

# How do practitioners understand external platforms and services? A Grounded Theory investigation

**Anar Bazarhanova**

*Aalto University  
Espoo, Finland*

*anar.bazarhanova@aalto.fi*

**Jesse Yli-Huumo**

*Aalto University  
Espoo, Finland*

*jesse.yli-huumo@aalto.fi*

**Kari Smolander**

*Aalto University and Lappeenranta University of Technology  
Espoo and Lappeenranta, Finland*

*kari.smolander@lut.fi*

## Abstract

In this article, we investigate how practitioners understand external platforms, whose core offering is shared and utilized by a number of heterogeneous and interconnected organizations in an ecosystem. We especially look into situations where organizations wish to extend their own capability instead of building services that extend the functionality of the platform. Such dependencies to external platforms can be envisioned as the contemporary evolution from traditional outsourcing service models. We interviewed twenty-four practitioners from eight IT organizations and discovered a considerable ambiguity in understanding of what are the external platforms utilized by the organizations. We further elaborate that the diversified meanings that various stakeholders give to the concept of external platforms, can hinder efficient communication and may have implications on important strategic decision making.

**Keywords:** External platforms, industry platforms, ecosystems, dependencies, integration

## 1. Introduction

There is a growing interest on platform thinking [11, 22, 23, 54], which has resulted in a cumulative knowledge on platform ecosystems and their governance [17, 19, 31, 53]. However, there are fewer attempts to investigate the companies that are not dominant players [25, 30, 37], but need to integrate to various infrastructures and platforms to sustain or extend their business capabilities [49]. These non-focal firms, from the viewpoint of platforms, are platform-utilizing businesses that do not develop platform capability extensions, have no influence on the platform whatsoever, but depend massively on it. Our research focus departs from the majority of contemporary platform ecosystems research in two aspects. First, we position non-focal actors - subordinate ecosystem participants that are not in the position of power and control to influence the changes in the ecosystem, at the centre of our attention. Second, we are interested in integrations with external platforms - when the core offering of the platform is shared and utilized by a number of heterogeneous actors to build services that extend not the functionality of the platform, but their own capability. For example, the travel management industry has platforms that are jointly established by one or many large organizations and then opened to other businesses of any size. Various infrastructures and platforms are constantly evolving, proliferating and becoming more integrated [19]. Blockchain and Internet-Of-Things will bring integrated platforms that force firms to utilize them without any control of the platforms. As platforms grow bigger and form monopolies, smaller firms are constrained to interact with big players. This can be explained as an indirect or cross-side network effect [42], i.e., the more users the platform has, the more valuable it is for platform-utilizing firms. Once firms integrate into a

platform ecosystem, they become dependent on the decisions of the platform owner, which is similar to vendor lock-in.

Success of many businesses in the future is dependent on their ability to leverage the power of innovations coming from the outside, which are often global, remote and dynamic. A new breed of outsourcing has already appeared – the external platform dependency, which can emerge as a monopoly-like industry platform, integration with which is critical to the thriving of a non-focal actor. An example of public API program shutdown at Netflix shows high volatility of the platform and its boundary resources. The significance of dependencies to external platforms is not yet well understood from the viewpoint of platform users. We address this gap by analysing how practitioners give meaning to their integrations with external platforms. Our main research question is: *How do practitioners understand external platforms utilized in their firms?* The meanings and definitions of external platforms among stakeholders within and across organizations are interpreted into higher level conceptualizations. Grounded Theory with no a priori hypotheses was used as the inductive research method.

## 2. Background

There are a number of studies on platforms evolution [28, 52] their governance [35], the leadership [22] of big players like Google [32, 36], Amazon [54], Apple [14] and organizational decisions to adopt platform strategies [24]. A number of useful conceptualizations have been derived from platform ecosystems stream of research: boundary resource model [14, 26], studying software platforms as two-sided and multi-sided markets [3, 16, 45], control and openness mechanisms to allow innovation [10, 21] and generativity mechanisms of platforms [28]. The notion “platform” is relative to its design, utility and the environment of its use, which could often cause confusion. We adopt the definition of Parker & Van Alstyne [42] and define a digital platform “as the components used in common across a product family whose functionality can be extended by applications and is subject to network effects” [10, 30].

Gawer & Cusumano [23] categorize platforms in two predominant types: internal or company-specific platforms, and external or industry-wide platforms. The authors define *external platforms* as “products, services, or technologies developed by one or more firms, and which serve as foundations upon which a larger number of firms can build further complementaries”. Throughout the manuscript we imply the aforementioned definition, however, narrowing the focus in two critical areas and discussing about so-called *shared external platforms*. First, the extant literature tends to focus on challenges of platform leaders and their competitors. In this study, we investigate external platforms from the other end i.e., the perspective of non-focal actors. Non-focal actors are ecosystem participants that do not have any control over the offering of an external platform. The second aspect is in the context of platform utilization. Unlike Gawer & Cusumano [23], that discuss about industry platforms as a base for complementary products development *for* the platform e.g., solution extensions built on top of SAP platform that can be sold to third parties, we look at non-focal firms that utilize industry platforms for their own needs. An example case is a popular messenger application WeChat, China’s App for everything, which operates as a platform for providers of payments, bookings management, transport and other services. There the third-party developers of the platform consciously choose to be non-focal, but their initial business intention is to develop complementary products primarily for their own business.

Innovation moves of non-focal actors may be opportunistic at times, due to the need to act fast to tap into new capabilities. Thus, dependencies and long-term consequences created from integrations into platforms are not always fully anticipated. As the relationships between non-focal businesses and platform orchestrators (i.e. owners) can be characterized as asymmetric [43], non-focals are forced to continuously accommodate quick adjustments to changes introduced by platform owners [1]. When the number of reasonable platform choices in the market falls to one or only a few, then that only reasonable choice becomes the *de facto* standard, also known as its dominant design [4]. While many scholars study how the dominant design emerges and platforms become industry leaders, in our research we wish to draw attention to the need for the knowledge on how “ordinary” firms interact with them.

Innovations in software business are found to comprise a mix of internally generated and external solutions [41], in which different stakeholders collaborate or coopete [40]. Organizations can integrate with an external platform to sustain their business when the market is disrupted or to extend their offering by combining various resources. Conventional approaches to competitive advantage, such as the resource-based view [5], where the competitive advantage of the firm can be sustained when it accumulates resources that are valuable, rare, non-substitutable and hard to imitate (VRIN). These resources can be attributed to some valuable, rare, inimitable and non-substitutable [6], resources (data), unique competences (knowledge), services (methods and algorithms) and people (customer base). In the age of Service Oriented Architectures (SOA) and microservices prevalence, more and more actors offer new innovative services by combining and recombining various either internal or external resources. Although the number of unique resources is limited, there can be close to infinite number of various combinations and service mashups [18]. Using the service composability principle software companies might consciously or by chance become dependent on platforms using which they build their innovations.

Semantically, the choice between the concepts of “integrating with” and “integrating into” depend on how equal the two things being integrated are. From perspective of platform owner, all heterogeneous ecosystem participants become part of the ecosystem i.e., integrating the smaller ones into the platform ecosystem. Although non focal ecosystem participants understand their obedient position, zooming in into their innovation habitat, the platform is only one component of their business landscape. When the external platform becomes the infrastructure of the firm, as a consequence, it might become virtually impossible to substitute or eliminate the integration. Cusumano [12] provides a good illustrative example of actors’ integrations with platform ecosystems: real estate agencies or retail shops that build applications that incorporate Google Maps and, therefore, tie their applications to Google’s platform. When firms plan to integrate into a global, multinational and remote platform, their relationships can hardly be called a partnership. Agreements and terms of service may include some standard performance metrics like service availability and response time, but rarely assure responsibility, continuity and business decisions-driven changes. Success of non-focal firms is dependent on their abilities to leverage the platform offering and their organizational response strategies. Research from non-focal viewpoint is almost non-existent thus having a high potential for research and practice.

### 3. Methods

In order to explore the understanding of practitioners on external platforms, we used the Grounded Theory method [27]. We chose this qualitative theory-forming method as the area of interest is complex and the perspective is unexplored. An interpretive research methodology also allows to investigate a phenomenon within its real-life context. Our study commenced with a different research question than we are reporting in this manuscript. Initially, we wanted to investigate how the utilization of external platforms can be explained. We then proceeded with data collection as explained in the paragraph below. During the data collection and analysis we recognized the emerging phenomena – divergent understanding among interviewees. Thus, the findings we report in this manuscript answer the following research question: “*How do practitioners understand external platforms utilized in their firms?*”

We arranged meetings with interviewees for data collection, formulated initial research objectives and interview themes. We chose an exploratory focus with no specific theory in mind. We had discussions with 24 industry experts from 8 organizations. The organizations vary by sectors: telecommunications, finance, software development, research, municipalities and ministries. The company sizes vary from 10 to 40000 employees. The selection of companies was based on convenience sampling [44].

We planned the interviews as semi-structured, more in the form of a discussion. We used the interview instrument as a guide to discuss the topics such as “external platform utilization examples in the company”, “reasons for the integration with this platform”, “problems and benefits of this integration”. The interviews were conducted during the period of 6 months and

lasted between 35 minutes and 95 minutes. The interviews followed the funnel model principle [44] - from open to more specific questions. Each interview began by asking general questions regarding the position of the interviewees, their background, experience and the projects they are managing, and then, proceeding to the questions on external platforms identification. The list of interviewees with their corresponding organization and positions is provided in Table 1. The interviews were conducted face-to-face at company facilities, except one video-conference call with A11 and A22.

We analysed the gathered data with a qualitative data coding and analysis tool, Atlas.ti. The first step of Grounded Theory [50] was *open coding*, where we went line-by-line in each of 24 interviews and labelled the pieces of information. For example, we coded the quote “*but we have almost all of the platforms somehow in-house*” – as attributing the external platform to its physical location outside the premises of the company.

**Table 1.** Interviewees

ID	Industry	Position
A1	Telecom	Head of Enterprise Architecture
A2	Telecom	Director, Corporate Solutions
A3	Telecom	Development Manager, Corporate solutions
A4	Telecom	Chief Digital Officer
A5	Telecom	Manager, Data services
A6	Telecom	Development Manager
A7	Telecom	Head of Online Performance
A8	Telecom	Vice President, Broadband and Entertainment Business
A9	Finance	Head of Point of Sale , Service Engineering
A10	Finance	Head of Quality Assurance, Merchant Services
A11	Finance	SVP Digital Innovation
A12	Finance	Senior Manager, Digital Practices
A13	Ministry	Development Manager
A14	Ministry	Main Architect
A15	Ministry	Service Manager
A16	ISV	Development Manager
A17	Research	Main Architect
A18	Research	Architect
A19	Research	IT Services Manager
A20	ISV1	CEO
A21	ISV2	CEO
A22	ISV2	CTO
A23	Municipality	Project Manager, Head of e-services Program
A24	Municipality	Main Architect

We extracted quotes from all transcriptions that we believed were relevant regarding the research topic such as the names of the platforms that interviewees identified as external platforms. The next step was *axial coding*, where we systematically browsed through the open codes to find the relations between them, merged or disaggregated relevant concepts. Table 2 presents the examples of what the interviewees identified as “external platform” – open coding data, labelled with the corresponding axial coding indicative concept e.g., physical location, lack of customization, outsourced solution. Our goal was to let the understanding of the phenomenon emerge from the interviews. Finally, in *selective coding* we selected and described the core category, “external platforms interpretations” in the light of other categories.

**Table 2.** Interview findings

<b>ID</b>	<b>External platforms identified examples</b>	<b>External platform is primarily a/an ...</b>
A1	“but we have almost all of the platforms somehow in-house” “SalesForce would be that kind of [external] platform”	Instance physically running externally
A2	“You can name any brand and most likely we have it”	Instance from big vendors
A3	Google Azure	Instance from big vendors, Instance for service development
A4	SAP CRM solution	Instance from big vendors
A5	“our BSS solutions, is more or less like a cloud service, but more like a dedicated cloud service of ours, and from my point of view is not a real cloud service”	Instance for service development
A6	-	Instance that is not under direct control, IT outsourcing
A7	“whether that is explicitly external, or, a service that we buy from a company and we integrate to -, there is, like, tons of, different types of providers that we use for, say, uh, order handling, you know, billing systems”	Black box service
A8	CDN platforms	Instance from big vendors
A9	ECR machines, ERP systems, MasterCard, Visa, hardware i.e. payment terminals	Instance that is not developed/maintained by them, IT outsourcing, Instance from big vendors
A10	AWS Real-Time Analytics	Black box service
A11	“But we are not using any AWS, not Google for production services or other kind of open platform trends. I think there is a fair question if we want to extend something on top of something, why should we do that. How much value can that bring us?”	Instance for service development
A12	“That is not really a platform but a service out of the platform”	Instance from big vendors
A13	“What is the role of Facebook in governmental organizations?”	Not under direct control
A14	“Security issues, so we do not really buy that as a service or rely on external service providers”	Instance that is not developed by them, Instance from big vendors
A15	-	Instance from big vendors
A16	“Something like that or, or whatever product that is, that is they are using via web ”	Instance physically running externally
A17	Microsoft, Google, HR platforms, billing, invoicing services	Instance from big vendors, Instance physically running externally, Receiving as a service, IT outsourcing
A18	Billing platform	That is not developed and maintained by them
A19	Capability level platforms	Instance that is not under direct control
A20	Google Transit	The only choice platform
A21	MailChimp, Trello, Office 360	Instance from big vendors
A22	eID platform	The only choice platform, Instance with a limited customization
A23	eID platform	The only choice platform, Connected with APIs
A24	-	Not developed by them

#### 4. Findings: different outlooks on external platforms

One of the first striking observations we noticed was that each interviewee gave different examples of what they considered to be external platforms. Even the respondents from the same organization suggested different cases: A17 discussed about the services from Google, Microsoft and Dropbox; A18 considered their PaaS for billing as the most suitable case, whereas A19 managed to interpret the external platform phenomenon immediately. Table 2 demonstrates example excerpts. From all 24 interviews 9 practitioners recognized immediately what we meant by shared external platforms. The differentiation between dedicated \*aaS models and external platforms was particularly challenging for business-unit professionals. Obviously, the difficulties in distinguishing the specifics of deployment and service models may have been due to incomplete technical expertise; yet, most of the interviewees have had managing and executive positions in organizations that operate in tech industry. An example excerpt, A2: *“Do you know how many external platforms we have? We do not develop anything ourselves”*. This interpretation suggests that external platforms are seen as something the organization did not develop, i.e., software products from various vendors. In contrast, tech-savvy professionals could clearly recognize the distinctions of external platforms and the types of dependencies to them. A5: *“our BSS solutions, is more or less like a cloud service, but more like a dedicated cloud service for Telco [us], and from my point of view it is not a real cloud service[external]”*. Excerpts in Table 2 are provided as illustrative examples. By merging and recombining the labels from the third column we discuss higher level conceptualizations below. To summarize, we identified four categories of disparate interpretations on external platforms.

**Externally deployed.** The most common understanding of external platform is the physical deployment of the underlying physical infrastructure where the platform is hosted. A platform was understood to be external when it is not running in house, but outside of the organization's premises. Hence, the majority of interviewees assume any service from the cloud, i.e., with network access, to be external. Although that is an absolutely valid statement, in our interviews we explained that \*aaS service model imply a dedicated instance for each user organization, where there is a limited, but some control over the instance. For example, organizations may utilize a number of cloud service platforms that are remote by definition, but there is a degree of control over the dedicated instance that the utilizing company has. This category reflects one of the characteristics of the cloud computing deployments models – availability over the network and accessing the resources remotely via the Internet.

**Externally developed.** The vast majority of practitioners associate any software system with the origin of predominantly big vendors e.g., SAP, Salesforce, Oracle, SAS, as external platform by default. *“You can name any brand and most likely we have it”*, was an example-reply when the interviewee was asked about the cases of external platforms used in the organization. Partially, the confusion might have been caused as a result of commercial offer descriptions when the terms may be misused for marketing purposes. A12: *“Every software would like to call [brand] itself a platform”*. Such advertising concepts misuse may lead to ambiguous understanding among customers what the offering really is [29]. A22: *“...everybody wants to sell you the business benefits, when you go to many of provider sites, you have to shift through all that business selling bullshit first. The documents always start with things like this is going to increase your revenue, and this is going to make your costs smaller and better results, better everything. So it is hard to know what the software capability is really provided”*.

**Externally managed.** This category includes two subcategories which we integrate for simplicity reasons. One abstraction the respondents affiliated with external service platforms were the blackbox services developed for the organization. Nowadays, organizations prefer to recruit individual developers or small supplier-companies to build and maintain the systems for the organization in order to solve some specific problems. Interviewees referred to them as something they do not want or/and need to know how it works. Examples include billing, invoicing services and other business intelligence tools.

As a second abstraction is, interestingly, even when only the operation and maintenance of a service was outsourced to a subcontractor or partner firm, the service was mentioned to be

external too. Interviewees from medium-sized and large organizations characterized their relations with service providers as “partnerships”, regardless the size of partners, implying a horizontal relationship mind-set. When choosing vendors or outsourcing partners they prefer to exploit existing network of partners. A4: “*For us, the roadmap of a provider is important*”. Respondents justify these strategic preferences by the degree of the power they are able to impose on long-term partners.

**Externally {managed + developed + deployed} + shared.** Lastly, interviewees acknowledge the existence of some voluntary-compulsory dependencies to certain services provided by other firms. These can be legal enforcements or constraints imposed by industry monopolies [7]. Other examples include public digital infrastructures such as Blockchains and X-Road [2], an open source data exchange layer solution that enables organizations to exchange information over the Internet. This metaphor reflects the notion of external platforms we introduce in this article; i.e., the dependencies in business-critical operations that were not possible to avoid. In case of such integrations, all interviewees expressed their preference to have a number of competing platforms than a full-fledged “one-stop shop” platform. The categories we identified are not mutually-exclusive and disconnected. On the contrary, the first three categories emphasize different dimensions of a bigger concept of external platforms.

## 5. Discussion

External platforms utilization, as well as cloud services adoption or systems maintenance outsourcing, can be seen as a means to manage the complexity [33]. Schneider and Sunyaev [48] define a cloud-sourcing decision as “the decision of the organization to adopt and integrate cloud services from external providers into their IT landscape, that is, the customer organization’s assessment of cloud computing offerings from one or more providers in any form of service model (IaaS, PaaS, SaaS) or deployment model (public, private, community, hybrid)”. We commit to the view of IT outsourcing as a predecessor of cloud computing models and extend this continuum with external platforms. Based on their comparison of Cloud Computing (Table 3, Column 2) and IT outsourcing (Table 3, Column 3) with external platforms. The categories from our findings descriptively correspond to the cloud sourcing models presented in Table 3: *externally developed* primarily refer to cloud computing models, *externally managed* to IT outsourcing, and *externally deployed* to all. Inconsistencies in understanding may represent idiosyncratic differences in the perceptions of interviewees and reflect the contextual differences of priorities among key personnel e.g., top management and enterprise architects. The confusion may also be due to lack of comprehensive clarifications and taxonomies.

### 5.1. Implications

**Inconsistencies in understanding.** Diversified answers of interviewees point to divergent notions of external platform among practitioners. Moreover, even traditional service models are confused with each other. Our findings indicate the absence of agreement within community of practitioners on various criteria of systems utilized in their organizational operations. The ambiguity is, perhaps, amplified because of difficulties to define what the platform is. The same level of comprehension on the phenomenon of integrations and dependencies with external platforms is crucial in conversations between architects, IT and business unit professionals. Improper differentiation can potentially lead to inaccurate communication of problems and opportunities, their evaluation and cause misleading judgments. One can argue that the dependency to external platforms are rare, because organizations hesitate to outsource business-critical resources or functions [29]. Obviously, no business will take the risk of putting its business-critical applications in the cloud without a very strong assurance of access to those applications and associated data. However, the utilization of intangible resources e.g., technological or managerial knowledge [51] or tangible IT resources i.e., software, data [13] coming from the outside is more common. As scholars note [9, 38], innovation shifts do not “happen teleologically, but

rather though gradual and locally emergent evolutions”. Cost advantages, flexibility and competitive advantages made IT sourcing, as one of the main strategic decision concepts in modern businesses [48]. In our work, we denote the integrations with external platforms as a contemporary emerging service model.

**Table 3.** External platforms as IT sourcing<sup>1</sup> evolution

	Externally managed	Externally developed	Shared external platforms
<b>Decision</b>	Vendor selection prior to decision on degree of outsourcing Top management as decision maker	Vendor selection bound to product selection SaaS by business department, IaaS/PaaS by IT department	The platform is valuable, rare, inimitable and non-substitutable enough to represent nearly the only reasonable choice Top management as decision maker
<b>Asset specificity</b>	Custom-tailored IT services, may include e.g. software development, datacentre or desktop maintenance, help desk	Standardized software (SaaS) or cloud infrastructure (IaaS/PaaS)	Standardized, dynamic platform offering with volatile boundary resources (APIs, SDK, contracts)
<b>Customizability</b>	Individually negotiated configurations	At a minimum, some limited user-specific application configuration settings	Non-existent configurational tuning capability at any of OSI stack layers
<b>User-to-system utilization cardinality</b>	One-to-one relationship between user-organizations and individual system instance, i.e. each user-organization has exclusive access to its own instance		many**one relationship, i.e. all user-organizations reuse the same platform instance
<b>Externally deployed</b>	Outside or in-premises	Usually outside, broad network access and dependence	Outside
<b>Ownership</b>	Varies with the type of outsourcing	Ownership of the data stored in the system and the rights to get it back belongs usually to the customer	The platform, its derivatives and sometimes even the associated data are owned by the provider
<b>Contractual mode</b>	Usually long-term strategic partnerships preferred	Standardized terms of use	Non-negotiable SLAs, strategic decisions on platform development or service discontinuity, interfaces availability are made by provider
<b>Substitutability or abandonment options [47]</b>	Moderate to high number of alternatives Outsourcing market is well established with numerous experienced providers	Moderate to high number of alternatives Volatile and immature market	Number of alternatives is non-existent or extremely limited Market in its nascent stage, uncertain legal issues
<b>Examples</b>	Software development subcontracting	SaaS e.g. Salesforce, PaaS e.g. Microsoft Azure IaaS, e.g. Amazon Elastic Cloud	CRM integration with Facebook, Google AdWords in marketing business, Applications based on Distributed Ledger Technology

<sup>1</sup> Table 3 is adapted and shortened, courtesy of [48], we renamed «IT outsourcing» with «Externally managed» and «Cloud computing» with «Externally developed» to conform to our findings.



**External innovation adoption tendency.** Dynamic capabilities of a firm can be defined as the ways to manipulate resource configurations to gain a competitive advantage [15]. They include strategic decision making, alliancing, and product and service innovation. There are studies on the relation of cloud computing solutions adoption into the internal IT capabilities of the company, and the results call for more research to confirm whether the lack of internal IT capabilities as a driver for SaaS adoption and inhibitor for IaaS/PaaS [48]. Benlian [8] provides evidence on the differences regarding the perceived relative performance of different delivery models among IS managers of SMEs compared to large enterprises [29, 48]. Examples of integrations with external platforms seemed to be rarer in larger organizations we interviewed. The mental model of managers in incumbent and large companies may be seen as trying to avoid dependencies they cannot control, preserve power integrity and gain more power and secure their position by carefully establishing alliance partner relationships. Exceptional cases are when established companies allow the use of external platforms for non-critical activities or as complementary solutions. For example, the use of social media platforms for boarding tickets distribution by airline companies where e.g. Facebook's Messenger is only one option among other distribution channels (e.g. email, sms).

From our findings we may theorize that young organizations in nascent [46], highly-dynamic markets follow entrepreneurial modes of behaviour strategies i.e., fast decision makers, open to experimenting and value newly acquired knowledge. Studies on cloud computing adoption find that "smaller and medium-sized firms are generally more prone to adopt on-demand outsourcing options for obtaining fast access to valuable IT resources and capabilities" [8, 29]. It is possible that young firms are more pragmatic in leveraging innovations coming from the outside. From our findings, we can envision that relatively smaller firms understand that they are undisguised to innovation threats from tech giants as they do not possess required capabilities and resources. Smaller organizations, therefore, can be seen unprejudiced about their power and control disadvantage and, consequently, fast in adopting innovations from global providers. Due to the lack of resources and power they make decisions based on facts and features and what actually the platform capability is. Incumbent organizations, on the other hand, that operate in moderately-dynamic markets with stable industry structures, tend to follow linear and incremental changes. These organizations usually value and try to leverage the existing, cumulative knowledge, therefore follow the risks mitigation practices [15] to avoid the integrations they cannot fully control.

## 5.2. Future research and limitations

An important future research agenda can be to identify the emergent conditions of external platforms-based dependencies; empirically-valid risks mitigation practices along with benefits realization would form a fundamental understanding of the phenomenon. Another important research direction can be the role of APIs as boundary resources between non-focal actors and platforms, including API ecosystems evolution and what it means for different industries and enterprise strategies [18]. The state of the practice indicates that the external dependencies among more established organizations are at its nascent stage – firms have mostly \*aaS types of relations and only few external platforms. Part of the difficulty in distinguishing these approaches is that they often coincide in practice and are neglected in theory. Proper visualization and modelling of enterprise information and IS architecture could improve the practice. Nowadays, organizations seem to be much consumed and involved in transforming their own products into platforms i.e., "platformization" [34], so that the external dependencies might be neglected, which could lead to twisted strategic manoeuvres, or missed opportunities.

Our study has three potential validity threats. We follow the validity dimensions of Maxwell [39] in qualitative research. First, descriptive validity threat is eliminated by recording and transcribing each interview in true verbatim, to ensure the factual accuracy of the data. As qualitative researchers are not interested in solely describing the reality, but concerned what the phenomenon under study mean, there is an interpretative validity threat. Although there is no "in principle access to data that would unequivocally address this threat to validity", we attempted to construct our findings closely grounded in the language used by interviewees, their

own words and concepts [39]. We used mostly open-ended questions to allow respondents to elaborate on answers, and avoided using leading questions to get a desired response. In fact, we view non-consistent interpretations among respondents as findings. The next validity threat is theoretical, which is not concerned with factual accuracy and consensus, but rather with the legitimacy of the applications of the concepts to the phenomena and the validity of causal relationships among them. Here, the choice of Grounded Theory with no a priori theory in mind and its continuous interplay of data collection and analysis along with incremental open, axial and selective coding procedure spanning for several months has proved its usefulness. This ensured that the constructs identifications and their application to the data are not biased and the patterns identified were (as much as possible) theoretically saturated and different types of relations between concepts are identified. Next, as any other qualitative study we cannot claim the internal or external generalizability of the findings as such, but rather their analytical transferability extended to other cases. Moreover, the generalization in qualitative research implies that the phenomenon identified should be also identified in other settings and cases, but, perhaps, with different results i.e., new interpretations on external platforms.

## 6. Conclusions

From our interviews with 24 practitioners we found that practitioners across units and sectors perceive the notion of external service platforms differently, confusing them within service and deployment models. External platforms, from the understanding of practitioners, may primarily refer to the ones which are externally deployed, developed, managed. A combination of three attributes together with a multiple simultaneous use of the platform refers to shared external platform-based dependence, i.e., monopoly-like platforms. We also anticipate that integrations with external platforms could be more common among entrepreneurial firms in nascent markets and that established organizations are less open to have such dependencies and give up the control. However, this proposition needs to be investigated and developed further in future research.

## References

1. Altman, E.J.: Dependency challenges, response strategies, and complementor maturity: Joining a multi-sided platform ecosystem. Working paper (2016)
2. Anthes, G.: Estonia: A Model for e-Government. *Communications of the ACM*. 58 (6), 18–20 (2015)
3. Armstrong, M.: Competition in two-sided markets. *The RAND Journal of Economics*. 37 (3), 668–691 (2006)
4. Baldwin, C.Y., Clark, K.B.: Design Rules: The Power of Modularity. *Academy of Management Review*. 26 471 (2000)
5. Barney, J.: Firm Resources and Sustained Competitive Advantage. *Journal of Management*. 17 (1), 99–120 (1991)
6. Barney, J.: Firm resources and sustained competitive advantage. *Strategy: Process, Content, Context, An International Perspective*. 17 (1), 290 (2010)
7. Bazarhanova, A., Yli-Huumo, J., Smolander, K.: Love and Hate Relationships in a Platform Ecosystem: A case of Finnish Electronic Identity Management. In: *Proceedings of the 51st Hawaii International Conference on System Sciences*. (2018)
8. Benlian, A., Hess, T., Buxmann, P.: Drivers of SaaS-adoption—an empirical study of different application types. *Business & Information Systems Engineering*. 1 (5), 357 (2009)
9. Boland, R.J., Lyytinen, K., Yoo, Y.: Wakes of Innovation in Project Networks: The Case of Digital 3-D Representations in Architecture, Engineering, and Construction. *Organization Science*. 18 (4), 631–647 (2007)
10. Boudreau, K.: Does Opening a Platform Stimulate Innovation? The Effect on Systemic and Modular Innovations, <https://ssrn.com/abstract=913402>, (2007)
11. Boudreau, K.J., Hagiu, A.: Platform Rules: Multi-Sided Platforms as Regulators. *Platforms, Markets and Innovation*. 163–191 (2009)

12. Cusumano, M.: Cloud computing and SaaS as new computing platforms. *Communications of the ACM*. 53 (4), 27 (2010)
13. Dreyfus, D., Iyer, B.: Managing architectural emergence : A conceptual model and simulation. 46 115–127 (2008)
14. Eaton, B., Elaluf-Calderwood, S., Sørensen, C., Yoo, Y., Sorensen, C.: Distributed Tuning of Boundary Resources: the Case of Apple’s iOS Service System. *Mis Quarterly*. 39 (1), 217–243 (2015)
15. Eisenhardt, K.M., Martin, J.A.: Dynamic Capabilities : What Are They ? 1121 1105–1121 (2000)
16. Eisenmann, T., Parker, G., Alstyne, M.W. Van: Strategies for Two- Sided Markets. *Harvard Business Review*. 84 (10), 12 (2006)
17. Eisenmann, T.R., Parker, G., Van Alstyne, M.: Opening Platforms: How, When and Why? *Platforms, Markets and Innovation*. (February), 131–162 (2009)
18. Evans, P.C., Basole, R.C.: Revealing the API ecosystem and enterprise strategy via visual analytics. *Communications of the ACM*. 59 (2), 26–28 (2016)
19. Evans, P.C., Gawer, A.: The rise of the platform enterprise: a global survey. (2016)
20. Evans, P.C., Gawer, A.: The Rise of the Platform Enterprise A Global Survey. *The Center for Global Enterprise*. (January), 1–30 (2016)
21. Förderer, J., Kude, T., Schütz, S., Heinzl, A.: Control versus Generativity: A Complex Adaptive Systems Perspective on Service Platforms. *ICIS 2014 Proceedings*. 1–13 (2014)
22. Gawer, A., Cusumano, M.A.: How Companies Become Platform Leaders. *MIT Sloan Management Review*. 49 (2), 28–35 (2008)
23. Gawer, A., Cusumano, M.A.: Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*. 31 (3), 417–433 (2014)
24. Ghanam, Y., Maurer, F., Abrahamsson, P.: Making the leap to a software platform strategy: Issues and challenges. *Information and Software Technology*. 54 (9), 968–984 (2012)
25. Ghazawneh, A., Henfridsson, O.: Balancing platform control and external contribution in third-party development: The boundary resources model. *Information Systems Journal*. 23 (2), 173–192 (2013)
26. Ghazawneh, A., Henfridsson, O.: Balancing platform control and external contribution in third-party development: The boundary resources model. *Information Systems Journal*. 23 (2), 173–192 (2013)
27. Glaser, B., Strauss, A.: *The discovery of grounded theory*. 1967. Weidenfield & Nicolson, London. (1967)
28. Henfridsson, O., Bygstad, B.: the Generative Mechanisms of Digital Infrastructure Evolution. *MIS Quarterly*. 37 (3), 907–931 (2013)
29. Hoberg, P., Wollersheim, J., Krcmar, H.: The business perspective on cloud computing-a literature review of research on cloud computing. (2012)
30. Huang, P., Ceccagnoli, M., Forman, C., Wu, D.: When Do ISVs Join a Platform Ecosystem? Evidence from the Enterprise Software Industry. *Icis*. 1–18 (2009)
31. Huber, T.L., Kude, T., Dibbern, J.: Governance Practices in Platform Ecosystems: Navigating Tensions Between Cocreated Value and Governance Costs. *Information Systems Research*. (2017)
32. Iyer, B., Davenport, T.H.: Reverse Engineering Google’s Innovation Machine. *Harvard Business Review*. (April), 58–69 (2008)
33. Iyer, B., Henderson, J.C.: Preparing for the future: Understanding the seven capabilities of cloud computing. *MIS Quarterly Executive*. 9 (2), 117–131 (2010)
34. Jansen, S.: Opening the ecosystem flood gates: Architecture challenges of opening interfaces within a product portfolio. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*. 9278 121–136 (2015)
35. Jansen, S., Cusumano, M.: Defining software ecosystems: A survey of software platforms and business network governance. *CEUR Workshop Proceedings*. 879 41–58 (2012)

36. Karhu, K., Tang, T., Härmäläinen, M.: Analyzing competitive and collaborative differences among mobile ecosystems using abstracted strategy networks. *Telematics and Informatics*. 31 (2), 319–333 (2014)
37. Lindgren, R., Eriksson, O., Lyytinen, K.: Managing identity tensions during mobile ecosystem evolution. *Journal of Information Technology*. 30 (3), 229–244 (2015)
38. Lyytinen, K., Yoo, Y., Boland, R.J.: Digital product innovation within four classes of innovation networks. *Information Systems Journal*. 47–75 (2015)
39. Maxwell, J.A.: *Understanding and Validity in Qualitative Research*. Harvard Educational Review; Cambridge. 62 (3), 279 (1992)
40. Nalebuff, B.J., Brandenburger, A.M.: Co-opetition: Competitive and cooperative business strategies for the digital economy. *Strategy & Leadership*. 25 (6), 28–33 (1997)
41. Olsson, H.H., Bosch, J.: *Collaborative Innovation: A Model for Selecting the Optimal Ecosystem Innovation Strategy*. August (2016)
42. Parker, G., Van Alstyne, M.: Innovation, openness, and platform control. *Management Science*. (2017)
43. Pfeffer, J., Salancik, G.R.: *The external control of organizations: A resource dependence perspective*. Stanford University Press (2003)
44. Runeson, P., Höst, M.: Guidelines for conducting and reporting case study research in software engineering. *Empirical Software Engineering*. 14 (2), 131–164 (2008)
45. Rysman, M.: The Economics of Two-Sided Markets What Defines a Two-Sided Market? *Journal of Economic Perspectives*. 23 (3—Summer), 125–143 (2009)
46. Santos, F.M., Eisenhardt, K.M.: Constructing Markets and Shaping Boundaries : Entrepreneurial Power in Nascent Fields. *Academy of Management Journal*. 52 (4), 643–671 (2009)
47. Saya, S., Pee, L.G., Kankanhalli, A.: The Impact of Institutional Influences on Perceived Technological Characteristics and Real Options in Cloud Computing Adoption. In: *ICIS*. p. 24. (2010)
48. Schneider, S., Sunyaev, A.: Determinant factors of cloud-sourcing decisions: reflecting on the IT outsourcing literature in the era of cloud computing. *Journal of Information Technology*. 31 (1), 1–31 (2016)
49. Selander, L., Henfridsson, O., Svahn, F.: Capability search and redeem across digital ecosystems. *Journal of Information Technology*. 28 (3), 183–197 (2013)
50. Strauss, A., Corbin, J.: *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). (1998)
51. Teece, D.J., Pisano, G., Shuen, A.: Dynamic Capabilities and Strategic Management. *Management*. 18 (7), 509–533 (2008)
52. Tilson, D., Lyytinen, K., Sørensen, C.: Digital infrastructures: The missing IS research agenda. *Information Systems Research*. 21 (4), 748–759 (2010)
53. Tiwana, A., Konsynski, B., Bush, A.A.: Platform evolution: Coevolution of platform architecture, governance, and environmental dynamics. *Information Systems Research*. 21 (4), 675–687 (2010)
54. Venkatraman, V.N., El Sawy, O.A., Pavlou, P., Bharadwaj, A.: *Theorizing Digital Business Innovation: Platforms and Capabilities in Ecosystems*. Fox School of Business Research Paper 15-080. 1–36 (2014)