

## Love and Hate Relationships in a Platform Ecosystem: A case of Finnish Electronic Identity Management

Anar Bazarhanova  
Department of Computer  
Science Aalto University,  
Helsinki, Finland  
[anar.bazarhanova@aalto.fi](mailto:anar.bazarhanova@aalto.fi)

Jesse Yli-Huumo  
Department of Computer  
Science Aalto University,  
Helsinki, Finland  
[jesse.yli-huumo@aalto.fi](mailto:jesse.yli-huumo@aalto.fi)

Kari Smolander  
Department of Computer  
Science Aalto University,  
Helsinki, Finland  
[kari.smolander@aalto.fi](mailto:kari.smolander@aalto.fi)

### Abstract

*There has been a substantial interest among scholars in digital platforms and their governance. This paper proposes a different perspective on the phenomenon, by providing observations on non-focal firms' dependencies to external platforms. Using the case study results of Finnish firms' utilization of a monopolistic BankID authentication platform, we describe the platform ecosystem and its transformation on organizational and technology aspects. We show how legislation can transform the roles and relations between ecosystem participants and lead to the long-time dominant legacy platform weakening. Our study extends existing research on platforms and contributes new knowledge about the enforced adoption of the platform by heterogeneous organizations. These findings have important managerial implications, as they inform how non-focal firms can understand the use of existing and coming digital platforms.*

### 1. Introduction

Ever-evolving digital platforms are ubiquitous. Platforms are disruptive to organizations and users across all sectors, by transforming the ways to think, operate and innovate [1]. A company can generate new business value by using shared and external multi-sided platforms [2] like restaurants using Facebook for reservations management, companies using EBay and Amazon marketplaces for in B2B, or LinkedIn as a core platform for human resources management. By external platform utilization, we imply a phenomenon when the platform's core offering is shared and collectively utilized by heterogeneous actors to build the services that extend not the platform's functionality, but their own capability.

Exant platform ecosystems research provides little guidance on firms and platforms interrelationships, from the perspective of those organizations that do not

own or govern the platform, but profoundly depend on it. We call these organizations *non-focal actors* [3]. In our context, non-focal actors are subordinate platform ecosystem participants that leverage the power of the platform for their business needs to extend their capabilities. Non-focal actors are usually not in a position of power and control to influence the changes in response to dynamic needs of a digital ecosystem [4]. Nevertheless, the companies willing to sustain their competitive advantage have no choice but to engage in relationships with the platform. Despite calls for investigating the factors that influence a firm's strategic choices on digital platforms [3], [5] there is a dearth of studies on fundamental understanding of strategic digital platforms utilization by non-focal firms (both in industry and academia). This study attempts to contribute to the discourse on digital platforms by exploring the cases of dependencies to an industry platform and untangling "the platform ecosystem thinking" perceptions from industry professionals. We demonstrate the example of a proprietary platform becoming an industry- and country-wide dominant infrastructure for organizations from public and private sectors. We then show how legislation changes affect the platform ecosystem. Our findings also suggest that the participation in the platform ecosystems, as argued in existing literature [3], [6], is not always prompted to ecosystem health and prosperity motives when the platform adoption is enforced and it is the only choice.

### 2. Background

Regardless their size, companies need to carefully choose and identify the directions of their innovation paths from the myriad of available service platforms [7]. Prior research on digital ecosystems positions platform owners, tech giants such as Google, Amazon, Facebook and Microsoft, at the center of attention. For example, Eaton et al. [8] studied the boundary resources evolution of Apple's iOS ecosystem. Gawer & Cusumano [9] studied the strategies for platform

leadership building. Paradigmatic analysis of digital application marketplaces and the monopolistic quality of platforms was discussed by Ghazawneh & Henfridsson [6] and Eisenmann et al. [10]. The results obtained by Henfridsson & Bygstad [11] on configurational perspectives of digital infrastructures evolution demonstrated the generative mechanisms of such infrastructures. Adner & Kapoor [12] showed how the challenges faced by external innovators affect the focal firm's (platform owner) outcomes. This asymmetrical emphasis on focal actors and platform ecosystem governance makes the work of Selander et al. [3] on non-focal actors' capability search and redeem to stand out from the extant literature. In this idiographic research explanation [3] based on historical data limited to Sony Ericsson, the authors acknowledge the need for empirical evidence that would enrich the conceptualization and bring a deeper understanding on first-hand accounts of non-focal actor use of platform ecosystems. In addition, Huang et al. [13] studied the tendencies of software vendors to join an innovation ecosystem with a larger empirical focus. Lindgren et al. [14] also adopt a non-focal actors perspective and question how the identity of non-focal actors may be changed by the participation in an ecosystem. We depart from this literature by exploring how the organizations that purely *utilize* the platforms to extend their own capability recognize such dependencies.

## 2.1. Non-focal Perspective

A platform owner or sponsor (i.e. focal actor) often dominates and exercises control over the innovation network of its ecosystem [2]. Eck & Uebernickel [15] define platform providers and sponsors as "*platform orchestrators*". Focal actors regulate the resources and knowledge flow within the network and, subsequently, orchestrate the types of innovations created in the ecosystem [15]. Focal actors also define the boundaries of the ecosystem by creating different types of entry-barriers. Non-focal actors are subordinate ecosystem participants that extend their business capabilities by building their services, products or technologies using the platform resources. Resources can include a combination of assets (physical, human or technology), knowledge, or capabilities. Non-focal actor's individual participation in platform ecosystem is not critical for the ecosystem survival and sustainability, thus non-focal actors are positioned at the periphery of the ecosystem from the ecosystem's perspective [3]. However, alliances of larger non-focal firms or a majority of small firms, so called "the power of the crowd", sometimes with the help or support of regulating bodies (e.g. legislation, corporate lobbying) can influence platforms' development [8].

In this paper, we show how such changes can take place in platform ecosystems in the context of Finnish Identity Management (IDM) standard abatement. *External platforms or industry platforms* are "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 complementary innovations and potentially generate network effects" [16]. These "larger number of firms" or platform-utilizing businesses are in the primary focus of this research.

The platform orchestrators decide on whether they can open the platform to their competitors within the same industry or to other firms in other industries with complementary assets, such as existing user bases, technologies, or distribution channels. Lyytinen et al. [17] identify three strategic behaviors in this regard: competition (one firm provides a platform and competes against the other platforms in the ecosystem); co-opetition (competing firms within the same industry decide to collaborate and provide a single intra-industry platform within the ecosystem); and collaboration (multiple firms from different industries collaborate to provide an inter-industry platform). These mechanisms, especially co-opetition, have been mostly studied from platform and complementor (Independent Software Vendors, ISVs) perspective, leaving the perspective of platform-utilizing firms relationships ill-defined. We aim to contribute to the digital platforms research by filling this void.

## 2.2. Platforms, Ecosystems and Infrastructures

We adopt the definition of *digital platform* as "the set of components used in common across a product family whose functionality can be extended by third parties" [18], [19]. However, this definition is somewhat framed towards software platforms and independent software vendors (ISVs) that develop complementary products to extend the platform core functionality (e.g. SAP add-ons). Gawer & Cusumano [16] distinguish platforms between internal and external platforms. They define *internal (company or product) platforms* as a set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products [16]. Whereas, *external (industry) platforms* are sets of assets organized in a common structure that act as a foundation upon which external innovators can develop their own complementary products, technologies, or services.

It is important to highlight the inseparability of social and technical constructs when investigating the digital artefacts in an organizational context. The same applies to *platforms and infrastructures*; they are socio-technical entities comprising social (governance rules

and social actors) and technical aspects (systems and architecture). We agree with Hanseth & Lyytinen [20] that the differences between platforms and infrastructures are in their overall increasing complexity, how they relate to their design and use environments, and how they behave over time in relation to those environments. Platforms are integral parts of digital infrastructures and there is a recursive relation between them. The core utility of a platform is that it allows building a valuable service to its users. A platform that is used to extend firm's capabilities becomes that firm's infrastructure, i.e. the internal platform can evolve into external platform, when it is an integral part of its user organizations. In this paper, we do not seek to reargue the definitions. Rather, we adapt the interpretation on *digital infrastructures* from [11] as "the heterogeneous collection of sociotechnical components that are essential or contribute to the functioning of a system, organization or industry." The definition could be also adjusted to different contexts: enterprise, industry, economy, national, regional, and global levels [21].

Scholars mostly agree on the notion of *platform ecosystem* defined as "collectives of organizations that are interlinked by a reciprocal interest in the prosperity of a digital platform for materializing their own product or service" [3]. Organizational economics literature refers to platform ecosystems as "two-sided markets", "multi-sided markets", or "multi-sided platforms" [2]. Armstrong [22] defines two-sided markets as "markets involving two groups of agents interacting via 'platforms' where one group's benefit from joining a platform depends on the size of the other group that joins the platform". Consequently, a phenomenon whereby a product or service gains additional value as more users use it, is called the network effect [23].

The body of knowledge on inter-organizational networks [23]–[25], business and platform ecosystems suggests that the focus on a pair or a network of firms helps to explain different outcomes of firms' in a given industry. We follow the relational view theoretical traditions [25] that stresses the idiosyncratic inter-firm linkages. This perspective helps us to focus on non-focal actors' *roles* in platform ecosystem by interpreting their *relations* and views towards the platform and its orchestrators.

### 2.3. Research Problem and Questions

A growing stream of research have investigated the value co-creation mechanisms of non-focal ISVs. Platform ecosystems are emerging ubiquitously, across industries and domains, not being limited to software add-on development scenarios. As digitalization progresses, it affects the processes of products and

services creation, and strengthening the role of software overall. The number of non-focal platform-utilizing firms usually outnumber the platforms - this is the characteristic of multi-sided markets [2]. The lack of theoretical and analytical models tackling organizations' dependencies to various platforms and infrastructures indicates insufficient understanding of such phenomenon, consequently making it an important research direction.

To address the research gaps, we formed the following research questions to study:

*"How do the changes in the platform ecosystem affects non-focal firms? How can the non-focal actor relations towards the dominating platform be characterized?"* To answer these two questions, we engage in case studies of seven Finnish organizations that utilize BankID electronic identity management (eIDM) platform. We inspect the dependency relations to the monopolistic BankID platform and investigate the roles that our case-firms have in that ecosystem.

## 3. Research Process

This research followed the exploratory case study design [26]. The holistic case study design is the most appropriate strategy when a single unit of analysis is studied within multiple cases [27]. The case study revolved around our perspective on the phenomenon: we took the interviewees' views towards the platform dependency as a unit of analysis within each case-company individually. The study design and context are presented in the following sections.

### 3.1. Research Site: Platform Dominance

The Finnish electronic Identity Management (eIDM) is based on three methods: national eID cards (FINEID), financial associations' BankID (commonly known as TUPAS), and MobileIDs endorsed by telecom operators. However, the TUPAS authentication method accounts for more than 90% of all online transactions [28]. In 1999, the state introduced non-mandatory FINEID cards to replace the older citizen ID card with a machine-readable smartcard chip, but citizens did not take the technology into use. In retrospect, experts account FINEID failure due to high costs of required card-readers, learning effort to the installation and certificate usage, user experience (UX) issues and historically well-disseminated TUPAS BankID [29]. TUPAS identification is a de facto standard from the late 1980s owned and administered by banks association in Finland. It is based on a combination of PIN and the paper access codes scheme (the list of One Time Passwords, OTP). Bank-specific identifiers have a high

penetration in Finnish market and can be used across a broad range of services and segments, not just banking, including e-commerce and governmental e-services. MobileIDs is a PKI-based (Public Key Infrastructure) authentication method released by Finnish mobile operators. It requires a specialized SIM card with a certificate in it and a contract with the mobile operator. MobileIDs can be used to access all public e-services, and many private services.

An important development in the Finnish eIDM case is the EU eIDAS regulation N°910/2014 on electronic identification and trust services for electronic transactions in the internal market [30]. Not going into details of the legislation vision, we only sketch how it affects the Finnish eIDM. Starting from mid-2017, Finnish banks need to lower the prices per transaction in the private market and allow distributors (Service Brokers) to solve the contracts and technical integration complexities. Firms interested in becoming Service Brokers need to meet the requirements for strong electronic identification laid down in the legislation. Practically, the list of registered providers includes banks, telecom operators, and incumbent service brokers.

### 3.2. Case Settings

Our cases include seven Finnish organizations and firms that utilize TUPAS eIDM platform in their e-services. Initially, the study involved the participation of three organizations: *Telco*, *PSP* and the *Agency* only. We did not begin this study with the intention of studying eIDM platform only. We started with a general inquiry on external integrations and consequently discovered the magnitude and dependence degree on TUPAS standard throughout the country. We further contacted *ISVI*, *ISV2*, *City* and *PRC* to get more insights on TUPAS utilizations.

*Telco* is a telecommunications operator and a major cable operator, a pay TV provider in both cable and terrestrial networks. The company employs around 1600 people and serves around 2.7 million customers.

*PSP* is a large payment service provider. The customers of *PSP* are banks, businesses, merchants and the public sector. *PSP* employs approximately 2,400 employees in six countries and according to recent stats (2016), it served a network of more than 300,000 merchants and 240 banks. *PSP*'s services also include the payment and authentication bundle services.

*Agency* is part of the Finnish government. The *Agency* prepares the government's economic and financial policy as well as the budget, and acts as a tax policy expert. One of the tasks of the *Agency* is the general steering of public sector agencies' information management.

*PRC* is a governmental organization that operates under the authority of the *Agency*. *PRC*'s task is to develop, support and manage the usage of electronic data contained in governmental and public Information Systems.

*City* is a municipality that represent the local level of administration. The *City* council is the main decision-making organ in local politics, dealing with issues such as city planning, schools, health care, and public transport. The *City* operates the portal for e-services where citizens can make appointments and manage documents electronically.

*ISVI* is the small payment service operator that resolves bureaucratic complexities of salary payments as an Internet service. Their cloud-based service provides a suite of open APIs and support services for any company or individual to integrate payroll features and salary payments, including integrations between insurance companies, tax agencies, pension companies, employment foundations and banks.

*ISV2* is a software-development company founded in 2015. Their main service is a native mobile app for students that integrates study records, campus restaurant menus, indoor positioning guide maps, various news and feeds – all essential information students need in their daily university life.

### 3.3. Data Collection and Analysis

We used both primary (i.e. interviews) and secondary (e.g. reports) data sources for this study. We began by performing a detailed background check of the companies, such as progress reports, internet searches, related case studies and literature review of similar companies. Companies involved in the study agreed upon commitment to research interaction and experimentations prior to research commencement.

We conducted interviews with 24 industry experts, most of whom have been associated with the industry for more than 15 years. The interviews were semi-structured [26] and lasted at least for one hour.

Each interview began by asking the interviewee's position, background, experience and projects/products/services he or she is managing. Next, the following discussion covered two topics: existing utilizations of external platforms, planned/expected integrations and experiences with TUPAS platform. Interviews followed the funnel model [27] principle - from open to more specific questions. We recorded and transcribed each interview and coded the data as in Grounded Theory [31]. We analyzed the gathered data with a qualitative data coding and analysis tool, Atlas.ti. We extracted quotes from transcribed interviews that we believed were relevant regarding the research questions.

**Table 1. Case companies and interviews**

	<b>Industry and size (number of employees)</b>	<b>№ of interviews</b>	<b>Interviewees positions</b>
<b>Telco</b>	Telecommunication operator, 1700	9	Main architect, Development manager, Head of online performance, Corporate solutions director, CDO
<b>PSP</b>	Payment service provider, 2500	4	Services development, SVP of digital innovations, Digital practices manager
<b>Agency</b>	Ministry, 360	4	Development manager, Main architect, Ministerial advisor
<b>PRC</b>	Government's digital services, 130	1	E-gov development project manager
<b>City</b>	Municipality, 40 000	2	Architect, Head of e-services program
<b>ISV1</b>	Software development, 20	2	CEO and CTO (interviewed together)
<b>ISV2</b>	Software development, 10	1	CEO

For example, we coded “*every software would like to call itself a software platform*” with the code “understanding about platforms”. The quote “*when it comes to let’s say web shop payments identifications we use TUPAS from other external partners*” with the code “service broker bundling”; and the quote “*because it makes no sense to build it yourself, it is available, relatively cheap and ready*” with the code “reasons for integration”. We organized these codes into categories (e.g. generic or case-specific) to each firm correspondingly and sorted them by social or technical integration aspect we identified. After this, we created the findings mapping between firms to find relationships and associations among them. We coded and analyzed the data without any priori hypotheses. Our goal was to let the understanding of the phenomenon emerge from the data and interviews [32]. We analyzed the perceptions in industrial organizations about external platforms, their recognition, realization of existing and future platform dependencies, associating challenges and issues.

#### 4. TUPAS: Socio-Technical Perspective

In this section, we present the findings of our case studies. Intertwined social and technical aspects of relationships in platform ecosystems are often complex to analyze. Thereby, we first present the *technical* view on integrations (software protocols) in section 4.1, followed by the *organizational* perspective on roles in platform ecosystem in section 4.2. With the aim of answering the research questions our results cover both technology-centric and social aspects of the platform ecosystem transformation. We cross-compare these in the light of eIDAS: how authentication services in Finland operated (*before*) and how the regulation is changing the ecosystem (*after*).

##### 4.1. How Actors Integrate to the Platform Ecosystem?

We describe TUPAS platform from the software and interactions perspective first. TUPAS protocol has been jointly specified by the Finnish Federation of Finnish Financial services (FFI, i.e. all Finnish banks) more than 20 years ago (the latest protocol specification dates from 2013).

**Before the eIDAS regulation change:** The Service Provider (a firm willing to authenticate its customers) initiates the identification by sending an identification request to the customer (Fig. 1, arrows 1 and 2). The customer then transfers the request to their own bank’s identification service by clicking on the bank’s icon (Fig. 1, arrow 3). The request validity is verified by the bank and the customer is asked to authenticate (Fig. 1, arrow 4). At this stage, the customer needs to use the paper-based OTP password. Only one of the banks has a token-generator mobile-app. Bank’s TUPAS service sends a response message to the customer once the identification has taken place (Fig. 1, arrow 5). The customer checks the information on the certificate (Fig. 1, arrow 6), and after approving it, returns to the Service Provider’s service (Fig. 1, arrow 7) at which point the certificate’s data is transmitted to the service provider (Fig. 1, arrow 8).

In short, in order to query the user identity by accessing the banks customers’ database, the method comprises a few SOAP over HTTPS calls. From our case-companies, we learned that the technical integration is not as difficult as the contracts management:

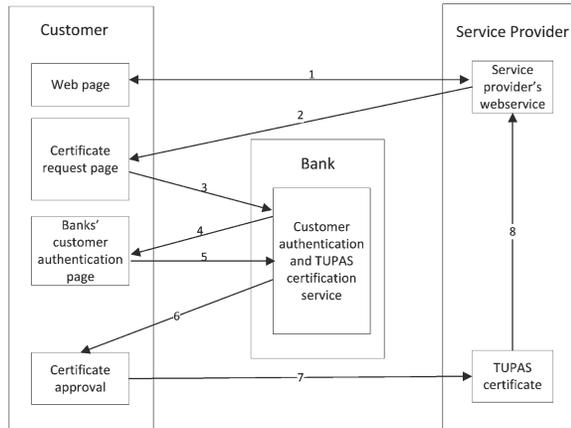
“... *technical part of the integration like the API calls look mostly the same from bank to bank. So from a technical point of view it was quite easy, but the paper work was huge* – ISV2, CEO.

“*It is very old and straightforward*” – ISV1, CTO.

Examining the relations of case-companies to the platform from the technology point of view, we observe

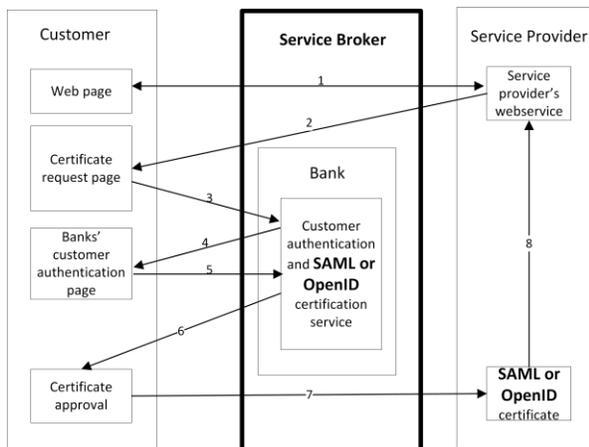
that firms understand the simplicity of integration process, yet, obsolescence of the standard itself.

“... the protocol sense – really technical sense. There are some problems with the technology, for instance it has been demonstrated that you can find SSN numbers in the cache of the browser”- Telco, Development manager.



**Figure 1. Before: BankID authentication workflow**

**After the eIDAS regulation change:** To comply with eIDAS regulation, eliminate security issues and enable single sign-on, the Finnish state decided to move from TUPAS to SAML and OpenID Connect protocol suites. The Figure 2 below highlights the changes, replacing “TUPAS” with “SAML or OpenID Connect” certificates, and wrapping “Banks” with the “Service Broker”.



**Figure 1. After: BankID authentication workflow**

Agency, as a member of the regulatory body, commented on these:

“Google is using that [SAML, OpenID Connect protocols], Facebook is using, everyone, those big players are using, and also the PRC using for long time already, they have these mandatory protocols that at least you have to support [specified in the regulation], and the SAML is mandatory and mobile, OpenID Connect is mandatory as well” – Agency, Development manager.

According to one informant, there are signs that that the TUPAS standard will not be upgraded/updated according to the new requirements. From the protocol viewpoint, that means that TUPAS platform might still be used internally among banks, however, they cannot offer TUPAS standard to service providers – it will be prevented by the legislation.

“What could happen is that if there are banks that don't want to invest or develop [TUPAS], they could of course protect these links here with VPNs, to make them private – because it is only P2P [banks - service Brokers] connection which is done only once – you could use path here for indefinite here, with some crypto tunnel. But you can't use it in the public internet side.”- Telco, Development manager.

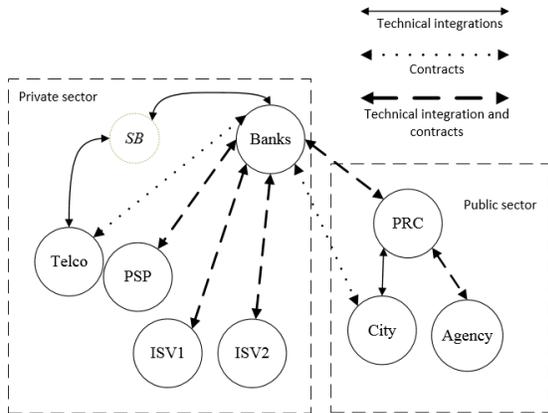
Though the financial organizations are genuinely secretive in their plans, the question is still open if the banks are going to continue cross-collaboration or develop solutions individually.

## 4.2. Roles and Relations in Platform Ecosystem

All our case organizations have enthusiastically acknowledged the eIDAS legislation change. In this section, we describe the social network view of ecosystem participants. The view of organizations, their roles and relations in the context of TUPAS ecosystem clarifies the individual organizations' roles and shows how their relations differentiate and how they are transformed by the eIDAS regulation.

**Before the eIDAS regulation change:** Until now, service providers had to sign separate contracts with each bank. Some third-party firms (SB in Figures below) provide both banks and service providers with bundle-services for identity assurance, authentication and signatures and facilitate the technical deployment (certificates acquiring, APIs). PRC is responsible for public sector's authentication services provision.

Banks kept the right to set the per-transaction charges in the private sector; the state had negotiated special pricing for public organizations. Banks could also refuse the authentication services provision to firms when “it is evident that the TUPAS certificate would be used for unethical or illegal activities, or if the use of the certificate could potentially cause financial or immaterial losses to the bank” [33].



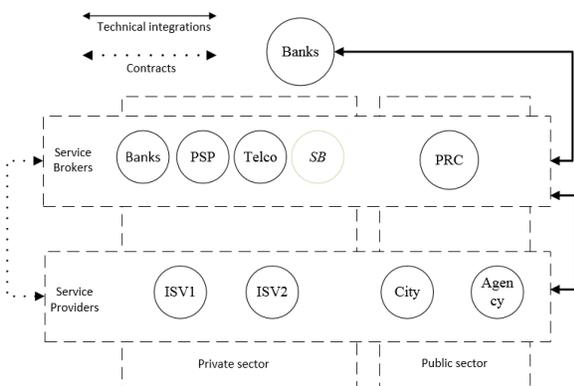
**Figure 2. Before: Actors' social network**

**After the eIDAS regulation change:** The introduction and legitimization of the man-in-the-middle distributor role solves the complexities of individual contracts that service provider needs to make with each bank.

*“The biggest relief for us is that we don't have to make contracts individually” – City, e-services manager.*

*“There's something good in EU” – ISV1, CEO.*

Starting from mid-2017, there is a price ceiling for each authentication transaction, a government-imposed price control that weakens the banks' valorization. The Figure below demonstrates the roles rearrangement service brokers<sup>1</sup> responsibilities. Currently, the list of registered brokers includes all Finnish banks, telecom operators, PRC and others (e.g. SB).



**Figure 3. After: Actors' social network**

Obviously, existing broker firms in the private market are going to face more severe competition. Telecom operators are also going to enter service broker

<sup>1</sup> Service brokers can be service providers simultaneously, but not all service providers can be brokers. There is a complex procedure in place in order to attain brokering license

market; *Telco* has expressed the enthusiasm about the change, as *“it is going to open up the market.”* Interestingly, *Telco* has a service broker firm (*SB*) that manages the technical integrations, and after the eIDAS change takes place – from having partnership relations they are going to be direct competitors.

## 5. Discussion

We compile the findings and investigate them through the spectrum of existing theories in the following themes. The first two themes belong to the platform and its focal role in the ecosystem, which has a great influence on the ecosystem development. The next three themes cover non-focal firms' resisting and accommodating attitude towards the dominating platform; roles and relations reconfiguration along with power redistribution among ecosystem participants, which were caused by the legislation change.

**Internal to external platform evolution.** Gawer and Cusumano's [16] distinctions between internal and external platform (from the platform owners' perspective) do not fit the case of TUPAS platform as it is an internal and external at the same time. Banks first established TUPAS platform for their internal use, and consequently they opened it to other heterogeneous actors. Scholars [16] suggest that the evolution from internal platforms to external platforms hypotheses would need to be developed and tested. Although it was not the main focus of this article, our case settings descriptively provide the context of the platform, which was used first by the banks only, i.e. was internal, evolved and became other firms' infrastructure, i.e. external. In this paper, we wish to draw attention to the emergence conditions of such platforms evolution and their enforced adoption by heterogeneous organizations.

**From dominance to deterioration.** The success and sustained dominance of TUPAS platform was contingent to the resource they possess (i.e. customer base), which is valuable and hard to imitate [34]. In such highly-regulated markets, changes can occur due to legislation, politics, corporate lobbying and technology disruption. By investigating TUPAS we fortuitously address the calls for public-private sector partnerships research [14] by reviewing how the governmental endorsement contributes to the authentication platform's sustained dominance and how the regulation changes in the ecosystem can recursively lead to the platform deterioration. Ecosystem changes from the software perspective could occur via boundary resources, e.g. data access protocol. The current

platform literature offers powerful lenses for conceptualizing the role of boundary resources<sup>2</sup> as a mechanism to secure platform owner's power and solve the paradox of control and generativity stimulation. [35], [36]. TUPAS eIDM case demonstrates how the platform itself is being counter-influenced through the boundary resources, i.e. the communication protocols defined by the platform owners are modified by more powerful entities. In this case the EU became the regulatory body.

The fact that banks have been using OTPs printed on paper for nearly 20 years is an ideal case of an incumbent inertia effect. Incumbent inertia happens when the market leader does not adjust to the new challenges of the market, or do not wish to change their strategy or products. Platform orchestrators must manage the delicate balance of generativity and control in the platform [37]. Banks in Finland exercised too much control over the TUPAS platform, with the risk of driving out third-party developers, thus possibly preventing the generativity of the platform.

**Resistance and accommodation.** Our case-organizations understand that the TUPAS “as technology” is obsolete; nevertheless, they are enforced to use it. We observe slight contrasting attitudes towards the platform as “banks” and platform as “protocol”. *PSP*, given the close relationships with the banks and financial institutions, is in cooperating relationships with the BankID method. We observe that *Telco*, due to its attempts to promote the MobileID method, has more competitive attitude to the platform and a forced acceptance of the standard itself. *Agency*, *PRC* and *City*, being public sector organizations, cannot interfere in private market's development, thus, also need to take BankID methods in use. Brandenburger and Nalebuff [38] define “*co-opete*” as “competing without having to kill the opposition and cooperating without having to ignore self-interest.” Coopetitive attitude towards the platform is observed among the firms that own a competitive authentication method (FINEID, MobileID). We could also observe the acquiescence, i.e. reluctant acceptance of the platform dominance among smaller organizations. *ISV1* and *ISV2* are small firms that do not have any special relationships with the platform and cannot influence conditions in any way.

Non-focal actors' views we present are complex, and to some degree with negative perception of platform owners' dominance and the forced utilization of the platform. Thus, the concept of actors' interest in ecosystem's health and prosperity [3] may not always

be true. Such relations towards the dominating platform can occur when the platform becomes “the only choice”.

**Power distribution.** Regulation changes can disrupt the roles of actors and disseminate the cumulative power in platform ecosystems. Recent literature has investigated the challenges of organizational identity transformations when establishing novel relationships with other ecosystem participants [14]. In this paper, we show that identity boundaries may be ambiguous and imprecise as the real dependencies could be masked with the complex service provider & orchestrator relations. In TUPAS case, banks still own the platform, but are forced to open the access to it to service brokers. That is to say that the cumulative power in the ecosystem is the same, but due to eIDAS regulation is more distributed among actors. Banks' position is weakened while service brokers gain more control.

**Roles and relations reconfiguration.** From social and organizational perspectives, regulation changes can affect the roles of ecosystem participants. Relations between firms are not always linear; firms can be partners in one market and be competitors in another. Lyytinen et al. in [17] point out that the participation in platform ecosystems pushes “innovators to increasingly connect and reconnect to actors across a myriad of organizations and communities; this will lead to a continuing expansion and reconfiguration of innovation networks, making them more like anarchic networks” (italics is ours). In this paper, we support this theoretical implication with example cases. The lesson learned from this last theme is that the firms should learn how to switch cautiously from e.g. partnership-based relations to direct competitors or vice versa.

## 6. Limitations and Future research

One of the key concepts of digitalization could be when the data - once entered is always retrievable. Most organizations, if not all, will need to open up and expose their interfaces and data flows, so it may trigger innovation and lead to an authentic digital society [21]. The same applies to the case we presented; identity management is an important step towards the successful digital services advancement in a society. In this paper, we presented how seven Finnish organizations have different perceptions on industry platform dependence. This study has limitations. The empirical evidence we provide may be industry or country specific. Qualitative research findings illustrate the specific phenomena studied in real-life settings and are not generalizable to the population as such. However, case studies not only

---

<sup>2</sup> Boundary resources refer to “the software tools and regulations that serve as the interface for the arm's length relationship between the platform owner and the application developer” [36].

bring richer semantical meanings for the problem understanding, but also can act as an effective benchmarking method to evaluate the theory, to which then the solutions could be developed and transferred into industrial practice. While understanding the inseparability of political context in studying contemporary industry platforms we call for more research to bridge the gap on non-focal actors' endeavors in ubiquitously emerging platform ecosystems. In this article, we managed to only scratch the surface of platform evolution, especially when the platform is internal and external simultaneously. Another important perspective is to theorize the transition of the platform to an infrastructure. These research directions promise to deliver novel insights and contribute to our understanding of platform ecosystem dynamics.

## 7. Conclusion

The present study contributes to the platform ecosystems studies by providing an empirical investigation of non-focal actors' insights on platform dependence. We show how legislation changes can affect the roles, relations and power controls of incumbent ecosystem participants. The Finnish monopolistic eIDM ecosystem provides a unique context to describe the platform's wide adoption, expansion, which then seem to weaken its position. Whereas from the non-focal perspective, firms across sectors exhibit a resisting and accommodating attitude towards the dominating platform. The findings also emphasize the role of software as a mechanism to disrupt the power distribution within the ecosystem. Extensive integrations to various platforms and participation in such ecosystems may lead to new roles, patterns for collaboration or competition and value proposition mechanisms. Yet non-focal firms need to understand the "rules" to benefit the most and minimize the risks of such platform-dependencies.

## 8. References

- [1] K. Lyytinen and G. M. Rose, "The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations," *MIS Q.*, vol. 27, no. 4, pp. 557–596, 2003.
- [2] J.-C. Rochet and J. Tirole, "Two-Sided Markets," *J. Eur. Econ. Assoc.*, pp. 990–1029, 2003.
- [3] L. Selander, O. Henfridsson, and F. Svahn, "Capability search and redeem across digital ecosystems," *J. Inf. Technol.*, vol. 28, no. 3, pp. 183–197, 2013.
- [4] H. Boley and E. Chang, "Digital ecosystems: Principles and semantics," in *Proceedings of the 2007 Inaugural IEEE-IES Digital EcoSystems and Technologies Conference, DEST 2007*, 2007, no. February, pp. 398–403.
- [5] Y. Yoo, O. Henfridsson, and K. Lyytinen, "The new organizing logic of digital innovation: An agenda for information systems research," *Inf. Syst. Res.*, vol. 21, no. 4, pp. 724–735, 2010.
- [6] A. Ghazawneh and O. Henfridsson, "A paradigmatic analysis of digital application marketplaces," *J. Inf. Technol.*, vol. 30, no. 3, pp. 198–208, 2015.
- [7] M. Ceccagnoli, P. Huang, C. Forman, and D. Wu, "Co-Creation of value in a platform ecosystem: The Case of Enterprise Software," *MIS Q. Manag. Inf. Syst.*, vol. 36, no. 1, pp. 263–290, 2012.
- [8] B. Eaton, S. Elaluf-Calderwood, and C. Sorensen, "Distributed tuning of boundary resources: the case of Apple's iOS service system," *Mis Q.*, vol. 39, no. 1, pp. 217–243, 2015.
- [9] A. Gawer and M. A. Cusumano, "How Companies Become Platform Leaders," *MIT Sloan Manag. Rev.*, vol. 49, no. 2, pp. 28–35, 2008.
- [10] T. Eisenmann, G. Parker, and M. W. Van Alstyne, "Strategies for Two-Sided Markets," *Harv. Bus. Rev.*, vol. 84, no. 10, p. 12, 2006.
- [11] O. Henfridsson and B. Bygstad, "the Generative Mechanisms of Digital Infrastructure Evolution," *MIS Q.*, vol. 37, no. 3, pp. 907–931, 2013.
- [12] R. Adner and R. Kapoor, "Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations," *Acad. Manag. J.*, vol. 51, no. 2, pp. 315–334, 2009.
- [13] P. Huang, M. Ceccagnoli, C. Forman, and D. Wu, "When Do ISVs Join a Platform Ecosystem? Evidence from the Enterprise Software Industry," *Icis*, pp. 1–18, 2009.
- [14] R. Lindgren, O. Eriksson, and K. Lyytinen, "Managing identity tensions during mobile ecosystem evolution," *J. Inf. Technol.*, vol. 30, no. 3, pp. 229–244, 2015.
- [15] A. Eck and F. Uebernickel, "Untangling Generativity: Two Perspectives on Unanticipated Change Produced by Diverse Actors," *Proc. 24th Eur. Conf. Inf. Syst.*, no. August, 2016.
- [16] A. Gawer and M. A. Cusumano, "Industry platforms and ecosystem innovation," *J. Prod. Innov. Manag.*, vol. 31, no. 3, pp. 417–433, 2014.
- [17] K. Lyytinen, Y. Yoo, and R. J. Boland, "Digital product innovation within four classes of innovation networks," *Inf. Syst. J.*, pp. 47–75, 2015.
- [18] G. Parker and M. Van Alstyne, "A digital postal platform: Definitions and a roadmap," *Int. Post Corp. Sloan Sch. Manag.*, no. January, p. 30, 2012.
- [19] K. J. Boudreau and A. Hagi, "Platform Rules: Multi-Sided Platforms as Regulators," *Platforms, Mark. Innovation*, pp. 163–191, 2009.
- [20] O. Hanseth and K. Lyytinen, "Design theory for dynamic complexity in information infrastructures: The case of building internet," *J. Inf. Technol.*, vol.

- 25, no. 1, pp. 1–19, 2010.
- [21] D. Tilson, K. Lyytinen, and C. Sørensen, “Digital infrastructures: The missing IS research agenda,” *Inf. Syst. Res.*, vol. 21, no. 4, pp. 748–759, 2010.
- [22] M. Armstrong, “Competition in two-sided markets,” *RAND J. Econ.*, vol. 37, no. 3, pp. 668–691, 2006.
- [23] M. L. Katz and C. Shapiro, “Systems Competition and Network Effects,” *J. Econ. Perspect.*, vol. 8, no. 2, pp. 93–115, 1994.
- [24] J. H. Dyer and H. Singh, “The Relational View: Cooperate Strategy and Sources of Interorganizational Competitive Advantage,” *Acad. Manag. Rev.*, vol. 23, no. 4, pp. 660–679, 2012.
- [25] D. Lavie, “The Competitive Advantage of Interconnected Firms: An Extension of the Resource-Based View,” *Acad. Manag. Rev.*, vol. 31, no. 3, pp. 638–658, 2000.
- [26] R. K. Yin, *Case Study Research . Design and Methods*, vol. 26, no. 1. Thousand Oaks, Calif.: Sage Publications, 2003, pp. 93–96.
- [27] P. Runeson and M. Höst, “Guidelines for conducting and reporting case study research in software engineering,” *Empir. Softw. Eng.*, vol. 14, no. 2, pp. 131–164, 2009.
- [28] T. Rissanen, “Electronic identity in Finland: ID cards vs. bank IDs,” *Identity Inf. Soc.*, vol. 3, no. 1, pp. 175–194, 2010.
- [29] T. Rissanen and J. Dumotier, “eID Interoperability: National profile Finland,” 2007.
- [30] The European Parliament and the Council of the European Union, “Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.” [Online]. Available: <http://preview.tinyurl.com/ocpt64y>. [Accessed: 10-Mar-2017].
- [31] B. Glaser and A. Strauss, “The discovery of grounded theory. 1967,” *Weidenf. Nicolson, London*, 1967.
- [32] M. D. Myers, “Qualitative research in information systems,” *Manag. Inf. Syst. Q.*, vol. 21, no. June, pp. 1–18, 1997.
- [33] FFI, “TUPAS Service Identification Principles,” 2013. [Online]. Available: [http://www.finanssiala.fi/maksujenvalitys/dokumentit/TUPAS\\_identification\\_principles\\_v20c.pdf#search=tupas](http://www.finanssiala.fi/maksujenvalitys/dokumentit/TUPAS_identification_principles_v20c.pdf#search=tupas).
- [34] J. Barney, “Firm resources and sustained competitive advantage,” *Strateg. Process. Content, Context. An Int. Perspect.*, vol. 17, no. 1, p. 290, 2010.
- [35] B. Eaton, S. Elaluf-Calderwood, C. Sørensen, Y. Yoo, and C. Sorensen, “Distributed Tuning of Boundary Resources: the Case of Apple’s iOS Service System,” *Mis Q.*, vol. 39, no. 1, pp. 217–243, 2015.
- [36] A. Ghazawneh and O. Henfridsson, “Balancing platform control and external contribution in third-party development: The boundary resources model,” *Inf. Syst. J.*, vol. 23, no. 2, pp. 173–192, 2013.
- [37] Y. Yoo, R. J. Boland, K. Lyytinen, and a. Majchrzak, “Organizing for Innovation in the Digitized World,” *Organ. Sci.*, vol. 23, no. 5, pp. 1398–1408, 2012.
- [38] B. J. Nalebuff and A. M. Brandenburger, “Co-opetition: Competitive and cooperative business strategies for the digital economy,” *Strateg. Leadersh.*, vol. 25, no. 6, pp. 28–33, 1997.