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Extending the international new venture phenomenon to digital platform providers: A longitudinal case study

Arto Ojala, Natasha Evers, and Alex Rialp

Abstract

People increasingly interact with services enabled by digital platforms. This has been a consequence of the digitalization of artifacts, which has transmuted traditional businesses into digital forms. With the increasing digitalization and modularization of services, digital platforms have given many digital service providers possibilities to scale globally, and to rapidly transcend national borders by serving multi-sided markets. However, we still know very little about how digital platform providers actually internationalize their services, or how they make their platforms available for global markets. In this paper, we contribute to the increasing literature on digital-based INVs, examining how firms of this type internationalize their services, and more specifically, how recent technological developments have shaped the firms' internationalization processes. Drawing on concepts from the network approach to internationalization, resource dependency theory, and INV theory, we extend the scope of INV theory via a model that encompasses the internationalization process of digital platform providers. We report on a longitudinal case study of a digital platform provider (covering the period 2000–2017), which allowed us to gain in-depth insight into the INV phenomenon.

Keywords: Digitalization, Digital platforms, INV theory, Network relationships, Resource dependency theory, Bottlenecks, Multi-sided markets, Longitudinal case study.

1. Introduction

Digitalization has become an everyday phenomenon (Yoo, 2010), and has revolutionized how organizations, irrespective of their size or industry, create and deliver value-based transactions within local and foreign markets. Digital technologies can transform physical products and services into digital forms through greater connectivity across digital platforms¹ (Nambisan, 2017; Tilson et al., 2010; Yoo et al., 2012). Research has clearly shown that the digitization of commerce is disrupting traditional business models, removing established incumbents, and reconfiguring organizational

¹ For example, Amazon has created a digital platform for its eBook service, whereby publishers, bookstores, and customers may enter and conduct business over the Internet.

structures (Brouthers et al., 2016; Tripsas, 2009; Yoo, 2010; Yoo et al., 2012). One of the most interesting business forms to emerge is that of digital-based international new ventures (INVs), i.e. firms that internationalize proactively and rapidly shortly after inception (Oviatt & McDougall, 1994). Also referred to as entrepreneurial internationalizers (Schwens et al., 2017), such firms make use of the contemporary globalized and digitalized world to develop a unique competitive advantage across borders. However, the timely acquisition of scholarly knowledge across international business (IB) paradigms has been outpaced by the constant transformation of global commerce through digital technologies in this, the Digital Age.

Because there are several types of digital-based INVs, in this study we focus on a new and increasingly important group of firms, namely digital platform providers². These firms – which have been referred to as today’s most influential businesses (Parker et al., 2016; Tan et al., 2015) – have spawned services which are radically changing existing business models, disrupting ecosystems, and shaping industry structures (Evans & Schmalensee, 2016; Parker et al., 2016; Watanabe et al., 2017). Evans and Gawer’s (2016) global survey indicates that in 2015 the market value of platform companies was 4.3 trillion US\$, and that the world’s four most valuable brands are held by digital platform providers (Forbes, 2017). Furthermore, the number of startups engaged in developing new kinds of digital platforms for global markets is increasing (Edelman, 2015; Korhonen et al., 2017). Hence, we cannot overlook the crucial importance of digital platform providers in our present information-based economy and society.

Digital platforms can be defined as “a shared, common set of services and architecture that serves to host complementary offerings” (Nambisan, 2017, 1032). By using services offered by firms developing and marketing digital platforms, we can listen to music as a service through Spotify or iTunes, watch movies through Netflix, or rent a house in a foreign country through Airbnb. To better understand the industry context of digital-based INVs providing digital platforms, one can apply the layered modular architecture³ framework of Yoo et al. (2010). The framework includes the following four layers: (i) a content layer, (ii) a service layer, (iii) a network layer, and (iv) a device layer (Yoo et al., 2010). As an example, Netflix (a digital platform provider) provides video-on-demand service within the service layer, whereas film studios provide content for Netflix’s service within the content layer. The end users of the Netflix service can gain access to movies through the network layer,

² A *digital platform provider* refers here to digital-based INVs developing digital platforms. The platform provider may differ from the brand name of the platform. For instance, YouTube (a digital platform) is owned by Google – a digital platform provider which also develops other digital platforms, such as the Android operating system platform. There can be also several other types of digital-based INVs operating in a digitally enabled environment (Laudon & Laudon, 2017), e.g. digital content or service providers.

³ A layered modular architecture comprises a hybrid model, existing between a modular and a layered architecture, with digital components embedded in physical products (Yoo et al., 2010).

operated by network operators. The device layer is operated by hardware manufacturers and designers, who provide equipment such as TVs and tablets to watch the movies. However, digital platform providers tend to rely on the resources provided by other firms, operating within different layers of the architecture. For instance, Netflix needs movies for its service, obtainable from content providers who might be located in several countries. Furthermore, in order to bring content providers, end-users, and other actors around the globe together in the digital market space, digital platform providers must operate in two-sided or multi-sided markets across different countries (Eisenmann et al., 2006; Evans & Schmalensee, 2016).

In the field of IB, a considerable number of studies have been conducted on INVs (referred to also as *born-globals*). In particular, this stream of literature has shown how these firms use network relationships (Coviello, 2006; O’Gorman & Evers, 2011) and global resources (Andersson et al., 2018) to accelerate internationalization to multiple countries. However, much less is known in current INV literature are the ways in which digitalization is enabling the emergence and internationalization of more special types of firm, such as digital-based INVs (Brouthers et al., 2016; Knight & Liesch, 2016). To increase our understanding on this topic, we must expand our insights to other domains (Coviello et al., 2011; Coviello, 2015; Cavusgil & Knight, 2015), seeking to gain a more comprehensive conceptualization of the technologies that enable the existence and internationalization processes of these firms (cf. Knight & Liesch, 2016). In other words, we do not know how a layered modular architecture, in conjunction with the availability of enabling technologies, impacts on the internationalization process, or on the capability to establish global multi-sided markets. This is important because, in the first place, the success or failure of the platform provider depends ultimately on its capability to implement a feasible layered modular architecture that can be replicated for global markets. Secondly, compared to other types of firms, digital platform providers are highly dependent on enabling technologies and content for the platform, and this makes their international opportunities vulnerable to technical and strategic bottlenecks⁴ in the market (cf. Baldwin, 2015; Ojala & Lyytinen, 2018). Finally, multi-sided markets differentiate digital platform providers from mainstream software or e-commerce firms that operate in traditional “left-to-right” value chains (Evans & Schmalensee, 2016; Parker et al., 2016).

Due to the highly idiosyncratic ways in which these firms generate value and commercialize their services in digitally-enabled environments, we posit that the internationalization process of digital platform providers represents a particular case of internationalization. In a similar vein,

⁴ A *technical bottleneck* refers to a situation in which there are no (or only limited) alternative technologies to bring the innovation to the market. In the case of a *strategic bottleneck*, a firm (e.g. a competitor) can prevent or limit other actors’ access to resources that it controls (Baldwin, 2015).

Brouthers et al. (2016) argue that the internationalization of digital-based INVs differs from the incremental pathway models suggested by traditional internationalization theories (Bilkey & Tesar, 1977; Cavusgil, 1980; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975; Luostarinen, 1979). General IB paradigms and product life cycle theories can be also ruled out, given their tendency to focus on larger and experienced manufacturing-based multinational enterprises (e.g. Buckley & Casson, 1976; Dunning, 1988; Vernon, 1966). However, we would argue that in this context, the network theory of internationalization (Johanson & Mattsson, 1988; Johanson & Vahlne, 2009) can be applied in studying how firms network with different actors and gain access to the resources they need. Related to this, Resource Dependency Theory (RDT) helps us understand early firm internationalization, when firms are dependent on external resources (Hillman et al., 2009; Pfeffer, 1987; Pfeffer & Salancik, 2003) that are internationally diffused, controlled by other firms, and difficult to replicate (cf. Barney, 1991; Wernerfelt, 1984, 1989). INV theory combines ideas from the two theories. It focuses on the opportunity-seeking behavior, by which an INV “seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (Oviatt & McDougall, 1994, p. 49). However, since the international opportunities of digital platform providers are closely dependent on their underlying architecture (cf. Yoo et al., 2010) and on the evolution of new technologies (Tiwana, 2015), we recognize that our combined theoretical approaches may not fully explain how digital platform providers actually internationalize their operations. For this reason, we shall here build upon these core theories with the layered modular architecture framework, our aim being to extend the INV phenomenon to digital-based INVs, and especially to firms providing digital platforms.

Following on from the discussion above, the main objective of the research described here was to longitudinally analyze the internationalization process of a digital platform provider, addressing the following key questions: 1) What is the role of layered modular architecture in the internationalization process of digital platform providers? 2) How and why do these firms access external resources for developing layered modular architecture along with other actors? 3) What types of technical and strategic bottlenecks govern their internationalization processes? To answer these questions, we drew on theoretical insights from the network theory of internationalization, RDT, and INV theory, including also literature from small firm internationalization and information systems (IS). Furthermore, we comprehensively examined the internationalization of a digital platform provider, applying a longitudinal single-case study approach.

We contribute to and expand on existing IB literature and theories in several ways. First of all, we contribute to the network model of internationalization by revealing how a firm’s networking processes can differ from the traditional model, in the case of digital platform providers that operate

in multi-sided markets. Secondly, we contribute to RDT by examining how the various actors operating in multi-sided markets can create technical and strategic bottlenecks by controlling important resources. Finally, we extend INV phenomenon and related theory by developing a preliminary model for the internationalization of digital platform providers. The present paper responds also to the call for more phenomenon-based (Doh, 2015) and interdisciplinary studies (Coviello et al., 2011; Coviello, 2015; Cavusgil & Knight, 2015; Etemad, 2017). It further contributes to our knowledge on INVs that act within digital business contexts (Brouthers et al., 2016; Knight & Liesch, 2016). Finally, from a methodological perspective, it responds to calls for more longitudinal case-based research on new venture internationalization (Kuivalainen et al., 2012).

2. Literature and conceptual background

In 2.1 below, we present literature on networks and resources in the context of INV internationalization. In 2.2 we integrate these ideas with IS literature, aiming to gain a better understanding of technological environment in which digital-based INVs operate. In 2.3 we summarize the literature and the research gap.

2.1. The network and resource-dependency perspective on INV internationalization

Since the introduction of Johanson and Mattsson's (1988) network model of firm internationalization, an extensive body of research has examined the influence of international networks in small firm internationalization (Chetty & Blankenburg Holm, 2000; Coviello & Munro, 1995, 1997; Evers & O'Gorman, 2011; Johanson & Vahlne, 2003, 2009; Jones et al., 2011; Madsen & Servais, 1997; Ojala, 2009; Oviatt & McDougall, 2005). Overall, the network theory of internationalization (Johanson & Mattsson, 1988, 1992), which is largely influenced by the resource-based view and RDT, has been crucial for the emergence and consolidation of the INV theory (Oviatt & McDougall, 1994, 2005). Network relationships have been identified as important through various stages of a new venture's internationalization process, which proceeds from the identification and exploitation of market opportunities towards growth as its presence in international markets becomes established (Evers et al., 2012; Johanson & Vahlne, 2003; Shirokova & McDougall-Covin, 2012). As no single company, including INVs, owns all the resources required to explore and exploit continuously changing markets and new knowledge, networks are seen as a source whereby a firm can acquire resources (both immaterial and material) held by other firms (Johanson & Vahlne, 2009; O'Gorman & Evers, 2011; Sullivan Mort et al., 2012). Hence, through their embeddedness in

network relationships, INVs can help bridge key resource gaps and enter a foreign market by deriving knowledge and resources from their network partners (Coviello & Munro, 1995; Prashantham, 2011; Oviatt & McDougall, 2005). Networks can also be a source of aspiration and inspiration in, for example, international and technology development (Prashantham & Birkinshaw, 2015).

During a firm's internationalization process, networks are established and developed (and if need be terminated) to obtain the necessary resources and to develop a better position in the market (Johanson & Mattsson, 1988). To be successful, internationalization through networks requires *reciprocal commitment* (Johanson & Vahlne, 2009), and it should offer mutual benefits to both parties (Johanson & Mattsson, 1988). Networking with foreign partners can be conceptualized as a firm's actions and reactions in the market, and these can take different forms (Coviello, 2006; Coviello & Munro, 1997; Johanson & Vahlne, 2009). In *active networking*, there is a lack of resources, and this leads to opportunity-seeking behavior, within which the service provider has an active role. In this situation, the service provider makes contact directly with the potential partner in a foreign market. In *reactive networking*, a potential partner in the target country may take the initiative and ask for a service from the provider. Alternatively, another firm may take the initiative and help the provider to establish a network with a foreign firm (Johanson & Vahlne, 2009). This is related to opportunity recognition, which is the outcome of serendipity created by the service provider's indirect network relationships (Johanson & Vahlne, 2009; Kirzner, 1997). Altogether, various scholars (Chetty & Wilson, 2003; Coviello, 2006; Murmann et al., 2015; Oviatt & McDougall, 2005) have noted that firms can use their relationships with foreign firms to develop their resource pool without actually owning such resources. However, the network view presupposes that firms have established relationships, and are already part of a network that facilitates internationalization (Ojala, 2009).

Overall, we would conceptualize firms' internationalization as comprising the patterns of action and reaction by which a firm builds its network with different actors in the global market. By investigating these activities and the motivation behind them, we can gain an understanding of how a firm can acquire the resources (Barney, 1991; Hillman et al., 2009; Pfeffer, 1987; Pfeffer & Salancik, 2003) it needs for the different layers of the architecture (Yoo et al., 2010), and how the architecture itself may govern firms' internationalization. In order to profit from the external resources owned and controlled by other firms, a firm has to offer some valuable resources in exchange (Pfeffer, 1987; Wernerfelt, 1989). Relatively little scholarly attention has been given to the resources that INVs are able to exchange when they develop their international networks. This is especially true of small firms operating in digital markets, in which the technologies are evolving rapidly (Arthur, 2011; Henfridsson & Bygstad, 2013). The constant evolution creates a continuous need for new technologies, innovations, and relationships, and consequently for new types of

resources. In parallel with this, there is an ongoing need to reform existing relationships, and to terminate non-beneficial relationships.

2.2. Digital-based INVs and layered modular architecture

As argued by Andersson et al. (2014), the level of a INVs internet dependency in an industry can influence its strategic choices in terms of the speed of its internationalization, its foreign market and operational scope, and its foreign entry mode/strategy. As an INV's internationalization choices can be contingent upon the idiosyncratic nature of the sector in which it operates, and its role in the value chain, a more integrated or eclectic approach to theory building is needed (Cavusgil & Knight, 2015; Coviello et al., 2011; Coviello, 2015; Crick & Spence, 2005; Oviatt & McDougall, 1994). Given the high degree of architectural embeddedness that binds digital platform providers to network actors within their value chains (Yoo, 2010), we suggest that the internationalization of these firms is resource dependent, and that by networking with actors controlling such resources, they can expand to the global markets.

These resources can be described in terms of a layered modular architecture (Yoo et al., 2010). Figure 1 presents a simplified example of a layered modular architecture stack relating to a video-on-demand service. As shown in the figure, to bring the platform to the market, a firm needs to establish multi-sided markets that bring various actors together (Evans & Schmalensee, 2016; Yoo et al., 2010, 2012). Hence, the following resources, controlled by different actors, have to be in place in addition to the service itself: (i) content for the service, (ii) an Internet connection to deliver the service to users, and (iii) a device to use the service (Yoo et al., 2010). This means that in order to provide video-on-demand services, a firm needs content from media companies (video films), a network operator who is capable of delivering content over the Internet, and devices that can be used to watch movies. Typically, these resources are heterogeneously divided, and are controlled by different providers (Pfeffer & Salancik, 2003; Wernerfelt, 1984, 1989). Moreover, some of the resources may be immobile, hence without possibilities for replication (Barney, 1991). This means that the firms providing digital services are dependent on resources that are controlled by other firms. For the purposes of the present study, we were particularly interested in the kind of situation in which the resources needed for the different layers of the architecture stack are not available in the home country. In seeking to gain access to these resources, firms have to enter foreign markets and develop relationships with firms that control such resources abroad.

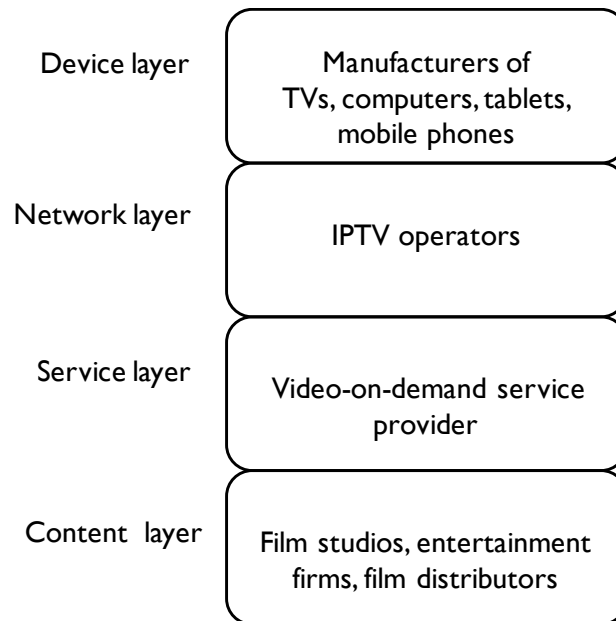


Figure 1. Example (simplified) of a layered modular architecture stack for a video-on-demand service: adapted from Yoo et al. (2010)

Because there are several actor groups participating in multi-sided markets around the digital platform, the internationalization of platform providers can be restricted by factors that limit their access to the resources controlled by other firms. In this study, we were especially interested in *technical* and *strategic* (Baldwin, 2015; Jacobides & Tae, 2015), which may limit the platform provider’s access to external resources at different layers of the platform architecture stack (Yoo et al., 2010). According to Baldwin (2015, 7), a bottleneck is “a critical part of a technical system that has no –or very poor– alternatives at the present time.” In the case of technical bottlenecks, there may be no (or very few) alternative technologies available to a firm that would allow it to bring its service to the market (Baldwin, 2015).

Our eBook reader example may serve here to illustrate technical bottlenecks. The first vision for the eBook was presented as long ago as the 1930s by Brown (1930), in his book “The Readies.” Clearly, there was no technology that could bring this concept to the market at that time. Decades later, in 1992, Sony brought the first commercial eBook reader to the market (Adner, 2012; Mumenthaler, 2010). However, because of technical bottlenecks at the device layer, it never achieved success with consumers. The technical bottlenecks in question were related to the low quality of the LCD display, and to the fact that the components of the device were large and heavy (e.g. Mumenthaler, 2010). It should be noted also that when digital platform providers internationalize their operations, the unavailability of broadband technology at the network layer in the target country may constitute a technical bottleneck (cf. Andersson et al., 2014; Czernich et al., 2011).

A strategic bottleneck refers to a situation in which a firm can prevent or limit access by others to the resources that it controls (Baldwin, 2015). With regard to our eBook example, at the content layer Amazon controls the kind of content that can be read through its Kindle eBook reader (Benhamou, 2015). Following this strategy, Amazon prevents the usage of the EPUB format in its Kindle readers. This creates a strategic bottleneck for Amazon's competitors, including Apple and Google, who use the EPUB format in their eBooks (McIlroy, 2012).

2.3. Summary of the literature

Overall, the network theory of internationalization, including RDT and INV theory, may greatly enhance our understanding of digital platform providers' internationalization. According to the emerging conception, the internationalization of digital platform providers can be closely related to the resources that they need for different layers of the architecture. To gain access to these resources, they need to actively network with potential technology and content providers. Nevertheless, if applied in isolation, the theories in question lead to a somewhat abstract and simplified understanding of how digital platform providers internationalize their operations. So far, no studies have yet applied these theories in a combined manner, seeking to identify or explain how an underlying architecture shapes internationalization in multi-sided markets, and how various technical and/or strategic bottlenecks might limit international opportunities. Given that the literature on digital platforms has highlighted the important role of these elements, we need to look at the broader scope and content of these elements, plus their impact on the internationalization of digital platform providers. Otherwise, we will overlook important aspects, ending up with oversimplified theories that offer little guidance on the nature of the phenomenon.

3. Research methodology

To gain insights on the international process of digital platform providers, we conducted a longitudinal, exploratory single-case study (Yin, 2009). We chose an exploratory approach because this would allow us to utilize empirically rich and detailed data belonging to an understudied phenomenon (Dyer & Wilkins, 1991; Edmondson & McManus, 2007; Yin, 2009), seeking thus to capture cause-and-effect relationships (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Pettigrew, 1990). Adopting an exploratory study provided the flexibility and openness that was needed to study new phenomena, given that there were no hypotheses or fixed routines to guide the study (cf. Swanborn, 2010). In other words, it allowed us to observe new and often unexpected events in the

internationalization process. The single case study method is also of use in revealing aspects of a phenomenon that has so far been largely inaccessible (Yin, 2009), and in gaining a better understanding of organizational processes (Doz, 2011; Langley et al., 2013). Furthermore, in seeking to understand the dynamics and evolution of digital platforms, longitudinal studies are required (Reuver et al., 2017).

We selected the case firm *G-cluster*⁵ for this study. In global terms, G-cluster is one of the leading cloud gaming platform providers (Tiwari, 2015). The firm was established in Finland in 2000. Currently, G-cluster has its headquarters in Japan, but its R&D activities are located in Finland. The main business idea of G-cluster is to acquire gaming content from game developers and to make the games available for consumers over the Internet as a cloud service. G-cluster presents an extreme case, since to the best of our knowledge, no other empirical studies have taken a longitudinal view of the internationalization of digital platform providers. Furthermore, previous empirical works on digital platform providers have mainly been personal or historical biographies relating to well-known platforms such as Facebook, Amazon, Apple, Uber, or Airbnb (e.g. Isaacson, 2011; Simon, 2011; Stone, 2013, 2017). In contrast, our aim here is to gain an in-depth understanding of actions, illustrating how a nascent firm can bring a digital platform to international markets. Up to now, this has not been done, bearing in mind that previous studies have investigated the phenomenon by means of single snapshots of firms, without genuine longitudinal investigation (Reuver et al., 2017). It should also be noted that G-cluster fits the generally accepted definition of an INV (Oviatt & McDougall, 1994).

We had also open access to information related to the firm's operations and internationalization. This included interviews with the top management team, and with software developers. These assisted us in understanding the firm's activities in foreign markets (cf. Stake, 1995) and in avoiding elite bias (Myers & Newman, 2007). The first author has cooperated with the case firm on several research projects, and has been acquainted with it over many years. This increased the firm's willingness to provide the kinds of sensitive and confidential information that would be needed to build the case.

3.1. Data Collection

We collected empirical material covering the entire history of the case firm, from 2000 to 2017. The most important material consisted of interviews with the managers of the firm. As shown in Table 1,

⁵ <http://gcluster.jp/>

these took place between 2005 and 2017. Because the case firm is relatively small⁶, interviews with the Chief Executive Officer (CEO) formed the main source of information. However, to improve the validity of the study, to avoid personal bias, to triangulate, and to gain the most relevant information on each topic (Huber & Power, 1985), we interviewed eight additional employees in the firm. To reduce recall bias, we also interviewed the CEO and four employees at least twice.

The interviewees were selected according to their knowledge of various phases of the internationalization. The interviews with the additional employees were tailored according to their role in the firm, their involvement in the foreign market entries, their networking with partners, and other related business activities. The CEO provided help in identifying relevant interviewees from the case firm. Furthermore, we conducted interviews with three employees from the case firm's main partner in Japan, thus acquiring a more comprehensive understanding of the firm's foreign market entries, its networking, and the development of its service (see Table 1).

Person interviewed	Time of the interview(s) (month/year)	Duration of the interview(s) (hours/minutes)	Field of knowledge
CEO	5/2005 9/2010 10/2010 5/2011 12/2012 8/2013 5/2014 5/2015 9/2015 1/2016 5/2016	1:30 1:30 1:10 1:00 0:55 1:00 0:55 1:25 0:45 0:55 1:15	- Internationalization - Business idea - Establishment of the firm - Global business development - Networking - Service development - Architecture - Business development in the UK, Japan, Cyprus, the USA, and France
CEO for Japanese operations	11/2005	1:20	- Operations in Japan - Commercialization of the service
Software Developer	10/2010	0:50	- Technical aspects of the service and the architecture - Technical restrictions
Vice President, software engineering	10/2010 5/2016 1/2017	0:45 1:10 1:00	- Internationalization in general - Business development in the USA - Technical and strategic restrictions on initialization and commercialization
Chairman, board of directors	11/2010 9/2013	0:50 0:55	- General business development globally
Executive Director, corporate planning	11/2010	1:00	- Content acquisition - Business development in Japan
General Manager, technical development	11/2010 9/2013 10/2015	0:55 0:50 1:00	- Content acquisition - Technical restrictions in different markets
General Manager, global management*	11/2010 10/2015	1:05 0:50	- Global market development

⁶ The number of employees varied between 10 and 50 through the time span covered. It depended on the number of projects with partners and the development cycles of the platform.

Previous CEO (years 2000–2002) ⁷	4/2013	1:00	- Early business development - Early market entries - Content acquisition in the UK
Financial Controller	8/2013 1/2016	1:05 1:00	- Background information on the firm - Reports and brochures - Daily activities
General Manager, business and legal affairs*	9/2013	0:45	- Content acquisition
Executive Director, home entertainment group*	9/2013	1:00	- Content acquisition - Global market development

Table 1. Persons interviewed. *=Interview with a partner’s representative in Japan

Altogether, we conducted 29 interviews, lasting from around 45 to 90 minutes. The average duration of the interviews was around 60 minutes. The first interviews (in 2005) focused on the initial establishment and early internationalization of the firm. The subsequent interviews were conducted from 2010 onwards, when the firm started to further expand its foreign operations. Thereafter, each follow-up interview focused on the development of the platform and on IB development since the previous interview. We took notes during the interviews, and photos from diagrams drawn by the interviewees when they illustrated the development of their service, the ecosystem⁸ around it, and the foreign market operations. All the interviews were recorded and transcribed verbatim, resulting in 315 single-spaced pages of interview data.

Although we used face-to-face⁹ interviews as the main source of information, telephone and email communication was used to clarify inconsistencies in interviews whenever necessary. These communications were added to the case-study database. After each interview, we sent the complete transcripts back to the interviewees so that they were able to review, and if necessary, comment on the transcripts. In most cases, the interviewees accepted the transcripts in the form in which they were written. However, in some cases, the interviewees gave minor comments relating to some particular wordings, or the names of partners.

To avoid retrospective bias (Huber & Power, 1985; Miller et al., 1997), we collected several types of secondary data (183 pages in all), covering the entire history of the firm, with a view to validating the interview data whenever possible (Table 2). The data included internal and external memos of the firm, such as a private placement memorandum from the year of its establishment,

⁷ The previous CEO refers here to a person who worked as CEO in G-cluster between 2000 and 2002. During 2000–2002, the founder (and current CEO) worked as chief technology officer in G-cluster.

⁸ In this paper, an ecosystem refers to a loosely coupled network of actors who interact and offer resources of different kinds, which together form a digital service around the platform.

⁹ All the interviews were conducted as face-to-face interviews, apart from one interview, which was conducted via Skype because of difficulties in finding a time for the face-to-face interview.

promotion materials for potential partners, press releases, video materials for advertising purposes, websites, and brochures.

Data source	Number of data sources	Year(s) + Number of observation(s)
Press releases	61	2001 (N=1), 2002 (N=1), 2003 (N=1), 2004 (N=4), 2005 (N=15), 2006 (N=5), 2008 (N=2), 2010 (N=1), 2011 (N=2), 2012 (N=8), 2013 (N=12), 2014 (N=4), 2015 (N=4), 2016 (N=1)
Brochures	5	2009 (N=1), 2010 (N=1), 2013 (N=3)
Websites	1	2005–2017
Private placement memorandum	1	2000
Video advertising material	3	2015 (N=5)

Table 2. Secondary material used in this study.

To ensure the validity of the data, we validated the descriptions of the foreign market entries, the development of the architecture, the networking activity, and the bottlenecks, together with the firm’s CEO and the Vice President (software engineering). We gave them access to our case descriptions, tables, and figures. Thereafter we discussed with them the accuracy of the emerging interpretation and related information. In some minor cases, we made changes based on their comments. We also used secondary data to validate and triangulate the data (Miles et al., 2013). We compared the interview data with the secondary data gathered from the case firm. If we noted inconsistencies between the interview data and the secondary data, we discussed these with the person interviewed and the CEO, to avoid misunderstandings and retrospective bias (Huber & Power, 1985). In the most complicated situations, we asked the interviewee to check his/her emails to recall a specific event.

3.2. Data Analysis

We used qualitative techniques to analyze the data (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Miles et al., 2013). We first conducted data reduction to remove unnecessary data, seeking to find the key themes and constructs from the collected data (Miles et al., 2013). This was conducted by synthesizing the complete transcripts from the interviews and the secondary data (Eisenhardt, 1989) into a baseline document, covering the entire history of the firm. We followed Pettigrew (1990), who recommends arranging incoherent aspects of context evolution in chronological order, in order to gain a clearer view of the causal links between critical events. By means of this process, we were able to arrive at a historical and evolutionary review of the firm.

After the data reduction, we coded the interview data using open thematic content analysis (Corbin & Strauss, 2014; Strauss, 1987; Taylor et al., 2015). First of all, we organized the case firm's internationalization, putting events in chronological order. Within each target country, we used as a template the framework for layered modular architecture created by Yoo et al. (2010); this was done with a view to tracing the connection between the foreign market entry strategy and the resources needed for the different layers of the architecture. On the basis of the framework, we coded for all the changes in the different layers, in relation to the internationalization process. For example, when an interviewee explained, "London is a cluster for the gaming industry in Europe. We established an office in London as we needed to acquire content for our service," the *content layer* was coded as the reason for the foreign market entry.

To trace the process of networking longitudinally, we followed the theory of narrative explanations formulated by Abell (2004). From the data, we recognized the actor (platform provider), and the following variables: (i) actions (networking), (ii) states (foreign market entries), and (iii) time (chronological order of the foreign market entries). The internationalization progressed on the basis of the platform provider's networking: this constituted a sequence of actions over time, whose aim was to acquire new resources from foreign markets. For more detailed coding of actions related to the networking process, we used the framework by Johanson and Vahlne (2009). Thus, when an interviewee said, "We were actively looking for a potential partner from the USA," this was coded as *active networking* (within which the firm was seeking a new opportunity to acquire resources). In contrast, the statement "Our partner cooperating in Cyprus introduced us to the local telecom operator" was coded as *reactive networking*, the reason being that the opportunity was recognized via an indirect network relationship. In the case when an interviewee said, "The platform in Cyprus was developed for a certain set-top box and these devices became outdated... and the market was very small... so, we quit the operations there" we coded this as a terminated relationship. Thereafter, we sought to discover and identify the motivations for the networking (i.e. the rationale) from the case history.

Thirdly, we traced technical and strategic bottlenecks from the data, using Baldwin's (2015) definitions. If the nature of the problem was technical, as in "In the US market, we had problems with the return channel in a cable TV network," this was coded as a *technical* bottleneck. By contrast, if the problem was based on, for instance the decision making or processes of a partner, as in "Testing and piloting require a huge amount of bureaucracy," this was coded as a *strategic* bottleneck. By progressing in this manner, we were able to establish causal links between the development of the digital service and internationalization. This was assisted by organizing the connections within tables;

these revealed the foreign market entries, the networking activity, and the bottlenecks (Miles et al., 2013).

In the final phase, we followed the guidelines of Eisenhardt and Graebner (2007), seeking to convey the empirical evidence in as faithful a manner as possible. We wrote down the entire case story, with supporting quotations, as a longitudinal narrative. Thereafter, we used the tables developed during the data-coding phase (Miles et al., 2013), together with the case narrative, to link empirical evidence to the emerging theory. This helped us to keep the empirical findings and theory at the forefront of the article (Eisenhardt & Graebner, 2007).

4. Description of the case firm, the case narrative, and findings

In this section, we first present the background of the case firm, followed by the foreign market entries in chronological order as a case narrative. Thereafter we present the key findings based on our research questions. Table 3 presents internationalization of the case firm through different delivery channels (partners) as a proxy to internationalization as we cannot show actual percentage of foreign sales due to confidentiality. It should be noted that the table describes internationalization through commercialization of the service in different countries whereas international operations (for content acquisition) started already in 2000. Countries in the list refers to the main market of the partner because depending on the contract and license agreements with game publishers, they might have operators also in other countries.

Year	Delivery channel	Country
2004	Broadmedia	Japan
2005	CYTA	Cyprus
2010	SFR	France
2012	Orange	France
2013	COX	USA
2013	NTT Plala	Japan
2014	LG	Japan
2014	Sharp	Japan
2015	J:COM	Japan
2015	Deutsche Telekom	Germany
2015	VMG Media	Vietnam
2016	Apple TV	Several countries
2016	Google Android	Several countries
2016	Apple iOS	Several countries

2016	Amazon Fire	Several countries
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Table 3. Internationalization of the G-cluster through different partners.

4.1. The establishment and inception of operations

G-cluster's business idea based on an interactive cloud gaming platform that can be used to provide games-on-demand services. Traditionally, video games are installed from a diskette or downloaded from the Internet, onto a computer or a game console that runs the game. In the digital service provided by G-cluster, games are run on a cloud platform. The platform is operated by a cloud game server that sends the game content to the devices of the end-users, over the broadband network. Thereafter, the clients' devices receive the game content, display the game, and send users' commands back to the server. Thus, players do not need to install or download the game to a device. This also enables that the server running the game and the player who play the game are geographically in different location.

G-cluster's business idea presented a fairly radical change to the video gaming market. It was an idea with huge business potential. Nevertheless, its implementation in practice faced several difficulties, notably the fact that the resources needed for the service were not available in Finland at the time. The first difficulty was set by the broadband connections (i.e. at the network layer). In 2000, broadband connections were far too slow in most countries to transmit a real-time bit stream without latency. This severely limited the number of potential target countries. Consequently, G-cluster started to looking for countries where the broadband connection was fast enough to handle Internet Protocol Television (IPTV)¹⁰ services. IPTV technology uses two-way communication over the broadband network, and if the connection is fast enough for IPTV services, it should be able to handle G-cluster's gaming service as well. The CEO commented on this in 2005, as follows:

“We had a strategy to approach operators that already had or were planning to launch IPTV services. It is a basic requirement that the network should have the capacity for video-on-demand services... If we think about the nature of our product, the technology that enables it is available in Japan and in South Korea... In Europe, there are no such fast networks available. We cannot set up a server in Helsinki and then serve the whole of Europe. It requires a huge number of servers that are located near to end-users.”

¹⁰ Network and telecom operators can use IPTV to deliver interactive digital services such as video-on-demand services over the broadband network.

The second challenge was to convince IPTV operators of the potential of the new service and to get IPTV operators to install G-cluster's client software¹¹ on their set-top-boxes. As a small firm, G-cluster lacked credibility in negotiating with large operators. In many cases, the negotiation process was very slow, and the decision making was bureaucratic. The third challenge was related to the acquisition of content for the service. To acquire content, the firm needed to establish relationships with game publishers. As these resources were not available in Finland, they had to enter international markets, and to network with firms that would provide the resources needed for the different layers (device, network, and content) of the layered modular architecture in question.

4.1.1. The UK from 2000 to 2008. In 2000, G-cluster established an office in London, UK, to acquire content for its game service. London is one of the centers of the video game industry, and most of the game studios and game publishers have a strong presence there. The main aim of the office was to establish relationships with game publishers and to license game content for its gaming service. The market entry was successful for this purpose, as G-cluster was able to open new contacts with European and North-American game publishers, and later also with telecom operators and set-top-box manufacturers. The CEO explained the firm's entry into the UK market as follows:

“The main reason why we established the presence in the UK was that it is one of the centers of the games industry. Game publishers had their offices there, so it was a good place to acquire content [games for the service] and to make contacts with the publishers.”

Networking with content providers was challenging: G-cluster's business idea was very novel, and G-cluster did not have an existing market for the games. Extremely active networking was required, with G-cluster having to demonstrate the potential benefits of its business model for the content providers. In seeking to convince the content provider, G-cluster explained that its business model would help in avoiding piracy: since the game content would be run in the cloud environment, the end-users would not acquire the game code. Second-hand markets would be avoided, as the customers would not be able to resell the games. In addition, the business model would enable more durable markets for the games, with flexible revenue models, such as pay-per-play or monthly subscription. G-cluster maintained an office in London until 2008, when the office was moved to France.

¹¹ Client software is software that communicates with a server running the service. For instance, if a user wants to read Amazon's eBooks via mobile phone, he/she has to install Kindle application (client software) on the mobile phone.

4.1.2. *Japan, from 2003 onwards.* After acquiring content for its service from the UK, G-cluster was looking for markets in which it could commercialize its service. However, the markets were limited to countries that had a broadband connection fast enough for its service. Through a partner who had developed software for IPTV operators in Japan, G-cluster became aware that there were large-scale IPTV projects under way in Japan. This – together with fast broadband connections and a large customer base – made the Japanese market very attractive. In addition, the high population density meant that distances from the servers running the games to the end-users were relatively short. This decreased the latency, thus improving the gaming experience and overall customer satisfaction.

Although G-cluster got to know a potential IPTV operator in Japan through its partner, it took an active role in networking, deliberately building relationships with the operator in question. During this process, G-cluster was able to convince the operator of the benefits of its gaming service. The representative of Japanese IPTV operator explained this in 2010, as follows:

“We created the first IPTV video-on-demand service in this country several years ago. I was invited to a conference to make a keynote speech about our service. The CEO of G-cluster and a few other people from the firm were there. After the conference, they gave me a call and we had a meeting. I was amazed by the technology, and by the fact that they had created it without having enough broadband capacity in Finland at that time.”

The partnership was based on the benefits of the gaming platform that G-cluster was able to demonstrate. For the operator, these benefits included an opportunity to extend its existing service portfolio, to differentiate its offering from competitors, and to gain more revenue.

The business model of G-cluster attracted an extensive interest in Japan and in 2003, Japanese holding company (who also owned the IPTV operator in Japan) acquired the share capital of G-cluster. Consequently, in 2004, G-cluster moved its headquarters to Japan. However, despite the change in ownership, G-cluster continued as an independent firm, and its research and development activities stayed in Finland. The new owner helped G-cluster to build relationships with the IPTV and other network operators in Japan and integrate G-cluster’s client software for different devices (PC, Mac, set-top-box), so that a maximum range of players had access to the service. G-cluster was also able to benefit from the well-known brand of the new owner in its marketing activities. The headquarters in Japan took care of the marketing activities, licensing game content for the service from Japanese game publishers, and building up business development and customer support activities in Japan. At this stage, G-cluster had all the resources it needed in the different layers of the layered modular architecture, and it was able to commercialize the service.

4.1.3. *Cyprus, 2005-2010.* After commercializing the service in Japan, G-cluster started looking for new foreign markets for its service. The slow broadband connections in several countries continued to limit larger-scale commercialization of the service. In 2005 G-cluster launched its gaming-on-demand service in Cyprus, together with a local operator. The market entry was implemented with the assistance of G-cluster's partner from the UK, who was selling an IPTV system for the local telecom operator. In other words, G-cluster's partner was able to convince the local operator of the value of the gaming service. G-cluster avoided technical bottlenecks with the broadband connections. This was because Cyprus is relatively small island, so that the distance between the servers running the games and the players was relatively short. Hence, even though the speed of the broadband was not particularly rapid in 2005; the network enabled adequate Internet connections. However, the technology used for the service became outdated in 2010, and because of the small size of the market, G-cluster and the telecom operator decided to close the service.

4.1.4. *France, 2008 onwards.* The market entry to France was based on its market potential and highly developed IPTV infrastructure¹². Towards the end of 2005, G-cluster began an active search for potential IPTV operators in the French market, and established relationships with them. In 2006, G-cluster started developing the service, in cooperation with the local telecom operator, and in 2008 it established its own office in France. After the office was established, the firm moved its activities in global content acquisition from London to Paris. The office also functions as a marketing and sales unit for European markets and manages customer relationships. In 2010, The CEO rationalized the reason for market entry to France as follows:

“In France, there is one of the most developed IPTV markets in the world. There are several network operators that have a lot of IPTV customers. In addition, they have very advanced broadband connections in France. Paris is also one of the centers, in addition to London, where most of the game publishers have their offices.”

G-cluster found two telecom operators from France who were willing to commercialize its gaming service. The first operator was found through its own active networking, while the second partnership came with the help of a partner, who was selling servers for telecom operators. The development of the relationships was demanding and time consuming, as IPTV services were at an early stage of

¹² From 2005 onwards, France has aggressively developed its IPTV network, and it is one of the leading countries in the world in IPTV adoption <https://gigaom.com/2012/12/18/why-france-leads-the-iptv-world-but-isnt-winning-the-race/>

development in 2006. The telecom operators were bringing out video-on-demand services for their customers, and they were very cautious about risking their reputation by introducing new services that were insufficiently tested. Thus, much time was spent in the negotiation and testing of the service before the telecom operators were willing to launch G-cluster's gaming-on-demand service – despite the fact that the gaming service brought considerable extra value for the operators' consumers. Finally, the cloud gaming service was commercialized with the first partner in 2010 and with the second partner in 2012. In 2010, the CEO explained the difficulties with the telecom operators as follows:

“Implementation of our service is technically very easy, but getting our client software into telecom operators' set-top-boxes is a very slow process. It is not a technical thing, it is more related to the telecom operators' policy and product management, and it always involves several people making decisions. It is an unbelievably slow and time-consuming process. And when you get the deal, you have to wait for their next software update schedule and before that, they have to test all the upcoming software, and the interactions of the components.”

4.1.5. *The USA, 2008-2010 and 2013 onwards.* G-cluster established a subsidiary in the USA in 2008. The main reason for the market entry was the huge market potential. There were several cable TV providers providing a video-on-demand service, and this made the market attractive. In the USA, G-cluster cooperated with a global video-on-demand technology provider, who helped G-cluster to establish relationships with cable TV providers. This relationship was established in an exhibition in which G-cluster was actively looking for new partners for USA market entry. After establishment of the subsidiary in the USA, G-cluster faced problems when its partner tried to integrate the gaming service with the video-on-demand service of local cable TV providers. In the first place, the return channels from the users (the game players) to the servers running the game proved to be too slow. Cable TV was originally designed for one-way TV broadcasting; the return channel was only added later. The slow speed of the return channel increased latency. Because of such problems, and the global recession, G-cluster closed its subsidiary in the USA in 2010. In that year, the Vice President (software engineering) explained the attraction of the market, and also the main problem in the market, as follows:

“In the USA, video-on-demand services were common already in 2008, and the operators had around 20 million households as their customers. So, the market was very attractive. However, the return

channels [in the cable network] were too slow and unreliable. The network was fast enough for video-on-demand services, but too slow for our games-on-demand service.”

In 2013, G-cluster re-established its operations in the USA. By that time, the broadband capacity and also G-cluster’s product had developed considerably. Together with a new partner in the USA, G-cluster launched its games-on-demand service using an over-the-top (OTT) model. That is, instead of using IPTV or a cable TV network, it started to deliver its games-on-demand service over the public Internet. This new delivery model made it possible to avoid earlier technical problems. In 2012, the CEO explained the new situation as follows:

“From the technology point of view, it is now possible to have cloud gaming activities without having the USA full of data centers. It is enough to have servers in certain places. We have also developed our technology so that it will automatically choose the best possible server, one that is physically close to the customer.”

4.1.6. A new internationalization strategy from 2013 onwards. After commercializing the service in the main markets (Japan, France, and the USA), G-cluster started focusing on a new internationalization strategy. In this strategy, the role of G-cluster was that of a technology provider which licensed its technology (platform). This made the gaming service available to potential partners (telecom operators, digital service providers, etc.) who were willing to add it to their service portfolio. G-cluster was able to implement this strategy because most of the technical and strategic bottlenecks had been removed, and the service had been successfully commercialized in the main markets. In this new strategy, the networking became less controlled, since partners were able to commercialize the service by themselves, and to enter new countries. In addition, partners were able to acquire content for the service directly from content providers. This expanded the networking to an ecosystem level, since different actors (digital service providers and game developers) were now able to join and/or exit freely from the platform. In practice, this new strategy made it possible to commercialize the platform through licensing in all countries that had sufficiently rapid broadband networks. In 2017, the Vice President (software engineering) explained the new strategy as follows:

“In our new strategy, we license our technology to operators and OTT service providers globally... and our existing customers expand the market coverage by internationalizing the service to other countries. Thus, we provide the platform that makes it possible to run the service, and our partners increasingly take care of its internationalization, as well as content acquisition for the service.

4.2. The layered modular architecture and internationalization

The layered modular architecture of digital technology had a strong impact on the case firm's internationalization, given that G-cluster was dependent on resources provided by actors in the different layers of the architecture. The impact of the architecture was strongest in the first two foreign market entries (the UK and Japan) that were realized already before G-cluster commercialized their service. The first foreign market entry to the UK was necessary, in order to acquire content for the service that would enable a pilot version of the service, plus demonstrations to potential partners of how the service would work in a real-life context. The second foreign market entry (to Japan) made it possible to acquire the resources needed for the two missing layers (the network and device layers). Firstly, G-cluster needed access to a broadband network that is fast enough to deliver their gaming service over the Internet. Secondly, they needed a device that gives an access to the end users to the games. The foreign market entry to the Japanese market enabled access to these resources and enabled commercialization of the service in Japan. Thereafter the following market entries were mostly dependent on the actors (the telecom operators) at the network layer. That is, during 2000-2010 the capability of telecom operators to deliver real-time content over the broadband networks largely determinate the countries where G-cluster was able to internationalize their operations. However, 2013 onwards, when the broadband technology developed further and the networks became faster, G-cluster was able to use operator independent OTT model that facilitated further internationalization. In 2005, the CEO commented on the requirements that should exist in a potential target country, before market entry would be possible:

“We have three kinds of technical requirements [in order to implement the service in a target country]. Firstly, the broadband has to be fast enough from the server to the end-user. Secondly, the latency has to be very small. Thirdly, the connection has to be bidirectional.”

In 2016, the CEO explained the benefits of new technology as follows:

“We are now able to commercialize our service by using OTT model... it is not tied to a certain telecom operator. It is new way to deliver content and it was not available e.g. when we operated earlier in the USA (2008).”

4.3. Networking undertaken to acquire resources for different layers of the architecture

Table 4 helps us to trace (i) how G-cluster used different kinds of network relationships for foreign market entries, (ii) the rationale behind the networking, and (iii) the resources exchanged in the network relationships. The most important countries (the UK, Japan, France, and the USA) were entered by using active networking and opportunity seeking behavior to acquire the resources needed. The first two countries (the UK and Japan) were important for commercializing the service. Active networking was needed, as there were no existing relationships that would have helped them to enter these countries. Because of this, the partners in the target countries were contacted directly, with efforts to convince them of the value of the new gaming service, and demonstrations of how it would benefit their business (as content providers and network operators). These value propositions were used to exchange the resources that G-cluster needed for the different layers of the architecture. Thereafter, the two biggest markets for the service (France and the USA) were entered in a similar manner. In these market entries, the rationale was related to the developed IPTV infrastructure (in France), and to the huge market potential (in the USA). In these markets, partners were convinced of the gaming service through demonstrations of how the service would bring extra value to the IPTV and cable TV providers' traditional service offering. The CEO explained the value of the service for the operators in 2005:

“Most of the operators are in a market situation where they send a letter to customers saying that they have doubled the connection speed of the broadband network and decreased the price of the connection. So, in this kind of situation it is difficult to increase revenue. However, value-adding services such as video-on-demand and our games-on-demand services are one way to increase the offering and the revenue.”

The Cyprus market was entered via reactive networking by recognizing new opportunity through indirect network relationship that was initiated by G-cluster's existing partner operating in Cyprus. Although the market for the service in Cyprus was fairly small, it made it possible to acquire more experience, and to gain feedback from the service. Furthermore, G-cluster needed only access to the telecom operator (at the network layer) in Cyprus to commercialize the service. In return, G-cluster was able to provide added value for the network operator's services.

Some of the relationships proved non-beneficial and were terminated. This happened in Cyprus, where the technology became outdated and renewal was unprofitable. In the USA, partnership with a cable TV provider was wound up because of technical problems, which prevented smooth usage of

the service. The network relationships that became non-beneficial led to an exit from the market in Cyprus, and to de-internationalization from the USA, prior to a more successful re-entry in 2013.

Market entry / year	Networking	Rationale	Resources acquired	Resources provided
The UK 2000	Active	-To acquire content for the content layer from games publishers	-Game content for the service	-Value proposition to extend markets for the publishers' games
Japan 2003	Active	-To enter markets that would enable commercialization of the service -To acquire resources for the content, the network, and the device layers	-Game content for the service -Delivery channel for the games (through the network operator) -Access to the devices (client software for PC, Mac, and set-top-boxes) via operators and OTT	-New business opportunities and content for network operators -Value proposition to extend markets for the publishers' games
Cyprus 2005	Reactive	-The partner opened up a business opportunity to commercialize the service	-A delivery channel for the games through a local network operator	-New business opportunities and content for network operators
France 2008	Active	-Development of the IPTV market created business potential	-Game content for the service (the content layer) -A delivery channel for the games (through a network operator)	-New business opportunities and content for network operators -Value proposition to extend markets for the publishers' games
The USA 2008	Active	-Business potential -A partner opened up a business opportunity to enter cable TV networks in the USA (2008-2010) -A partner opened up a business opportunity in the USA via the OTT model	-Delivery channel for the games -Access to the device layer (TVs) via the OTT model	-New business opportunities and content for cable TV and network operators

Table 4. The network relationships and resources exchanged during internationalization.

4.4. Technical and strategic bottlenecks in internationalization

The technical bottlenecks were mostly related to the network layer, and in particular had slowed broadband connections for the service. This limited potential target countries to those where rapid broadband connections were available. In this situation, G-cluster was dependent on IPTV providers who could ensure the functionality of their broadband, from the servers to the end-users. However, once the technology developed sufficiently, the service could be brought into the market via an operator-independent OTT model, in 2013.

Strategic bottlenecks were encountered in all the layers of the architecture. First of all, the operators in the network layer controlled access to the network, and to the device layers. G-cluster had to convince the network operators of the benefits of the service, since it was they who worked as delivery channels for the games. The operators also controlled the set-top-boxes in which G-cluster had to install its client software. These strategic bottlenecks slowed foreign market entries, as negotiations with the network operators were time consuming. However, the only way to get the service into the market was to surmount these bottlenecks. Secondly, the gaming content (at the

content layer) which G-cluster acquired from the games publishers had various intellectual property (IP) protections set by a number of IP rights holders. These slowed down the internationalization process, since the license agreements for the gaming content required negotiations and legal work to ensure that there were no infringements for the IP holders in question. Some of the license agreements also limited geographical delivery of the games, thus preventing internationalization. The previous CEO commented on this in 2013:

“Lawyers have to always check and ensure that there are no agreements that are against our usage, and that the rights are not reserved for someone else, or for exclusive usage. In the gaming industry, these kinds of agreements are very complex, and developers have reserved rights for all possible platforms, now and in the future.”

5. Discussion

In this section, we first discuss the findings of this study, in relation to the research questions highlighted in the introduction. Thereafter, we present a preliminary internationalization model for digital platform providers.

5.1. The role of layered modular architecture in the internationalization process

This study indicates that the early internationalization and subsequent foreign market entries of digital platform providers are governed by layered modular architecture (Yoo et al., 2010). We can theorize that the possibilities to internationalize the platform are largely dependent on the platform provider’s capability to replicate a workable architecture stack in a target country. This means that if the resources for the architecture stack are available in the home country, a platform provider can commercialize the service. Thereafter, the provider can replicate the architecture stack in other markets in which the necessary resources are available. However, in the case that resources are not available in the home country, the platform provider will have internationalized its operations even before it can commercialize the service. This would suggest that the international evolution of platform providers is initially resource-driven before it becomes market-driven. In such a context, RDT has more merits than traditional step-wise internationalization models (Bilkey & Tesar, 1977; Cavusgil, 1980; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975; Luostarinen, 1979). It would seem that for platform providers, dependency on external resources governs internationalization and foreign market entry more than environmental familiarity with neighboring

countries (cf. Oviatt & McDougall, 1994, 2005), as highlighted in traditional internationalization models. Thus, digital platform providers may enter distant countries at a very early stage to acquire crucial resources.

5.2. Access to external resources for developing layered modular architecture

The present study shows (i) how a digital platform provider may enter into foreign networks, (ii) the rationale behind the networking, and (iii) the resources that are exchanged within this process. Our findings suggest that the first target countries are entered by actively networking with partners who control or own the resources needed (cf. Johanson & Vahlne, 2009). The rationale behind the networking is to obtain the resources needed for the architecture. The exchange of resources is based mainly on a value proposition concerning a new service that has the potential to bring extra value to a network operator's current service offering. When these resources are found, and when the service is commercialized, the rationale for the networking changes to one of global market expansion. After commercialization, the growth of the networks becomes less controlled, since the partners are able to enter and exit the service freely. In other words, network growth expands to the level of an ecosystem, in which firms are able to use the service independently of each other (cf. Adner, 2012; Autio et al., 2017; Eaton et al., 2011; Tiwana, 2015).

5.3. Technical and strategic bottlenecks governing the internationalization process

Our findings indicate the important role of technical and strategic bottlenecks (Baldwin, 2015) within the internationalization process. It has been recognized in previous studies that there is a deep connection between innovation through technological advancements and new venture internationalization (Evers et al., 2016; Keen & Etemad, 2012). Going beyond this, our findings shed light on the relationship between technology and internationalization by demonstrating that the internationalization of digital platform providers is moderated by a variety of technical and strategic bottlenecks in the market. These bottlenecks restricted the case firm in building a workable architecture stack and creating a multi-sided market; because of this, foreign market entry was limited to certain countries, and this slowed down the internationalization process. Based on our findings, technical bottlenecks seem to be most relevant in the early phase of internationalization, whereas strategic bottlenecks limit internationalization in the later phases. Altogether, the findings suggest that bottlenecks have a significant role in the internationalization of digital platform providers. They act as entry barriers, going beyond the factors of cultural, psychic, and geographical distance

highlighted in previous internationalization literature (Ellis, 2008; Ojala, 2015) and theories (Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975).

5.4. Extending the INV phenomenon to digital platform providers

The internationalization of digital platform providers shares some similarities with INV theory and related literature, but it also involves some distinct differences. For this reason, we present a model that extends the INV phenomenon to encompass the internationalization of digital platform providers. Figure 2 illustrates the model. Within it there are four different phases: (i) establishment, (ii) early internationalization, (iii) commercialization, and (iv) globalization. These are described below (see also supporting summary, Table 5).

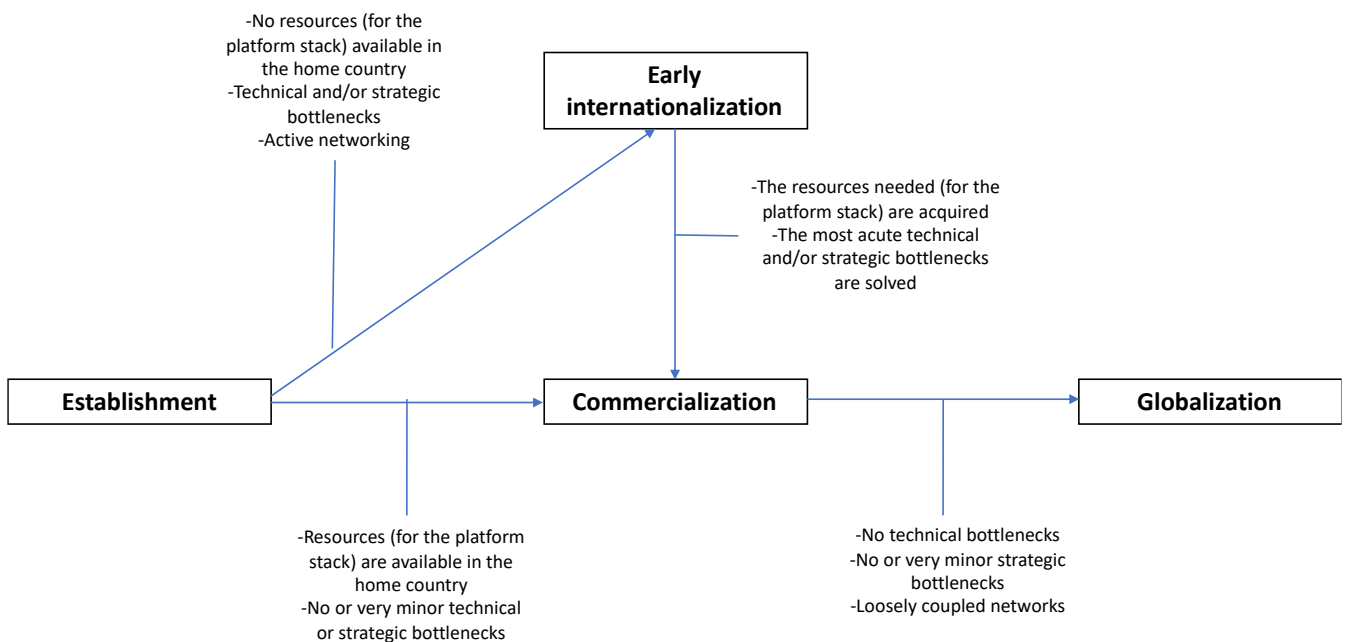


Figure 2. A preliminary internationalization model for digital platform providers

In the *establishment* phase, a firm is established, and the digital platform provider can start to look for ways to commercialize the platform (at the service layer), generate multi-sided markets, and make the platform available to global markets. The possibilities to commercialize the platform are highly dependent on the resources required for different layers (device, network, and content) of the

architecture stack (cf. Yoo et al., 2010). If all the necessary resources are available in the home market, and if there are no technical or strategic bottlenecks (Baldwin, 2015), the platform provider can move directly to the commercialization phase. In a contrary situation, the provider must move to the early internationalization phase in order to find the resources needed to commercialize the service and to overcome potential bottlenecks. As can be seen in the case study, G-cluster faced challenges, especially in finding content and broadband (cf. Andersson et al., 2014) sufficiently reliable to commercialize the service.

In the *early initialization* phase, efforts at foreign market entry focus on countries in which the missing resources (cf. Pfeffer, 1987; Wernerfelt, 1989) for commercialization may be obtainable. These resources may be for different layers of the architecture stack (Yoo et al., 2010); thus, they can include content for the service, devices to use the service, or a network to deliver the service. Because the platform provider lacks the crucial resources (cf. Oviatt & McDougall, 1994, 2005) to commercialize and generate multi-sided markets for the service, foreign countries are entered by means of active networking (cf. Coviello, 2006; Johanson & Vahlne, 2009; Ojala, 2009), with a view to finding partners who can provide the missing resources for the architecture. In this phase, a firm has to convince its partners about the technical capability of its platform, and the possibilities to generate economic value to all the actors participating in the multi-sided market in question (cf. Evans, 2011; Parker et al., 2016). Within the early initialization phase, there are several technical or strategic bottlenecks that have to be resolved in the different layers of the architecture. The digital platform provider has to solve such bottlenecks before there can be any further movement and commercialization of the service. When all the necessary resources have been acquired, and the most critical bottlenecks resolved, the firm is able to move to the commercialization phase. As the case findings demonstrate, G-cluster had a lack of resources to commercialize its platform. Consequently, it internationalized its operations to the UK to get content for its service (for the content layer). Thereafter, it entered the Japanese market to overcome a technical bottleneck related to slow broadband connections (at the network layer) in most countries. Hence, the availability of a fast and reliable Internet connection had a critical role (cf. Andersson et al., 2014; Czernich et al., 2011) in establishing multi-sided markets around the platform.

In the *commercialization* phase, the firm brings the service to the market. The aim is to find markets that will provide a large customer base for the service. These markets are entered by networking actively (cf. Coviello, 2006; Johanson & Vahlne, 2009; Oviatt & McDougall, 2005) with partners who can provide sufficient resources (cf. Barney, 1991; Pfeffer, 1987; Wernerfelt, 1989), and the capability to expand the availability of the service in the target country. Here, the firm needs to convince potential partners of the commercial benefits, economic value, and potential of the

platform to initiate multi-sided markets (cf. Evans, 2011; Parker et al., 2016). In this phase, it is important to solve strategic bottlenecks, in addition to any remaining technical bottlenecks, before the firm can fully globalize the service and move to the globalization phase. As the case findings show, G-cluster was dependent on telecom operators, since these had control of broadband connections, and consequently, access to the end-users in target countries. To surmount this strategic bottleneck at the network layer, G-cluster brought its own cloud gaming console to the market. This allowed the firm to make the service available widely and to expand the offering to other countries.

In the *globalization phase*, the service is fully commercialized, and most of the technical and strategic bottlenecks are resolved. In this phase, the platform becomes mature and globally accepted. The firm can focus on licensing the platform on a global basis, so that content providers, delivery channels, and users everywhere can join and exit the service, irrespective of their geographical location. In this phase, the platform reaches the ecosystem level (cf. Adner, 2012; Autio et al., 2017; Eaton et al., 2011; Tiwana, 2015), within which the network relationships are only loosely coupled and controlled. The transition from tightly controlled networks to loosely coupled ecosystems occurs when a platform provider has: (i) successfully developed network relationships with firms controlling important resources (Johanson & Mattsson, 1988, 1992; Johanson & Vahlne, 2009; Oviatt & McDougall, 2005), (ii) has gained access to these resources (Pfeffer, 1987; Wernerfelt, 1989), (iii) and reconfigured the acquired resources (Amit & Han, 2017), so that the technical and strategic bottlenecks (Baldwin, 2015) are removed, and multi-sided markets can emerge. Table 5 illustrates the elements identified, using examples from the case study. Thus, when technical and strategic bottlenecks were resolved, G-cluster was able to license its technology to other firms (partners) who were willing to add it to their service portfolio. Thereafter, these licensees started to internationalize the service further by making it available for their customers in different countries.

Phases	Theoretical concepts	Activities	Empirical examples
Establishment	- Resource dependency	- Firm is established - Firm brings its idea/innovation to the market at the service layer - Resources are needed for other layers (device, network, and content) to generate multi-sided markets	- New idea to bring video games to the market by using cloud computing technology (at the service layer)
Early initialization	- Resource dependency - Active networking - Resource exchange - Technical and/or strategic bottlenecks	- Foreign market entries focus on countries where the required resources (especially for the content layer) are available	- Foreign market entries to the UK and Japan made it possible to acquire resources for the layered modular architecture

		<ul style="list-style-type: none"> - Countries with the required resources are entered via active networking - Technical bottlenecks have to be resolved 	<ul style="list-style-type: none"> - The solution of technical bottlenecks played the major role
Commercialization	<ul style="list-style-type: none"> - Active networking - Resource exchange - Layered modular architecture (strategic bottlenecks) 	<ul style="list-style-type: none"> - Foreign market entries focus on countries that have a large market for the service - Countries with large markets are entered via active networking. - Strategic and technical bottlenecks have to be resolved at different layers of the architecture 	<ul style="list-style-type: none"> - Foreign market entries to France and the USA enabled the firm to commercialize the service on a large scale - Finding solutions for the remaining strategic and technical bottlenecks
Globalization	<ul style="list-style-type: none"> - Loosely and less controlled networks - Ecosystems 	<ul style="list-style-type: none"> - Foreign market entries are less controlled or planned. - Networking becomes less controlled and relationships become loosely coupled ecosystems 	<ul style="list-style-type: none"> - Licensing the service to partners (other service providers) - Partners internationalize the service to new foreign markets - Different actors may globally join or exit from G-cluster's service, controlled by different partners

Table 5. The phases of the theoretical model

6. Conclusions

This longitudinal case study makes several contributions to the development of INV phenomenon (Oviatt & McDougall, 1994, 2005) as it touches on the internationalization of digital-based INVs. First of all, the study extends the network theory of internationalization (Johanson & Mattsson, 1988, Johanson & Vahlne, 2009) to digital platform providers. So far, the network theory of internationalization has mainly been applied to traditional left-to-right value chains and to the establishment of relationships which are based on reciprocal commitment (Johanson & Vahlne, 2009), and which offer mutual benefits to both parties (Johanson & Mattsson, 1988). Here, we expand this view to multi-sided markets in which the resources and benefits of the network have to be shared among all the parties that provide value for the platform. This study also demonstrates how INVs can extend their resource base (cf. Johanson & Vahlne, 2009) through collaborative network relationships (Freeman & Cavusgil, 2007), and how they exchange important resources with partners. Furthermore, we highlight the importance of an ecosystems perspective (cf. Cavusgil & Knight, 2015), by demonstrating longitudinally how the networking activity changes from active and tightly controlled

networking towards more passive and loosely controlled networking, as the platform reaches the ecosystem level.

Secondly, we contribute to RDT (Hillman et al., 2009; Pfeffer, 1987; Pfeffer & Salancik, 2003) in the context of the internationalization of digital platform providers. Although the importance of a range of resources has been established in INV literature (Oviatt & McDougall, 1994, 2005), we extend this by demonstrating how and why digital platform providers are dependent on a range of resources that they must acquire in order to internationalize and build global multi-sided markets. We further show how other firms, who control important resources at different layers of the platform architecture stack, can create technical and/or strategic bottlenecks for the platform provider, significantly inhibiting the latter's internationalization process. We accept that the network theory of internationalization and RDT are valuable theoretical concepts in explaining how INVs can increase their dependency on other actors within the architecture stack, and overcome a lack of important resources. Nevertheless, INVs must also be able to build their own resources, in such a way as to tackle technical or strategic bottlenecks, given that not all the resources may be available through networks.

Thirdly, by integrating insights from the network theory of internationalization and RDT with IS literature (e.g. Yoo et al., 2010), we extend the INV phenomenon to digital-based INVs by developing a preliminary model of digital platform providers' internationalization. The model differs from previous internationalization models and theories (e.g. Johanson & Mattsson, 1988; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975; Oviatt & McDougall, 1994, 2005) in many respects. Firstly, the model shows how internationalization of digital-based INVs evolves when the firms develop their platform by bringing it to global multi-sided markets. It therefore diverges from previous models and theories by demonstrating how internationalization might start before a firm commercializes its service and acquires international customers. Secondly, our model focuses on the kind of internationalization process in which a firm has to orchestrate the internationalization by considering both supply and demand sides, to create a global marketplace in which several actors contribute to the economic value of the platform. Such multi-sided market aspects have been largely missing from extant IB models and theories. Thirdly, the model demonstrates how digitalization, the underlying architecture (e.g. the Internet, a range of devices), and technological evolution create possibilities – but at the same time set limits to the global expansion of digital-based INVs. These technical perspectives have largely been ignored from previous literature and theories on INVs (see e.g. Knight & Liech, 2016).

6.1. Limitations, and further directions for research

There are several issues to be considered in evaluating our findings. In the first place, even if the research method applied makes it possible to collect in-depth data and to gain a detailed view of the case in question, the exploratory single case method inevitably requires caution concerning how far generalizations can be drawn. Secondly, the present study focused on a digital platform provider in the video game market. It should be noted that digital services vary (Thomas et al., 2014), depending on the underlying technology and market structure, and that these aspects may impact on the ways in which the service providers internationalize. Thirdly, we believe that the availability of resources and enabling technology may govern how rapidly a firm can bring its service to the global market. It will be important to study these factors in the future, in conjunction with any attempt to generalize the findings of this study. Furthermore, there can be differences, depending on whether a digital service is developed by a well-established firm, or by a new venture that has built up its business from scratch. Fourthly, we studied the networking process as it relates to opportunities to gain access to external resources. However, commitment to the networks in question (Johanson & Vahlne, 2009) had only a minor role in our analyses. It would be interesting to study how digital platform providers and other digital-based INVs commit and develop trust with partners in the market, which is in many respects turbulent and fast-changing. Finally, our research supports the notion that digital platform providers' internationalization relies critically on a process of resource exchange that occurs in interorganizational linkages with foreign partners to overcome resource limitations, capability shortages, and bottlenecks (Lu & Beamish, 2001). However, despite widespread acceptance of networks as an effective pattern for smaller firms to go global (Coviello & Munro, 1995), little is known of the dynamic mechanisms that support the establishment, management, and co-ordination of global interfirm linkages and resource sharing processes.

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