaled operations.

5. Discussion

5.1. Contribution to scaling literature

Research on international scaling has attracted the attention of IB scholars, emphasizing the need for theoretical advancement of the field (Reuber et al., 2021; Tippamann, 2022a). This study undertakes the next steps in this direction. First, it introduces the concept of 'realized international scaling' and explicates its distinction from that 'scalability' and 'scalable expansion' concepts broadly used in the literature to date (Giustiziero et al., 2020; Monaghan et al., 2020). This research suggests that realized international scaling is achieved when a born-digital firm (1) generates exponential revenue by expanding its customer base by retaining existing and acquiring new users in large number of foreign markets; while (2) maintaining a lower increase of costs associated with customer retention and acquisition as well as those arising from organizational expansion.

This conceptualization highlights that realized international scaling is closely associated with revenue generation. It occurs when born digital firms succeed in their value capturing activities (Stallkamp et al., 2022), in addition to the value creating ones which merely manifest a potential for achieving scaled operations, referred as to 'scalability' of digital resource bundle (Giustiziero et al., 2021). Indeed, even though digital nature of firms' offerings allows to make them easily available in global market space (value creation) (Shaheer, 2020), to practically scale, born-digital firms' offerings need to be made discoverable and

appealing to target customers to generate actual revenue (value capture). For example, the free-to-play business model in mobile gaming allows users to download the game from the app store and play it for free and has zero additional costs per user (Seufert, 2014), but it is game attractiveness and skilful application of in-game monetization techniques that lead to revenue generation and demonstrate realized scaling.

Realized scaling also implies that born-digital firms succeed in maintaining lean principals of operations (Autio & Zander, 2016) that are largely enabled by their entirely digital business model. Born-digital firms rely on small professional teams, the use of digital tools to perform most of the business process, and the opportunity to outsource some of the functions to eco-system partners that allow to sustain low governance costs and its complexity. This put a pressure to organize the internal processes efficiently and effectively during the realized scaling which, however, have found to be challenging (DeSantola et al., 2022).

The definition of born-digital firms' international realized scaling delineates features that differentiate it from the concept of growth that implies expansion in costs but not necessarily in revenue (Reuber et al., 2021). Furthermore, this conceptualization highlights the argument that, theoretically, distinctive element of scaling is concerned with understanding of how the scaling is achieved and its outcomes (Tippmann et al., 2022a). However, it is important to stress that as the definition was derived inductively from the analysis of born-digital firms, the dominating digital features of the business model represent its boundary conditions.

Second, this explorative research contributes to the theoretical development of born-digital firms' international realized scaling by unveiling its dynamic process and mechanisms. It offers a framework suggesting that international realized scaling is achieved through an iterative process of initial business model adaptation, which is illustrated in Fig. 1.

The actual scaling process starts after market launch, when born-digital firms attempt to expand their user base and generate revenues through several interconnected mechanisms. The key objective in the beginning of the scaling phase is to acquire understanding about user perceptions of the offering and their purchasing behaviour to get an indication of offering appeal and actual revenue. These learnings enable firm to undertake the required adaptation in elements of the business model such as value creation, delivery, and capturing. This adaptation process requires continuous implementation and orchestration of various mechanisms (see Fig 1) and ability to sense and seize the opportunities and bottlenecks to make offering appealing and able to generate revenue (Teece, 2018).

One of the key mechanisms driving the process of business model adaption is *data-driven decision-making* based on analysis of user data acquired through marketing tools and direct user interactions. Data analytics is focused on understanding user behaviour, identifying bottlenecks, monitoring user feedback, and spotting potential new expansion avenues (e.g. in terms of target segment). Its results provide signals about perceptions and performance of offerings and enable identification of the directions of necessary modifications. Data analytics guides decisions about the optimization of offerings' business model elements throughout the scaling phase via rounds of iterations.

Marketing and direct interactions with users are key mechanisms for acquiring user data. Similar to the results reported by Huang et al. (2017), this study's findings indicate that a greater amount of user data leads to better-quality decisions. Marketing mechanisms vary in B2B and B2C firms. While B2C firms primarily rely on digital marketing, B2B firms extensively use non-digital channels to distribute their offering (e.g. network of business partners). However, in both sectors direct interactions with users via digital means represent an important source of data. The crucial role of digital data acquisition and analytics-based decision-making in achieving internationally scaled business model highlights the importance of digital competences for international expansion (Cahen & Boirini, 2020).

Localization is another important mechanism that assists firms in international scaling. This study shows that born-digital firms find it important to adapt their offering to local conditions that is in line with existing research (Lovelock & Yip, 1996; Prahalad & Doz, 1987). They often prefer to rely on local and international partners for undertaking the localization tasks to maintain the lean style of operations. The extent of localization varies across different offerings depending on their type and business segments. With regards to the type, the offerings that address global needs and have a high degree of independence of setting or genre do not require extensive localization, while those addressing specific local demands require more extensive localization. For example, in the mobile game sector, hyper-casual games (e.g. *Candy Crush Saga*) or casual games (e.g., those of case firms' E and F) require moderate localization related to interface translation, though games that are specific to a local cultural setting also need content localization. Similarly, in the digital education segment, the more generic an offering, such as music learning or language learning app (e.g. that of case firm A), the less localization is required. However, this research suggests that offerings in B2B segments tend to require more extensive localization and customization, as they target large business customers.

The implementation of data acquisition and localization is costly. Born-digital firms must have sufficient *investment capital*, from either venture capitalists or owners, to cover data acquisition and localization costs. The importance of venture capital has been emphasized elsewhere in IE research (Aernoudt, 2017; Duruflé et al., 2018), and this study illustrates how it also fuels the scaling phase of born-digital firms.

Digital international scaling appears to be an achievement context (Deshpandé et al., 2013), in which born-digital firms must overcome unforeseen obstacles if they are to succeed. The full design and appeal of the digital offering is unknown before the use by customers (Huang et al., 2017), which makes the scaling phase highly unpredictable. This research suggests that the *persistence of the entrepreneurial* team in driving the process of realized international scaling forward represents another underlying mechanism of scaled operations. This finding is in line with previous research highlighting the importance of entrepreneurial perseverance (Cardon & Kirk, 2015). It also enriches the understanding of the entrepreneurial role in the digital context, in which data-driven analytics offers unambiguous indications about the offering performance. In this context, the ability and willingness of the entrepreneurial team to quickly address revealed issues and opportunities and to adapt business model elements are crucial. This requires the existence of a learning orientation of founders (Domurath et al., 2020), which appears to be essential for the scaling of born-digital firms.

This comprehensive account of mechanisms mobilized by born digital firms in the process of realized international scaling addresses limitations of Huang et al. (2017), who examine only a few of them. While their study elaborates on such mechanisms as data-driven operations, instant release, and swift transformation, it recognizes the need to further investigate the role of marketing and venture capital in stimulating and scaling efforts. This research examines the interactions amongst data-driven operation, marketing efforts, and venture capital, as well as the role of managers and entrepreneurs, in driving the iterative process resulting in business model adaptation.

To sum up, the process of business model adaptation is iterative in nature and requires firms to orchestrate various mechanisms to succeed in its implementation leading to realized scaling. This observation highlights the fact that realized scaling of born digital firms is not solely a feature of their scalable bundle of digital resources (revenue creation), but the presence of dynamic capabilities to steer the execution of business model to achieve value capturing that exabits realized scaling. The need for dynamic capabilities were also implied elsewhere in scaling research. Tippmann et al. (2022b) show that digital MNEs have to continuously navigate with conflicting demands to navigate through the scaling paradox. Therefore, one of the important contributions of this studies is to extend existing understanding about the important role of dynamic capabilities in the process of realized international scaling. This study unpacks the iterative process and mechanisms of realized scaling

enabled by features of digital technologies such as connectivity, flexibility, replicability, and aggregation in implementation of business processes (Adner et al., 2019; Monaghan et al., 2020). It emphasizes the value of a large amount of digital data for learning about user behaviour that assist international scaling (Chalmers et al., 2021). This research also shows that firms in the B2B segment differ from B2C firms in the extent of their reliance on the discussed mechanisms of realized scaling due to the presence of non-digital elements in business model. Yet they follow similar heuristics in the scaling process (see Tables 3 and 4). These nuances contribute to a better understanding of the implications of digital affordances and data analytics, particularly with regards to international scaling of digital firms from different business segments.

5.2. Contribution to business model literature

First, this research contributes to the business model literature by developing an empirically based view of the dynamic process of business model adaptation during international digital scaling. It addresses the call for the need to better understand business model implementation and highlights the importance of dynamic capabilities in the implementation process (Teece, 2018). While most research on the business model is static and focuses on the business model design, typologies, and performance implications (Dunford et al., 2010; Foss & Saebi, 2018), this study explains the mechanisms of business model adaptation that help achieve realized international scale. A few notable exceptions have examined the process of effective business model development (McDonald & Eisenhardt, 2020) and entrepreneurial business model innovation (Snihur & Zott, 2020) during the start-up phase, revealing nuances associated with these processes. The findings of this research are novel, as they show how business model adaptation takes place in the post start-up phase to achieve realized scaling. The reason for the adaptation of the business model after market launch is associated with the novel nature of digital offerings and the challenges in predictability of how users will perceive them (Shaheer et al., 2020).

Second, the insights of this study shed light on the discussion about the explanatory power of the business model versus entrepreneurial approaches for understanding the speed of international expansions (Hennart, 2014; Hennart et al., 2021). They highlight that these explanations are complementary, rather than competing, by unveiling how entrepreneurial factors matter for the execution of the business model during the scaling phase. While potential scaling is based on estimations about an offering's appeal and the effectiveness of the digital business model before market launch, the realized scaling is an outcome of skilful business model adaptation implemented by entrepreneurial team during the scaling phase.

5.3. Contribution to literature on cultural industries

This explorative study offers implications for research on cultural industries. Cultural industries deeply rooted in values, customs, and traditions are rapidly undergoing digital transformation. The increasing reliance on digital technologies was even further trigged by the COVID-19 pandemic. This context lies at the heart of the IB discipline, and better understanding it allows drawing implications about the applicability of the assumptions associated with culture, such as the role of localization and location choice for digital international expansion (Wang et al., 2020). The discussion on born-digital firms' scaling sheds light on how the diffusion of digital cultural products and services occurs in global markets (Vora, Martin et al., 2019). As noted previously, IB-related research on scaling in cultural industries is based mostly on evidence from only a few sectors, such as music and movies (Wang et al., 2020). Thus, this study expands contextual richness in the IB field which is needed in order to further advance theoretical and empirical insights of scaling (Tippmann et al., 2022a).

5.4. Implications for practitioners

The growth of digital firms has exploded in recent years, and thus this research resonates with the recent call for IB research to produce a greater "impact, relevance, and a connection to the real world" (Buckley et al., 2017, p. 1053). By unveiling the process and mechanisms of practically scaled born-digital firms, this research informs managers about the strategic and operational matters that are important to consider when working to achieve realized international scaling. The findings of this study clearly illustrate that scaling is not simply a feature of the born-digital firm but the raison d'être for survival that warrants proper strategic efforts from management teams. As the CEO of firm E well explained, 'many people think of [scaling] as the wheels of a car, while it is the engine', which highlights the importance of implementing actual scaling if digital firms are to succeed in the IB arena.

5.5. Limitations and future research

This study has several limitations that could be addressed in future research. First, it takes first steps to uncover the nature of the realized international scaling of born-digital firms but does not claim to offer the all-embracing conceptual development of the scaling phenomenon. Additional studies should further explore scaling in a non-digital context.

Second, there is likely greater diversity in the mechanisms of scaling. Although this study includes different types of firms and business models, these belong to a single industry context, which has its specific features. The investigation of scaling in other digital sectors would complement the findings from this research. In addition to different industry contexts, research on the scaling of born-digitals from other national contexts could be insightful. For example, firms from emerging markets might have different objectives and mechanisms of scaling. In addition, the institutional environment might exert an important impact on operational aspects of the realized scaling of emerging market firms.

Finally, there is an opportunity to undertake a larger quantitative study to test some of the assumptions proposed herein. Doing so would strengthen the conceptual foundations of scaling and enhance the generalization of the research assumptions.

6. Conclusion

This research enriches knowledge in the scaling and business model fields by offering empirical insights into the concept, process and mechanisms of realized international scaling of born-digital firms through the lenses of the business model and dynamic capabilities. The research framework shows how the dynamic process of business model adaptation takes place after market launch and leads to scaled operations of born-digital firms. While scholars often define born-digital firms as being readily scalable (Monaghan et al., 2020), this research uncovers the 'work' behind practically scaled born-digital firms and offers an empirically based definition of realized digital scaling.

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