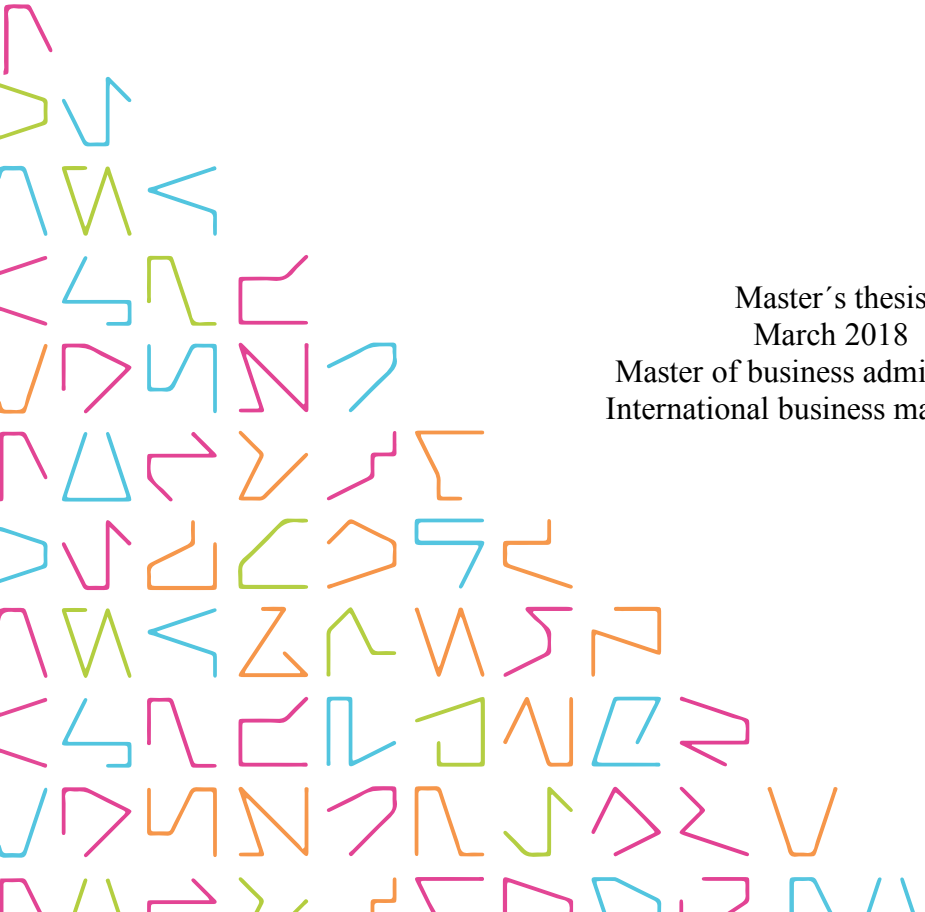
TAMPEREEN AMMATTIKORKEAKOULU

The human-centered and predictable society in the era of digital platform economy

Life event where university student moves in new home town to study

Eetu Leppänen



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ABSTRACT

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LEPPÄNEN EETU:
The human-centered and predictable society in the era of platform economy
Life event where university student moves in new home to study

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Research question where I am going to find answer in this thesis is, what possibilities platform economy model brings in university ecosystem.

Based on Research institute of the Finnish economy (ETLA) survey and in Singapore Smart Nation vision, university ecosystem should use openness and interface transparency for successful platform economy strategy. This supports findings in research, that transparency and openness are key elements in university ecosystem.

The objective of this thesis was to find out how could university personnel and its network help students integrate to study in their new home town. First chapters support the research by giving theoretical background how platform economy, ecosystems and artificial intelligence works in different business areas. It was highly important to recognize how these technologies are used in different business areas to form understanding how they can be used in between universities and their networks.

In research came out that university personnel had common opinion that university ecosystem needs to be mapped. This would ease the information flow thru universities and co-operation with ecosystem operators. Opinion of university personnel should be considered important in students´ career in university, adapting in new home town and finding employment after graduating.

Follow-up research is needed to get university students perspective from how they are experiencing university ecosystem and which service providers are the most important for them. This way we could make sure does university personnel and students opinions encounter from university ecosystem.

Key words: platform economy, artificial intelligence, digital ecosystems, application programming interfaces.

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ABBREVIATIONS

API	Application programming interface
AI	Artificial intelligence
EU	European Union
GDPR	General Data Protection Regulation
MaaS	Mobility as a Service
PPP	Public Private People
StoS	Silicon to Software
SDGs	Sustainable development goals
UN	United Nations
SWOT	Strength, Weaknesses, Opportunities, Strengths

1 INTRODUCTION

Purpose of thesis was to define what kind of possibilities is in Tampere universities digital ecosystem. The Government of Finland has decided to introduce a new operating model in the current government term to accelerate the emergence and development of digital ecosystems serving citizens and businesses.

In a human-centered and predictable society, people have the best conditions to take care of their own and their loved ones' well-being in different life events. A life event is a change in the human life that changes the human life situation. Changes can be seen as a change in the living environment, service needs or practices. A successful life event enables predictive services, smooth change management, and post-event support.

The life event pilot project is being implemented in order to speed up the change of society from effective management to a people-centered and predictable society. Preventive ability can be made possible by the artificial intelligence network Aurora. Aurora is a network of artificial intelligence (AI) and autonomous applications that creates the conditions for a people-centered and predictable society.

Aurora accelerates the transition of public administration to the era of artificial intelligence (AI). The project will accelerate the construction of a people-centered and predictable society in accordance with the recommendations of the DigiNYT monitoring group.

This thesis is assignment for Gofore Ltd and City of Tampere in the development work of a life event where student moves to study in new home town. Thesis aims at examining the prerequisites and recommendations for further development work of university ecosystem in this life event.

At the moment there is lot of data and information from services and ecosystem operators in Tampere universities which can be used for helping new students integrating in new home town. Problem is that data and information are now available in many sources. Advantage in current situation is that university personnel can help student and guide them to for right source of information or service provider. Disadvantage is that, this model takes time from personnel and students.

It is important now to investigate solutions how we can save time from university personnel and offer personalized information to students. This thesis aims to investigate could platform economy and artificial intelligence help in this situation.

1.1 Thesis topic

Although change has been constant, we are arguably experiencing the most remarkable era of enterprise transformation to date. The confluence of four tectonic technological forces social, mobile, analytics, and the cloud is reshaping everything we know about business: that is, how value is organized, created, and delivered in virtually all industries, ranging from banking and transportation to energy and healthcare. (Kane, 2015)

As Kane (2015) says we are in the era of enterprise transformation to date. Enterprises are more confluence about technological forces and has to reshape their strategy to meet today´s needs of doing business.

Business is both war and peace. In today's dynamic business environment, firms have to compete and cooperate at the same time in order to grow and survive. (Brandenburger & Nalebuff, 1996)

This modern way of doing business is helped by application programming interfaces (APIs), ecosystems and platforms. Application programming interfaces (APIs) the tools of digital transformation states Jacobson, Woods, & Brail (2011).

Platform economy, ecosystems artificial intelligence are modern building blocks of digital transformation and needs more investigating when university ecosystem is been built to serve future human centric and predictable society. That is the reason which led to choose this topic.

1.2 Thesis objective, purpose and research questions

This thesis is designed to be give more needed information about platform ecosystem and give data into further development work of ecosystem in the life event where university student moves to study in new home town.

Research question where I am going to find answer in this thesis is, what possibilities platform economy model brings in university ecosystem.

1.3 Concepts and theories

Main concept in this research is platform economy ecosystem. To form understanding at platform economy ecosystem, I need to examine terms digital ecosystems, digital platform, artificial intelligence (AI) and application program interfaces (APIs).

1.4 Data and methods

With the help of literature and peer reviewed articles is explained basic understanding from platform economy phenomenon and I will examine platform economy, ecosystems and artificial intelligence (AI) in theoretical level to give basic understanding from their importance.

Nature of this thesis is qualitative, and interviews are use as method to collect the data in further development work of university ecosystem. Interviews are executed thru internet survey and face-to-to face interviews.

1.5 Thesis contents

First chapters is explaining theory of platform economy thru literature of former researches. Former researches give information about the nature of platform economy in general level. Platform phenomenon is examined to give understanding importance of this digital phenomenon. Typology of platforms gives common understanding from different kind of platforms and dimensions of digital platforms. This first part is important reader to know the basics of platform economy.

Then I give notable information about term digital ecosystem and how they work. I explain how digital ecosystems are managed, how they are mapped and analyzed. Innovation ecosystem gives live example from role of the city in innovation ecosystem.

Then I give information from Public Private People term. It is important to examine because nature of this thesis assignment. I will give examples´ at Public Private People projects from the world to give understanding, how different sectors can work together to do good for the society.

Then I give information to reader about how artificial intelligence (AI) together with platform economy make more value to the business. Artificial intelligence (AI) research is stated and how human aware artificial intelligence (AI) is used to gather data to improve our life quality and track our health. Swot analysis of artificial intelligence (AI) in Finland states the readiness in national level to artificial intelligence (AI) business. Ethical framework in artificial intelligence (AI) is given to understand what kind of questions need to be answered before harnessing artificial intelligence (AI) to improve our live quality. I will give ethical viewpoints and key policy recommendations on artificial intelligence (AI) from Finnish government. That is given to strengthen the meaning of ethics in harnessing artificial intelligence (AI) to our society.

Third chapter is stating research strategy and the reasons for choosing qualitative research method for this thesis.

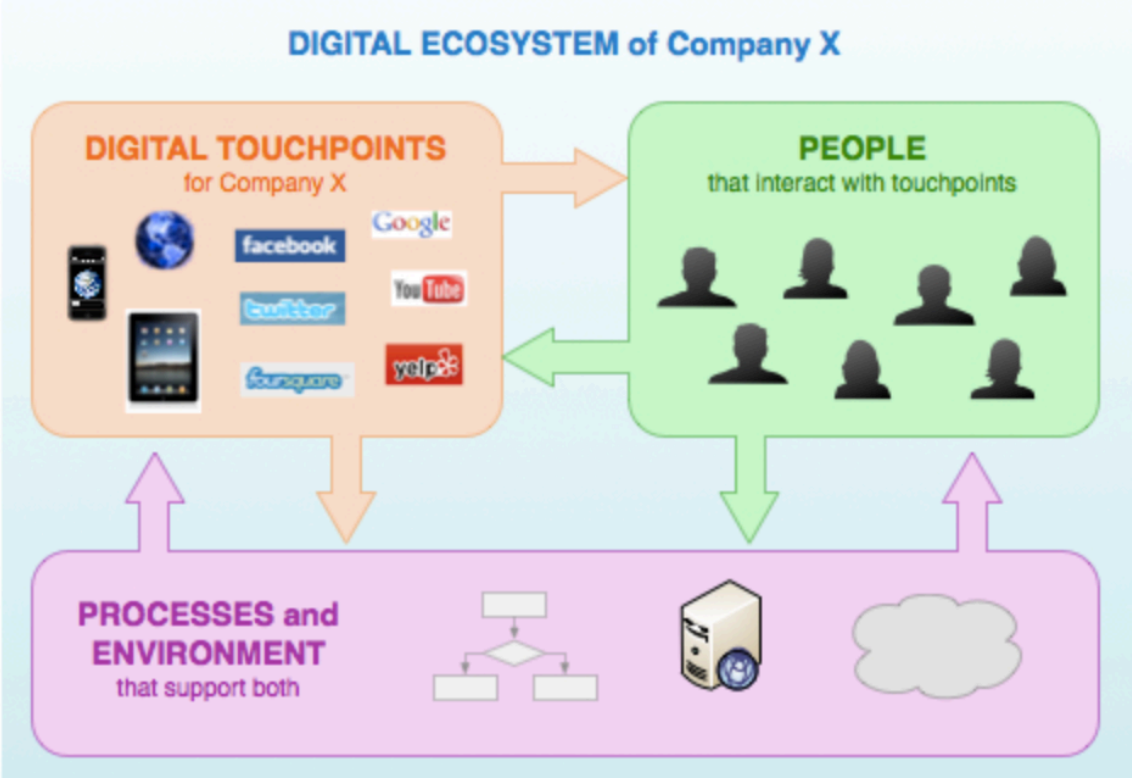
Next chapter gives results from the interviews of university personnel. Semi structured interviews states opinions of university personnel how could they collaboration with university network could help students´ career in university and aspects such as adapting in new home town and finding employment after graduating?

Final chapter gives to the reader summary and conclusions from the research and theory and gives the information to follow-up research and is it needed.

2 THEORETICAL FRAMEWORK

2.1 Literature review

McCormack (2011) says that "the digital ecosystem of a business is the combination of digital touchpoints, people interacting. Those are connected by the business processes and technology environment which supports both." Digital ecosystem is the interface where companies can provide their services thru application programming interfaces (APIs) and create more value to their actions. Picture 1 presents digital ecosystem and what it interacts.



PICTURE 1. Digital ecosystem of company X (McCormack, 2011)

Picture 1 is defining how in digital ecosystem of company x the digital perspective is the data centers, devices and data that reside in this network, and how they enable users and enterprises. This connectivity can be described as digital continuum that involves different network protocols, devices and sensors that are starting to create the technological ecosystem and the digital enterprise within it (Stilton, 2015, 46).

2.1.1 Platform economy as business model

Law & Birmingham (2016) states that in platform economy company who provide marketplace doesn't own the content or services. Platform economy connects individuals or businesses to creating content, exchange services and create new businesses.

According Huhtamäki, Basole, Still, Seppänen (2017) application program interfaces (APIs) duty is to allow others to innovate on top of digital platform and application program interfaces (API) providers are benefitting from ecosystem of platforms.

2.1.2 Artificial intelligence (AI)

Hardesty (2010) says that artificial intelligence (AI) emerged from the development of a mathematical language. It was resembling a computer language where researchers could encode assertions like “water is blue” and “eagles are birds”. After developed this sort of languages, artificial intelligence (AI) researchers started using them to encode lots of commonsense assertions. After researchers encoded this assertories, they stored them in huge databases.

2.1.3 Application programming interfaces

API stands for application programming interface. An application programming interface (API) can provide a hook for colleagues, partners, or third-party developers to access data and services to build applications such as iPhone apps quickly. The Twitter and Facebook APIs are famous examples (Jacobson et al., 2011).

Application programming interfaces (API) are technology that allows software programs to talk and interact with another. This simple idea helps to combine different skills in one application for to create better customer experiences. Information about Application programming interfaces (API) is important companies to know and how they can use the information more efficiently.

Platform economy is not new way of making more business. Since ancient Greece we have had fairs and we have been using platform to make trade. Nowadays platforms just gone digital to internet. It is strange that there is so less amount of literature about platform economy in Tampere university libraries. As a matter of fact, there is none. There is few Thesis made in Theseus which have researched some features from platform economy. Key founding’s to this thesis is from internet libraries Google Scholar, Emerald and ResearchGate.

Timmer’s published in 1998 the term electronic commerce which has same characteristics as in platform economy. Those are trading steps such as online marketing, ordering, payment, support and delivery. Timmers (1998) doesn´t mention that those trading steps are done in platform, but those steps are familiar also in platform economy. This was the time when world wide web was evolving and would open connections all over the world and gave electronic platforms their birth.

Tiwari & P. Sareen (2014) refers that word platform has been around over the past 25 years in literature and discourse within economics and management science research, business management, scientific, and government circles, technology marketing, and business, scientific and popular press and media. In their research, they define that platform economy consists from roles, actors and stakeholders. Roles are discrete set of responsibilities, actions, activities and authorizations that together have coherent value-adding logic. Actor is simply a marketplace and a stakeholder can be defined real-life organization with interest or stake in the outcome of certain action.

Wismer and Rasek (2017, 4) states that online platform is two-sided or multisided market where users are connected thru by a platform operator for facilitating interactions between people/companies. Common features to online platform are facilitation to value

adding activities between users, collection on large amount of personal and non-personal data in order to upgrading and optimizing the service and user experience, networking effect between users, possibility to creation of new markets and markets of new forms and maximize benefits usage of information and communication technology to achieve all stated above.

In 2016 United States Government stated a report where they defined platform economy and gave it name digital matching services. In the report platform providers belongs to the "sharing" or "collaborative" economies among other descriptors. Platform economy companies or "digital matching firms" as they are named in report exhibit following characteristics:

1. They use information technology (IT systems), typically available via web-based platforms, such as mobile "apps" on Internet- enabled devices, to facilitate peer-to-peer transactions.
2. They rely on user-based rating systems for quality control, ensuring a level of trust between consumers and service providers who have not previously met.
3. They offer the workers who provide services via digital matching platforms flexibility in deciding their typical working hours.
4. To the extent that tools and assets are necessary to provide a service, digital matching firms rely on the workers using their own.

European commission key characteristics to online platform economy are use of information and communication technologies to facilitate value of platforms interactions. European commission also says that: "today one million EU businesses are selling goods and services via online platforms, and more than 50% of small and medium enterprises selling through online marketplaces sell cross-border."

First comprehensive publication from platform economy in Finland is from state council office, ministry of employment and economy and innovation funding agency Tekes publication Roadmap of platform economy which was published in 2017. Viitanen, Paajanen, Loikkanen & Koivistoinen (2017) defines that Platform economy is emerged from development of the internet, it is business organizing model which can be established quickly, and which is used particular to quickly scale service modules implementation.

As J. Viitanen et al., (2017) is referring that platform economy has been found to produce ways to apply information technology and software engineering a holistic approach of the entire companies or organizations in to same platform. This allows systemic changes, new business models and is allowing more productive structures than earlier.

2.2 Platform phenomenon

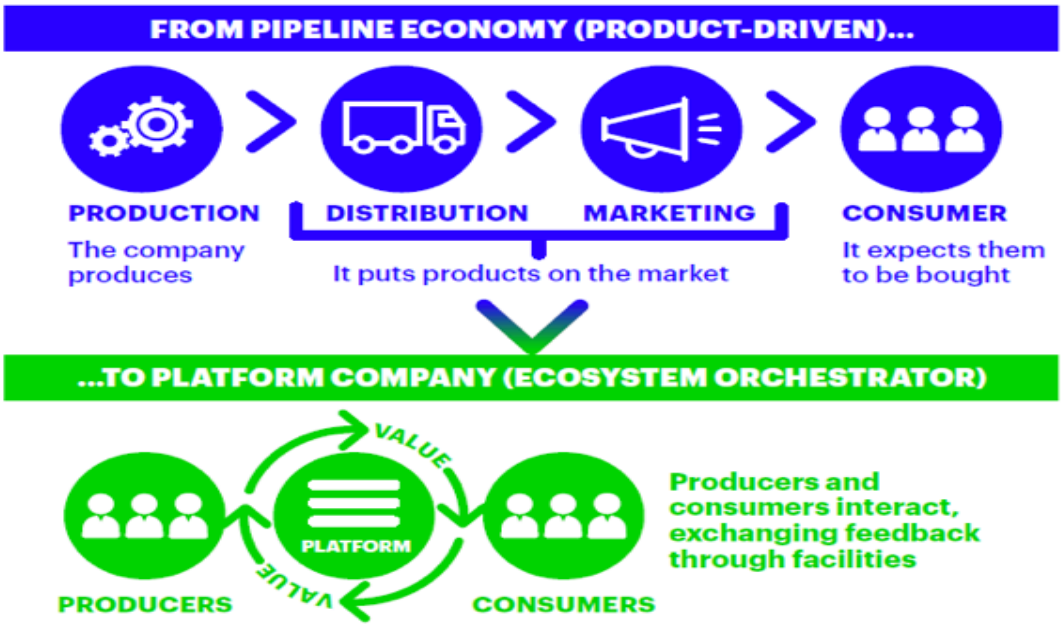
How digital platforms have emerged? What are they? Which kind of platforms there are? Why they are so important? There is couple of questions to define why platform economy is one of the most important economic and social developments of our time. Platform model underlies the success of many of today´s biggest, fastest growing and most powerfully disruptive companies from Google, Amazon and Microsoft to Uber, Airbnb and eBay. Platforms are also beginning to transform a range of other economic and social arenas, from health care and education to energy and government. Most

likely it has changed living of employee, a business leader, a professional, a consumer or a citizen (Parker, Van Alstyne & Choudhary 2016, 3).

The concept of platform has been used in many different formats and the meaning of term seems to differ between them. One could wonder if they are discussing the same phenomenon (Gawer 2009, 46).

In platform ecosystems has been lack in value creation logic within stakeholders. Each cooperative has been concentrating maximizing their own operations rather than contribute to maximizing the value of all stakeholders in platform ecosystem (Hänninen, Rusanen & Paavola 2018, 12).

Platforms invert companies focus from internal activities to external activities. In process companies inverts functions from marketing to information technology to operations to strategy all increasingly centering on people, resources, and functions that exit outside the business, complementing or replacing those that exit inside traditional business. (Parker et al. 2016, 22) Picture 2 defines how traditional economy model is centering in internal activities and platform company model is centering in external activities.

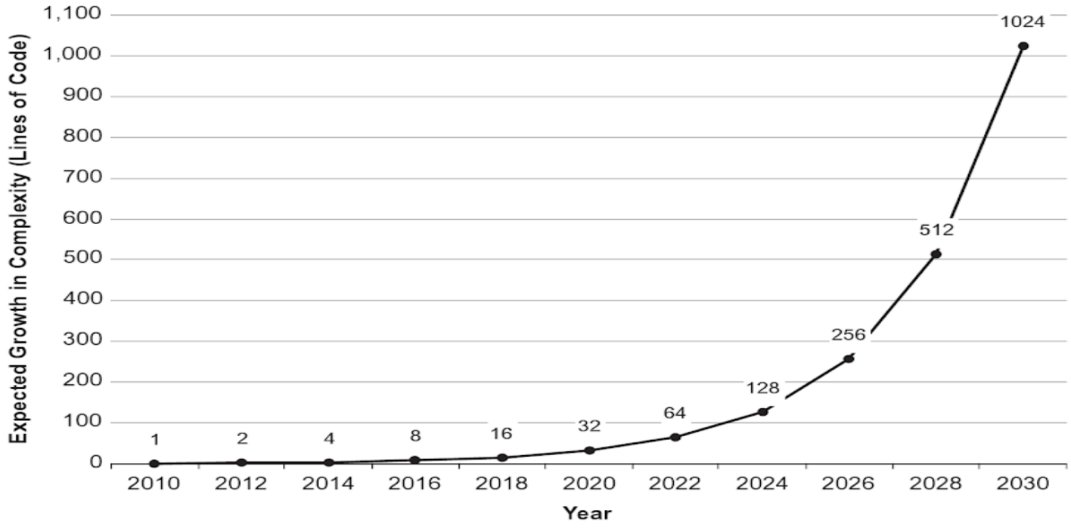


PICTURE 2. Traditional pipeline economy model vs. platform economy model (Presutti 2017)

As Presutti (2017) states in picture 2 defines traditional business model is more product driven pipeline which means that is process driven, where one process is ready the other one begins, and it has beginning and end. In platform economy value comes from an non-stopping flow of digital services between producers and customers.

Customers are demanding more and more customization instead of homogenous products and services. The complexity of products and services across diverse industries is also increasing. (Tiwana 2014, 11). Figure 1 is showing thru software company lines of code, how complexity of products and services are arising at the age of platform economy.

FIGURE 1. Expected growth in complexity (Lines if code) (Tiwana 2014, 11)



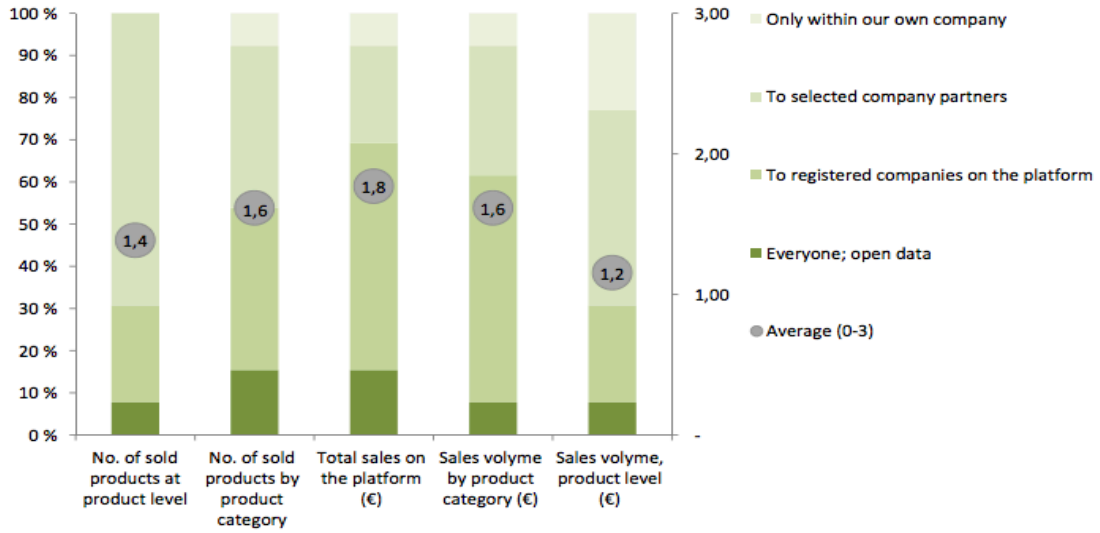
When lines of codes mean more complex products and services, in platform phenomenon it leads companies to specialize in their core competences and leave the rest to capable partners and form larger ecosystems involving many partners who can specialize narrowly and deeply and breadth of deeper insight to ecosystem making more value to serving customer.

Value of data is increasing, and platform developers are making more complex code to serve customer better in future. So far 90 percent of all data existing, has been created in last two years. In new service platforms are produced, disseminated, consumed immaterial services which don´t get worn out no matter how much platform users use them, and users refine platforms continuously better with their actions. (J. Viitanen et al. 2017, 15)

The platform economy is based on interaction and calls for the sharing of the co-created value. Openness and interface transparency are at the core of a successful platform economy. Digital platforms provide greater accessibility, speed, efficiency and sometimes an improved user experience, service and greater convenience compared to existing ones. In value creation, there is a shift towards networked structures crossing organizational and industry boundaries, enabling new kinds of business models in place of traditional value chain structures.

Though the value of each platform depends on the participation of partners, in many cases these so-called boundary resources are not genuinely open. According to a recent study by The Research Institute of The Finnish Economy (ETLA) respondents (n=17) were not ready to share their company's product level sales volumes with other companies operating on the platform. Results are presented in Figure 2. (Kotiranta, Seppänen, Tahvanainen, Hemminki, Mattila, Sadeoja & Tähtinen 2017, 30).

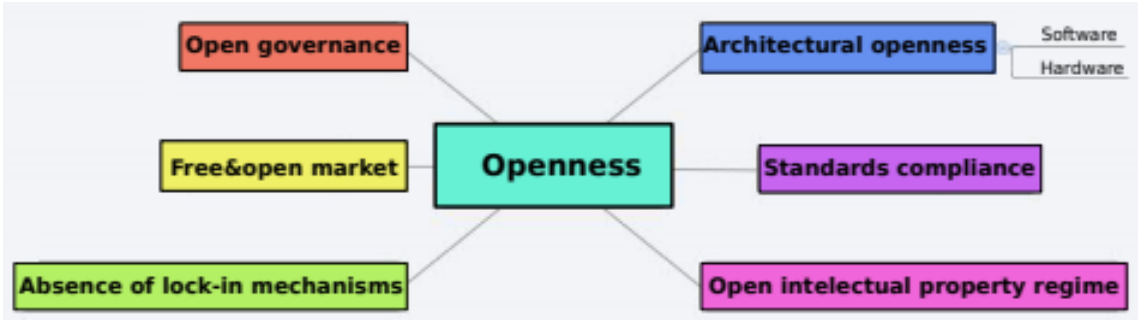
FIGURE 2. Companies/organizations willingness to share their data (A. Kotiranta et al. 2017, 30)



Source: ETLA. n=17.

Consequently, there was a higher readiness to share more aggregate, product category level data as study results in Table 1. For example, 70% of the respondents were ready to share their company's total sales generated on the platform. On strategic level, long term joint development pinpoints in ecosystem would be 1) development of algorithm for evolution of platforms, 2) interoperability of the platform thru company and field lines, and 3) interoperability with other platforms.

Picture 3 visually aggregates Teixeira (2015, 3) six aspects of openness, which are architectural openness, standard compliance, open governance, free and open market, absence of lock-in mechanisms and open intellectual property regime.



PICTURE 3. Six aspects of openness (Teixeira 2015, 3)

Texeira (2015) six aspects of openness would help as a tool to a fully-open platform/ecosystem. Openness could speed up development of platforms and ecosystems in university ecosystem also.

2.3 Typology of platforms

Understanding digital platforms, there are different kind of platforms depending on context. De Reuver, Sorensen and Basole (2017, 10) In Table 1 and 2, Gawer (2009) describes four different kind of platforms.

Type of platform	Internal platforms	Supply chain platforms	Industry platforms	Multi-sided markets or platforms
Context	Within the firm	Within a supply chain	Industry ecosystems	Industries
Number of participants	One firm	Several firms within a supply chain	Several firms who don't necessarily buy or sell from each other, but whose products/services must function together as part of a technological system	Several firms (or groups of firms) who transact with each other, through the intermediary of a double-sided (or multi-sided) market
Platform objectives	• To increase the productive efficiency of the firm • To produce variety at lower costs • To achieve mass customization • To enhance flexibility in the design of new products	• To increase productive efficiency along the supply chain • To produce variety at lower costs • To achieve mass customization • To enhance flexibility in the design of new products	For the platform owner: • To stimulate and capture value from external, complementary innovation For complementors: • To benefit from the installed based of the platform, and from direct and indirect network effects complementary innovation	• To facilitate the transactions between different sides of the platform or market
Design rules	• Re-use of modular components • Stability of system architecture	• Reuse of modular components • Stability of system architecture	• Interfaces around the platform allow plugging-in of, and innovation on, complements	• Not usually addressed in the economics literature*

TABLE 1. Typology of platforms (Gawer 2009, 4)

Type of platform	Internal platforms	Supply chain platforms	Industry platforms	Multi-sided markets or platforms
Context	Within the firm	Within a supply chain	Industry ecosystems	Industries
End-use of the final product, service or technology	• Is known in advance and defined by the firm	• End-use is defined by the assembler/integrator of the supply chain • End-use is known in advance	• Variety of end-uses • End-uses may not be known in advance	• Not usually a variable of interest in the economics literature
Key questions asked in the literature	• How to reconcile low cost and variety within a firm?	• How to reconcile low cost and variety within a supply chain?	• How can a platform owner stimulate complementary innovation while taking advantage of it? • How can incentives to create complementary innovation be embedded in the design of the platform?	• How to price the access to the double-sided (or multi-sided) market to the distinct groups of users, to ensure their adoption of the market as an intermediary?

TABLE 2. Typology of platforms continues (Gawer 2009, 48)

In table 1 and 2, internal platforms are designed to help internal activities and lower costs inside of a one firm. Supply chain platforms are designed to help activities to companies who are involved in one supply chain. End use of supply chain platform is defined integrator of the supply chain. Supply platform is designed to increase productive efficiency and reconcile low costs and variety within a supply chain. Industry platforms are designed to work in bigger context. Industry platforms are designed to serve companies in industry ecosystem. These companies don't necessarily buy or sell from each other, but whose products/services must function together as part of a technological system. Multi-sided market or platforms which are designed to firms or groups of firms who transact each other through the intermediary of double-sided or multi-sided market.

With De Reuver et al. (2017) research core concepts on digital platforms are defined on Table 3.

Concept	*Definition*
Multisided platform	Mediating different groups of users, such as buyers and sellers
Multisided markets	Bring together (or match) distinct groups, whereas the value for one group increases as the number of participants from the other group increases
Direct network externalities	The value of the platform depends on the number of users in the same user group
Indirect network externalities	The value the platform depends on the numbers of users in a different user group
Digital platform (technical view)	An extensible codebase to which complementary third-party modules can be added
Digital platform (sociotechnical view)	Technical elements (of software and hardware) and associated organisational processes and standards
Ecosystem (technical view)	A collection of complements (apps) to the core technical platform, mostly supplied by third-party
Ecosystem (organisational view)	Collection of firms interacting with a contribution to the complements.
Applications	Executable pieces of software that are offered as apps, services or systems to end-users
Boundary resources	Software tools and regulations facilitating the arms' length relationships between the involved parties
Platform openness	The extent to which platform boundary resources support complements

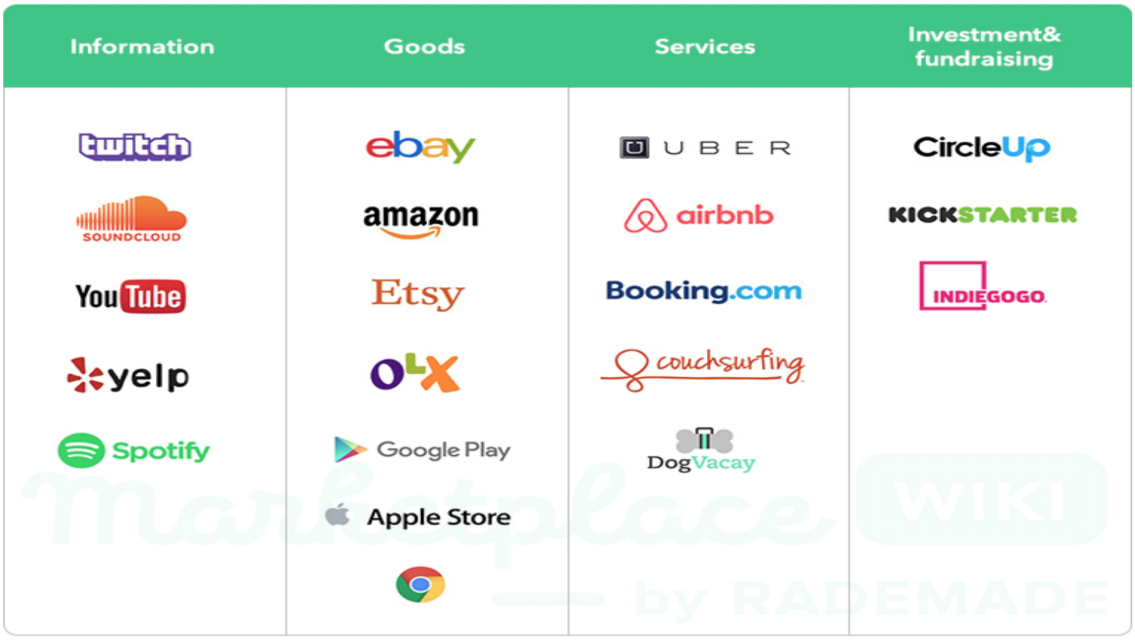
TABLE 3. Core concepts on digital platforms (De Reuver et al. 2017, 4)

M. De Reuver et al. (2017) definition is concentrating to define what kind of platforms there are and notice also definitions from ecosystem, applications and boundary resources. Gawer (2009) typology of platforms definition, context and objective of platform and what is the end-use of platforms is defined more detailed. There are also similarities with these two definitions. Both notice that platform economy is multisided, there are technical elements and there is platform owner who connects groups of users and their product/services.

Pryhodko (2017) defines that there are three different basic customer groups to model platforms and they are customer to customer (C2C), Business to customer (B2C) and business to business (B2B). From platform operator´s point of view, platforms can be divided in three categories:

- Internal platforms (intranet), one single operator provides product and service platforms and applications on its own environment.
- Supply chain platform (upscale intranet), Closed platform and system architecture combination for members of supply chain, usually managed by biggest company of value chain.
- Industrial or between industries (internet) platform, are open to third party operators. (Seppälä, Halen, Juhanko, Korhonen, Mattila, Parviainen, Talvitie, Ailisto, Hyytinen, Kääriäinen, Mäntylä & Ruutu, 2015, 7).

Platforms can be divided thematic categories which are information, goods and products, services and investment and crowdfunding. Picture 4 is showing few platform operators examples from each category.



PICTURE 4. Examples from different platform categories (Pryhodko, 2017)

Examples of Pryhodko (2017) from different platform categories are market leaders of their categories. To be successful platform owners has to make sure in all levels that at least following features are realized:

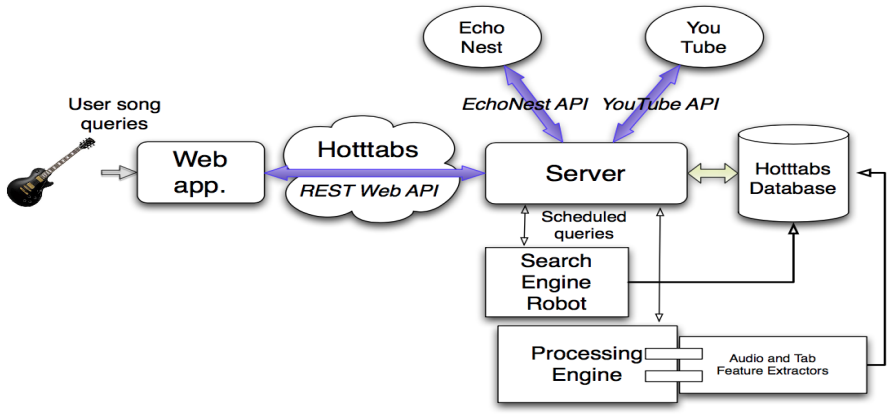
- Networking effect has to be available
- Multisided markets
- Common rules for platform operators
- Open application programming interfaces (API) and open software development kits (SDK)
- Openness for new innovations and corrections
- Centralized processes and quality assurance and controlling (Seppälä et al. 2015, 8)

2.4 Dimensions of digital platform

Sun, Gregor and Keating (2015) knowledge seven dimension of IT-platform. Those are technological base, standards, add-ons, interoperability, transactions, governance and ecosystem. In following chapters those will be identified more specifically.

2.4.1 Technological base

Sun et al., (2015, 7) states that technological base allows add-ons to be developed. Add-ons are seen as application programming interfaces (APIs) and they are supposed to allow changes unforeseen at the time when technological base of platforms were created.



PICTURE 5. Technological base of Hotttabs web application (Barthet, Anglade, Fazekas, Kolozali & Macrae 2011, 16)

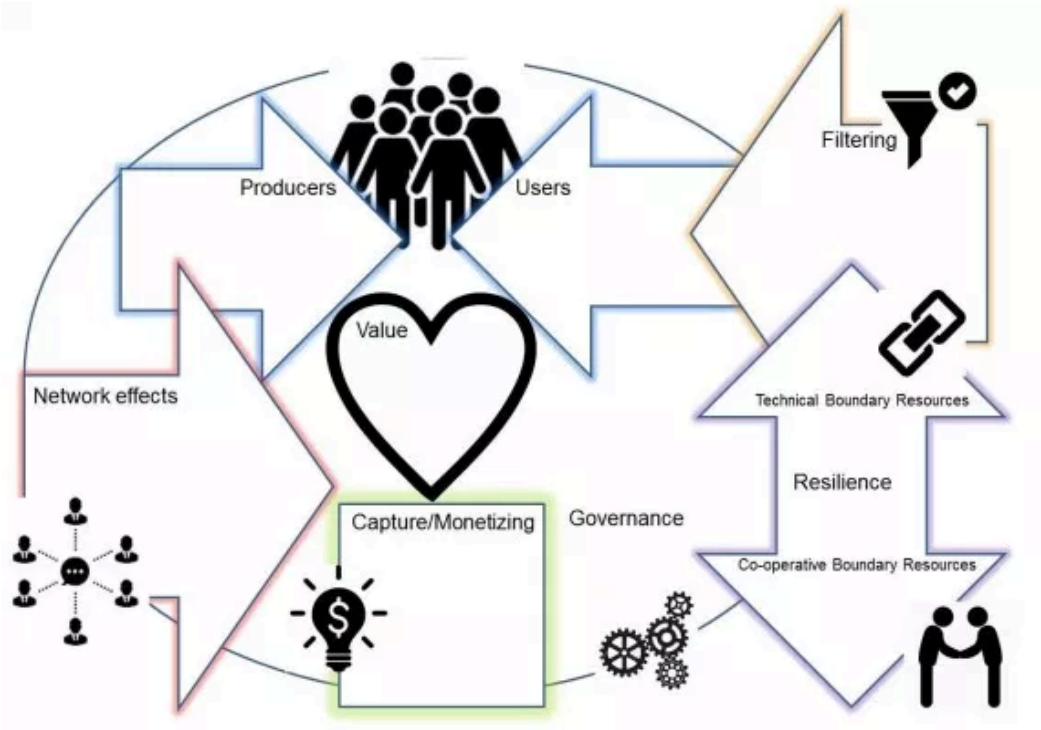
Picture 5 shows where Hotttabs web application technological base. Application core is in server and it is connected thru application programming interfaces (API) with different kind of add-ons. Technological base does accommodate changes and it permits changes without compromising functionality as Sun et al. (2015, 7) stated and one functionality does not affect each other performance.

2.4.2 Standards

A "standard" refers to design rules Sun et al. (2015, 7) and design process starts by identifying boundary business conditions and setting targets based on conditions and are referred to as core design choices. (Tura, Kutvonen & Ritali 2017, 5) This means that all developers of the platform should have equal knowledge from the parts of the platform and have equal starting point and standards to their work. Principles methodology refers also in standards and that in daily practice of mobilizing ecosystems through platform strategies (Cicero, 2018).

Platform owners are not working alone according to Still, Valkokari, Sorri & Seppänen (2017). Platform economy business is interaction of many businesses. Platforms are not limited by traditional business rules. Therefore, platform ecosystem should be configured carefully when companies are operating at platform economy.

In picture 7 is defined tool how to support identification and understanding of platform economy model. This tool helps companies describing platform which would be beneficial for all platform ecosystem actors.



PICTURE 6. Platform canvas (Sorri et al. 2017)

Sorri et al., (2017) are stating that platform canvas is tool for platform ecosystem participants. Platform should be based on multi-dimensional value co-creation between ecosystem members. Ecosystem members should guide their thinking with the help of platform canvas. According to Korhonen, Still, Seppänen, Kumpulainen, Suhonen & Valkokari (2017, 25, 26) there are four key questions that managers need to be considering:

1. Who are operating in the platform?
2. What value has been created in the platform?
3. What are the tools of value capture for the different platform parties?
4. How core interaction is supported in the platform?

It is important to understand the value of ecosystem and all participants in ecosystem and understand that having several partners in same ecosystem is making new business opportunities.

2.4.3 Add-ons

Still, Valkokari, Seppänen, Huhtamäki, Seppälä, Basole & Gawer (2017, 9, 13) are saying that Finnish companies should open their digital platforms boundary resources. There are only few Finnish companies that have public application programming interfaces (APIs). Situation has established activated in this matter in 2017. Finnish cities has been forerunners at developing and operating open data application programming (APIs) and other boundary resources.

2.4.4 Interoperability

Maia, De Muylder & Silveira Nogurira Reis (2018) is using term interoperability when electronic health records (EHR) is supposed to allow interoperability of one or more repositories of information by computer, physically or virtually integrated, enabling longitudinal record of clinical information centered on citizen, regardless of the institution that has originated the record.

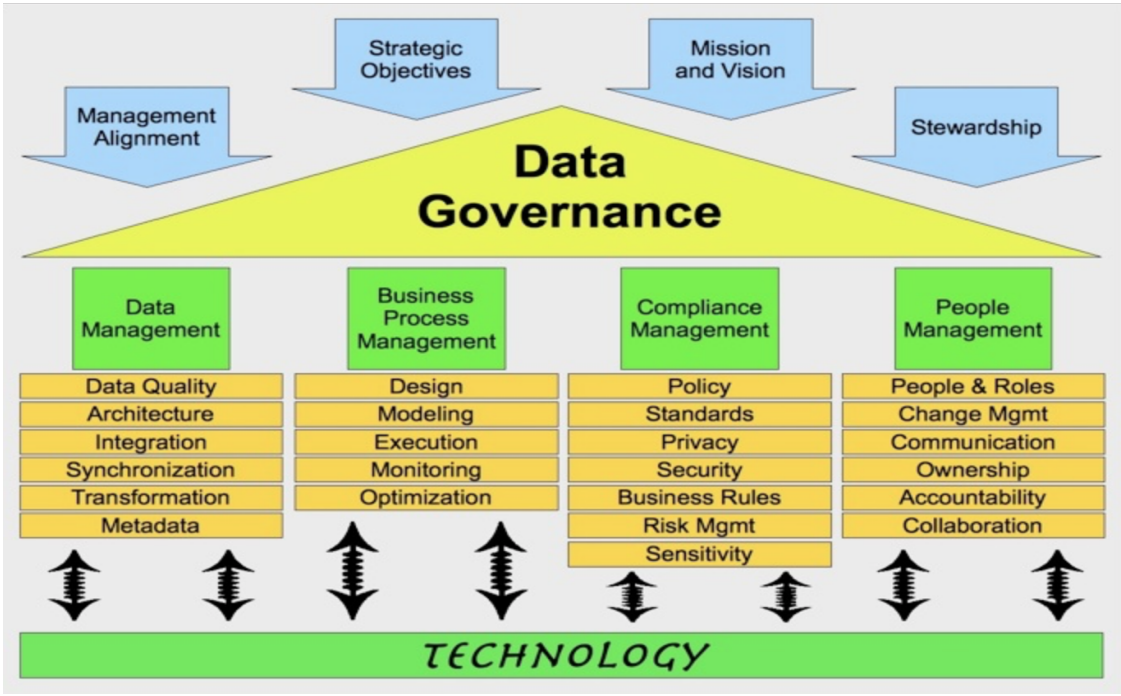
Interoperability in platform economy context has same aspects which Maia et al. (2018) defined. Interoperability means in platform economy in technological level the ability add-ons connect to platforms as an application programming interface connection. Moilanen, Niinioja, Seppänen, Honkanen (2018, 33, 48) Application programming interface provides better access to information or data by being openly or limitedly available and enables new kind of value creation in platform economy operators.

Transaction is an interaction between two entities in a channel or context and involves an exchange of value unit between two entities. Cicero (2018, 6) In platform economy is used digital transactions. It is seamless system involving one or more participants, where transactions are affected without cash. Digital transactions involve financial technology (Fintech) company collaborations for the purpose of meeting increasingly demands of the technological users (Investopedia, 2018).

2.4.5 Governance

Nowadays, governance can be broadly understood as the interaction between governments, business stakeholders and non-profit organizations by which policy decisions implementations are undertaken (Ysa, Albareda, Forberger 2014, 8).

In platform economy governance is defined the one who makes the decisions about a platform. Tiwana et al. (2010, 6) states that platform should have just the right amount of governance. Picture is defining what stakeholders and which kind of factors affects in data governance.



PICTURE 7. Data governance (Kimbro, 2018)

Picture 7 shows interaction is three layered. Governance of data consist from technology, management and from company objectives. These together formulate needs for data governance.

2.5 General Data Protection Regulation (GDPR)

When speaking from data governance, we cannot avoid from General Data Protection Regulation (GDPR) which strengthens data protection provisions for all EU data subjects (Collibra 2018) and this subject is mandatory to take notice when companies operate in platform economy because companies are using and transferring huge amounts of data in platform business. Regulations protect companies from misuse of data.

With regard to the situation in Europe, one of the first legal protections for personal information was codified in Article 8 of the European Convention on Human Rights (ECHR) in 1953. This wasn't in the form that we might expect to see privacy legislation today, but it provides the foundation for modern European privacy laws. Article 8 reads:

1. Everyone has the right to respect for his private and family life, his home and his correspondence.
2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others. (Calder 2016)

PICTURE 8. General data protection regulation (GDPR) Who is it for? (Pogrebna 2018)

Picture 8 shows who general data protection regulations (GDPR) is for and the stake-holders, rights and actions required to operate under general data protection regulations GDPR.

As Lambert (2018, 61, 64, 65) states, the new general data protection regulations (GDPR) defines personal data as any information relating to an identified or identifiable natural person. Data protection law protect the personal information of individuals; that is the personal data of and in relation to individuals.

The data protection regime around personal information that relates to or identifies, directly or indirectly, an individual. Data protection is in many respects wider than data protection and confidentiality. The data protection legal regime governs whether, when, and how organizations may collect and process personal data, and, when permitted, for how long.

2.6 Digital ecosystems, how they work?

Digital ecosystem is one of the seven dimensions of IT-platform by Sun, Gregor & Keating (2015) but it needs to examine more deeply because of assignment is so much related on ecosystems and how ecosystems work.

Adner (2017) says that from ecosystem operators perspective is necessary and critical to understand every firms´ actions, choices, and outcomes that they serve the whole ecosystem. Also, Iyer & Basole (2017) are saying that competition today is between ecosystems and understanding ecosystems can help managers improve strategic decisions and reshape the boundaries of their industries.

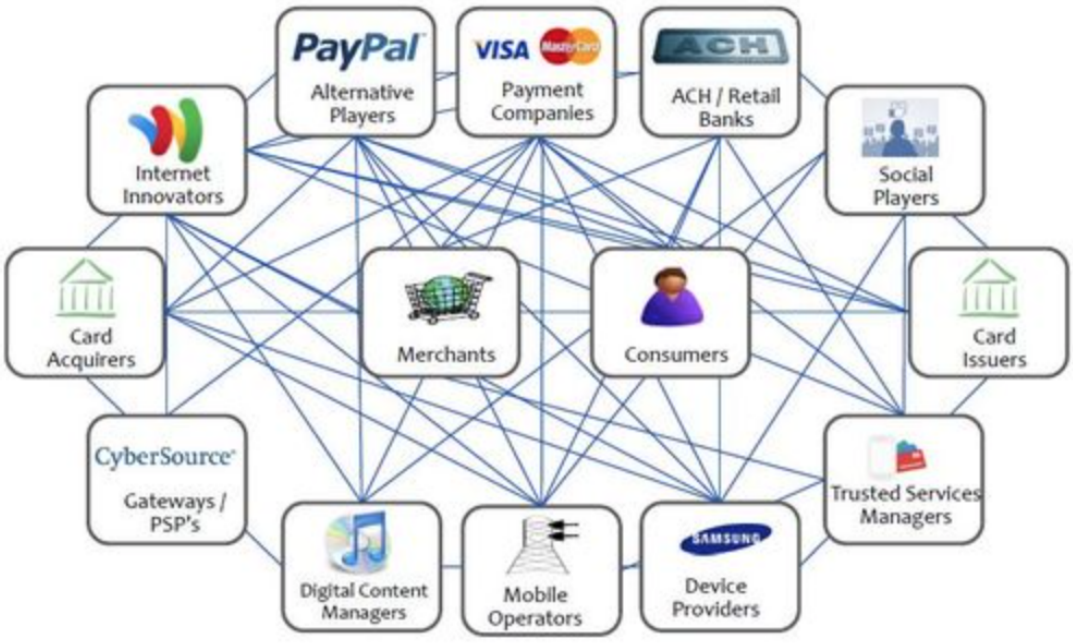
The businesses, institutions, and other environmental factors that affect the value, positively or negatively, that a platform can generate for the participants on the platform.

For example, the value of shopping mall to retailers is greater if there are easy road access to it and if it is located farther away from competing shopping malls (Evans & Scmalensee 2016, 208).

Viitanen et al. (2017) defines digital platform ecosystems are networks of different parties where autonomous actions forms a whole, whose value is significantly greater than the sum of its parts. Ecosystem service providers and their partners gather to develop complementary product-service packages and customer value-generating total solutions in the selected themes. In turn platform economy images, the market with digital platforms where business has reached significant or dominant market position.

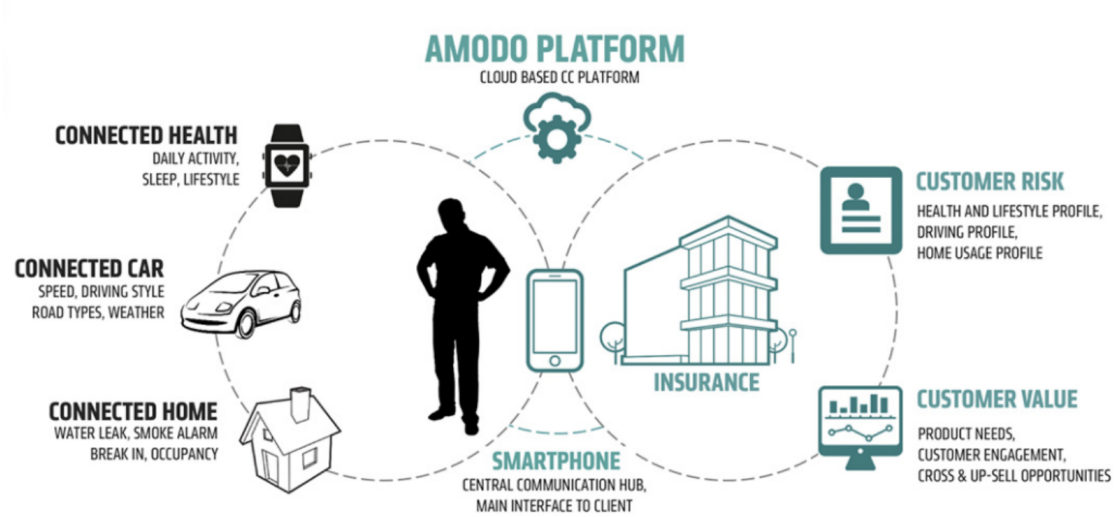
Tiwana et al. (2010, 3) developed the idea that the evolutionary dynamics of platform-based ecosystems is constant dialogue which is beneficial for all parties in ecosystem.

Picture 9 shows example from ecosystem with network from different parties. In picture, service providers forms ecosystem to mobile financing services which value is significantly greater than the sum of its parts.



PICTURE 9. Example from digital ecosystem (Skinner 2018)

In picture 10, is example from digital platform, there are services which combined together makes the added value to customer. Platform is operating thru smartphone. In comparison, ecosystem different service providers combined together makes the added value to customer and makes companies possibility to establish new business areas together and as Basole, Russell, Huhtamaki, Rubens, Still, & Park (2015, 29) visualize mobile ecosystem and sees that the transformational flow of transactions, information, talent, and financial resources, personal relationships may be seen as process indicators, deals and events as culmination of those processes. Data is depending of it is nature, the context in which is used and what answers it needs to be fulfill and cognitive abilities of the user.



PICTURE 10. Example from platform (Hugh 2017)

Ecosystem can be created behalf of institute networks, but it always comes from collaboration of people. People represent each institution and they have an obligation to represent institutions goals and follow given directions of institution, but the success and failure of co-operation is ultimately dependent on the adequate alignment of people's intentions and interaction between each other (Sutinen 2017, 21).

2.6.1 Analyze your ecosystem

Identify roles. List at least 15 roles played in your organization’s ecosystem. Don’t worry about specifics. Instead, focus on types. For example, roles in Boston’s dining industry include suppliers, distributors, restaurants, government regulators, customers, and so on.

Get specific. Write down some specific examples of each role to jog your thinking when you return to the map in the future. For example, you might list Clio and Upstairs on the Square as upscale restaurants, Russo’s as a distributor, and Waltham Farms as a local farmer.

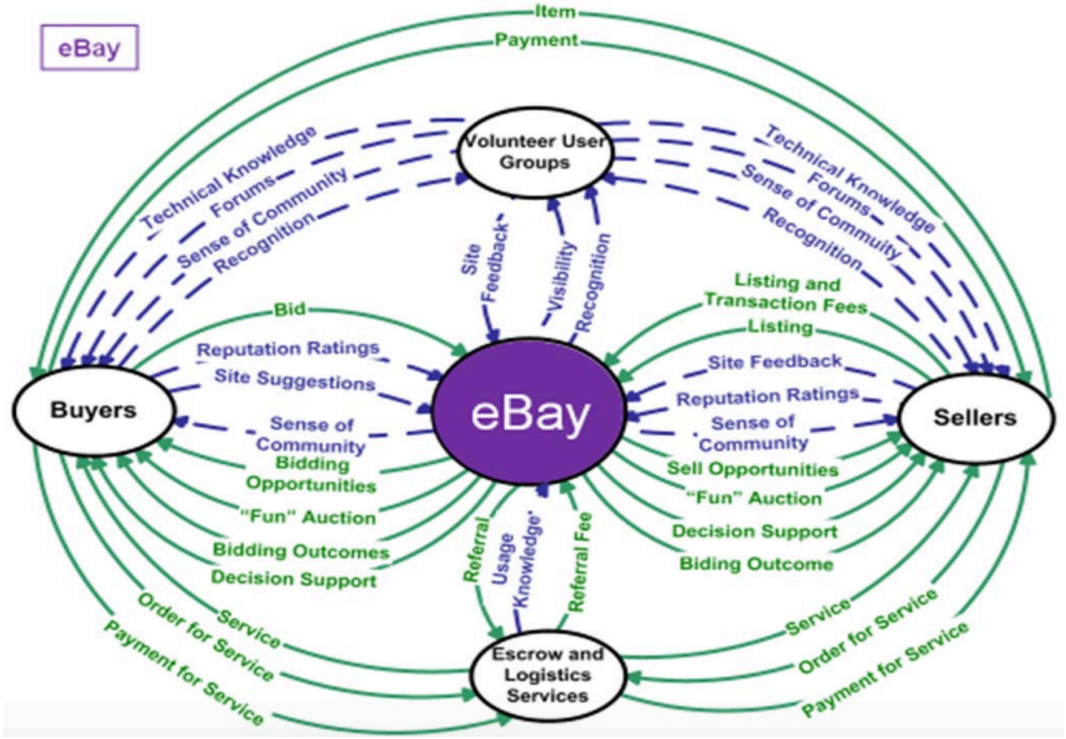
Begin your ecosystem map by drawing roles. Start by drawing one circle for each role (not for each specific entity) on your map. Make sure there’s enough room between them. You may wish to space those that you believe have more interactions closer together.

Tell the story. Tell the story of how roles interact in the ecosystem. Start with the customer. Who does the customer go to for service? What do they request? Then what happens? How are the requests fulfilled? Who’s involved? As you tell the story, draw arrows between entities to show the flow of transactions through the ecosystem. Since you’re starting with the customer, the first line should travel from the customer to another entity. Remember to label lines with their deliverable.

Look at your ecosystem map and analyze what you see. If you get stuck, try these questions:

- How much reciprocity is there between roles? Are some roles giving much more than receiving? Are others receiving more than they're giving?
- Do specific roles provide resources, work, and/or sustenance for others in the ecosystem? How dependent is your company on these roles? How stable are the companies that fill these roles?
- What part does your company play in the ecosystem? Does it provide a low-cost, commodity service that can easily be replaced by someone else? Does it fight for limited resources with many other companies? Does it set the pace for other entities?

In picture 11 is simplified example from ecosystem map of eBay.



PICTURE 11. Ecosystem map of eBay (Partnering resources, 2017)

Here are a few ways your ecosystem map can be helpful:

- Orienting new employees to your company / department.
- Demonstrating the value of a potential partnership to others in your company or ecosystem.
- Giving you a quick view of the environment, you need to monitor for disruptive changes and opportunities. (Partnering resources 2017)

2.6.2 Managing ecosystem

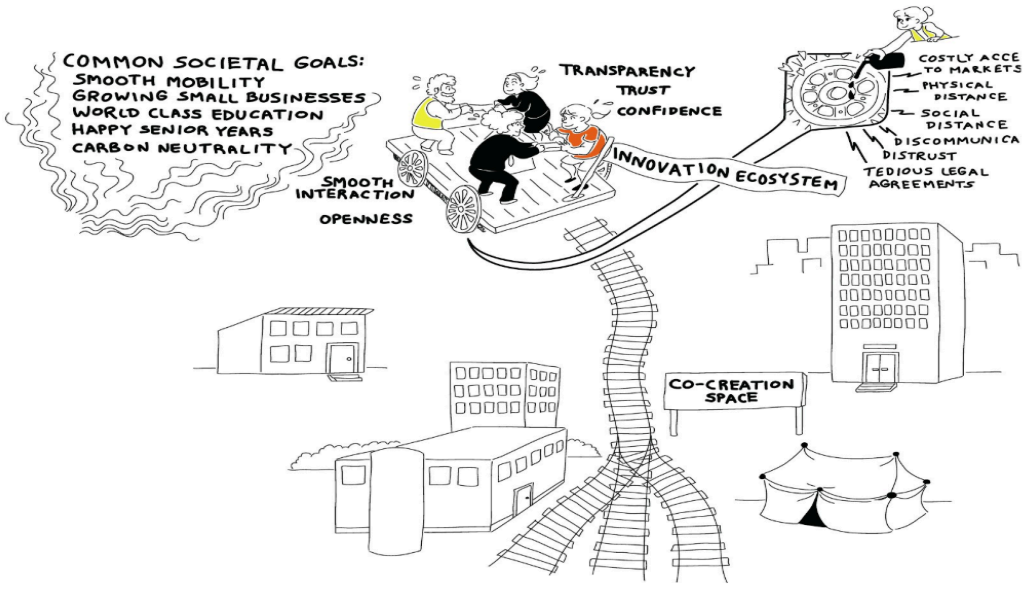
Understanding the business value chain and importance of active communication are important in ecosystem management. Characteristics of effective ecosystem management by It for business (2018) are:

- Implementations which boost the innovations
- Joint end-to-end key performance indicators (KPIs) and other performance dashboards
- Unified processes and quality assurance across stakeholders
- Continuity and flexibility from joint operation model

By It for business (2018) the most important is that cost efficiency is monitored regularly so constant improvement of ecosystem is ensured. Innovation and road mapping of new services are essential for continuous development for ecosystem maturity.

2.6.3 Innovation ecosystem

In innovation ecosystem innovative energy is aimed jointly, consciously and by practical actions towards the common strategic goal shared by the ecosystem members and at the same time aim is in each member's own strategic goal.



PICTURE 12. Innovation ecosystem in Espoo (Sutinen 2017, 22)

Innovation ecosystem of Espoo city is presented in picture 12. Main points in innovation ecosystem of Espoo is transparency, openness and smooth interaction between people. Thru these main points, Espoo is growing ecosystem which Co-creates common societal goals for example Smooth mobility, Growing small businesses, world glass education, happy senior years and carbon neutrality (Sutinen 2017, 22).

2.6.4 Role of the city in innovation ecosystem

Role of the city in innovation ecosystem is to be active facilitator and also be as developer of ecosystem himself with the network of customers and other institutions networks. City organization participates as co-developer in every ecosystem where it is participating, and the goal is to develop its´ own innovation ecosystem together with customers and other institutions.

City organization could invest for example in co-developing innovation platforms to Living labs, orchestrating actions in innovation ecosystem and provide physical, social and digital platforms for other organizations who is involving in development of innovation ecosystem. (Sutinen 2017, 29)

2.7 Public Private people co-operations

Commission of the European communities (2009, 2) says that Public Private People (PPPs) are forms of cooperation between public authorities and the private sector. These co-operation is supposed to modernize the infrastructure and strategic public services. Public Private People (PPPs) projects are involving financing, design, construction, renovation, management or maintenance of an infrastructure. These tasks vary depending from project.

2.7.1 Public Private People digital platform strategy in Finland

European Union has goals of leadership in industrial digital platforms. Finnish companies have good qualifications in international competition in areas: health and wellness, bio-economy, forest economy and Mobility as a Service (MaaS).

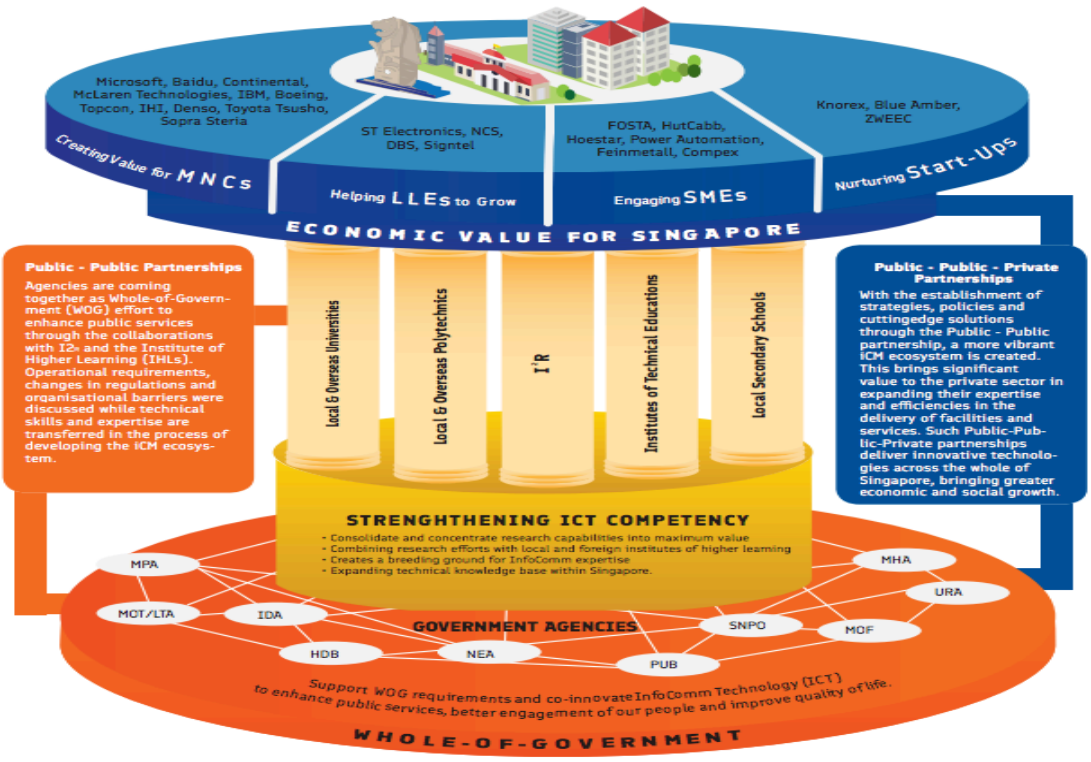
Here are the most important recommendations from Finnish prime minister for advancement of digital platforms and platform economy (Ailisto, Collin, Juhanko, Mäntylä, Ruutu, Seppälä, Halén, Hiekkanen, Hyytinen, Kiuru, Korhonen, Kääriäinen, Parviainen, & Talvitie 2016, 9,10):

1. Public procurement should favor innovative solutions– give first references for new products and services.
2. Public data should be opened to help digital platforms to get momentum internationally.
3. Create favorable conditions for co-operation between ecosystem operators. Clarify roles and be innovative.
4. Create regulation which encourages or mandates opening data in machines in order to enhance competition and third-party innovation.
5. Employ European Investment Fund to speed up investment.
6. Share and tell success stories about Finnish platforms and digital services in international publications.
7. Train new experts for digital platform economy and technology.

2.7.2 Singapore and Smart nation vision

In comparison to Finnish strategy, Singapore strategy is to create the world's best digital infrastructure, which creates the foundation for a competitive business environment. Singapore wants to open all interfaces equally to all service providers. All key sectors and business themes are wanted: mobility, housing, environment, manufacturing, education, health and administration for making the world´s best digital infrastructure (Viitanen et al. 2017, 152-154).

A*Star institute for Infocom research in picture 14 states how platform economy is layered, and all providers are working together for common goal.

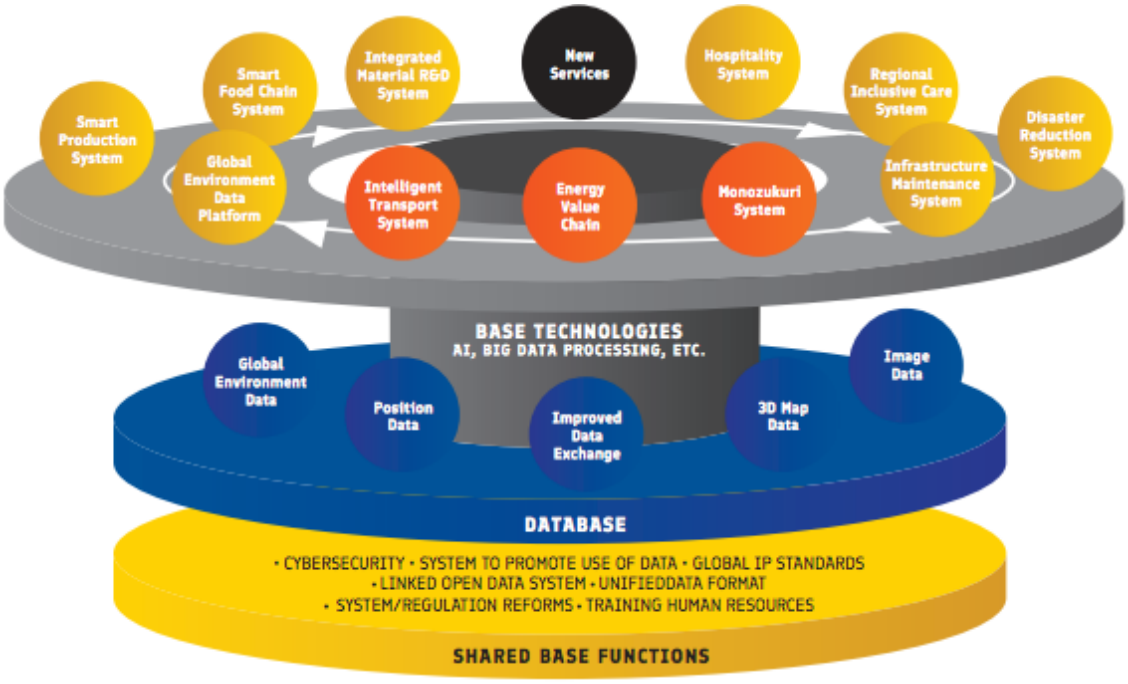


PICTURE 13. Singapore Smart Nation´s vision (Viitanen et al. 2017, 152)

Smart Nation vision is to create framework as model where public, private and people (PPP) framework works nationally and create a model that combines private sector leading companies and ministries for ongoing dialogue cross-administratively for developing customer-oriented digital solutions. The Singapore state is committed to invest in the digital platform and its open to share the platform with private sector. Businesses in private sector only have to develop their own business model over this common platform. This program is intended to demonstrate leadership and create a common level of knowledge base for joint and development work with the private sector (Viitanen et al. 2017, 154).

2.7.3 Japan and Society 5.0 project

Harayama (2016) has started project Society 5.0 in Japan which she describes that its purpose is to remove technology centered thinking to human centered thinking with help of technology. Picture 14 is describing how it is done.

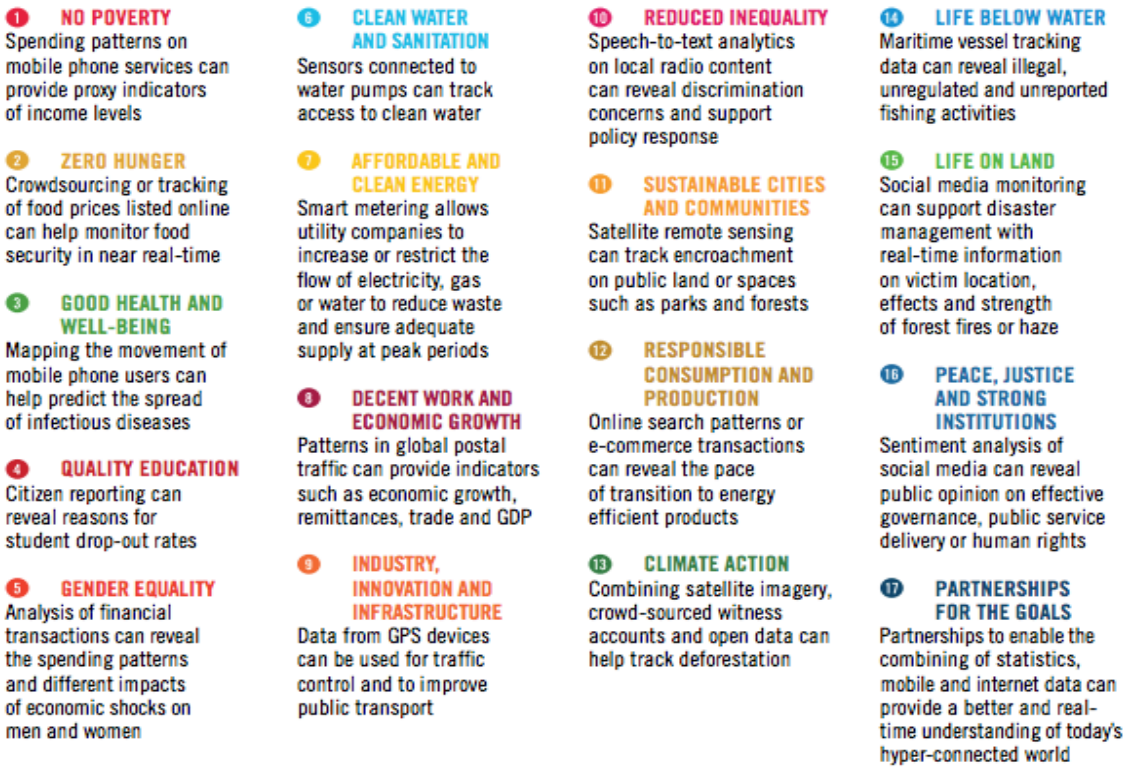


PICTURE 14. Model of layers in Society 5.0 project (Harayama 2016)

The private sector's commitment to the implementation of the Society 5.0 program is strong when companies are given the opportunity to take responsibility for the development. Most of the cooperation with companies will be implemented under the SIP (Strategic Innovation Promotion Program) which is divided into 11 nationally significant themes. Each theme includes representatives of ministries, representatives of the science and research community and the business world. Groups are chaired by either business representatives (50%) or leading academics (50%). The SIP program has its own budget, which is fully directed to investment in new research, technology and innovation projects (Viitanen et al. 2017, 150).

2.7.4 United nations and sustainable development goals

As World economy forum (2017, 9) states that digitalization is doing good by realizing the United Nations (UN) sustainable development goals. The United Nations UN Sustainable Development Goals (SDGs) are in big role at future of humans and the globe. United nations 2030 agenda has 17 goals with 169 targets. Goals are part of a bold global plan to end poverty, address inequality and tackle climate change.



PICTURE 15. United nations sustainable goals (United nations development programme 2018)

There are global, national and regional stakeholders in United nations development program. Statistical officers, science and research and development organizations providing analytics and visualization tools. Civil societies are making policy analysis and evaluations for communities. We could say that United nations have mobilized many sectors and modern tools for succeeding in implementing all 17 goals.

As United nations development programme (2018) in picture 15 states the 17 goals are

1. No poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation and infrastructure
10. Reduced inequality
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice and strong institutions
17. Partnerships for the goals

According to United Nations (2017) documents there are room for improvement in sharing critical data from global, regional and national development. Policymaking is lacking in this manners. Many governments do not have access to adequate data from their populations. This is common situation in the poorest countries. These are the countries which are needing the most help in United nations (UN) sustainable development goals (SDGs). Leaders in these countries should focus on actions for making more open data in Public Private People (PPP) projects if they are meant to achieve zero extreme poverty and zero emissions by 2030.

2.8 Engaged technology artificial intelligence (AI)

Artificial intelligence (AI) was born in 1960s early computers were automating tedious or laborious tasks. Scientist realized then that it was possible to simulate human intelligence and artificial intelligence (AI) was born.

Machines are normally meant to handle well-defined, high-volume or high-speed tasks by freeing humans to focus on more complex problems. Scientist realized in 1960s that artificial intelligence (AI) enables computers to solve problems and perform functions that would ordinarily require a human intellect (DARPA, 2018).

Kar & Dash (2018, 1) states that nowadays artificial intelligence (AI) has already been integrated in many applications. Artificial intelligence (AI) should for example automate business processes, gain insight through data analysis and engage with customers and employees. Visual tasks have been seen where artificial intelligence (AI) is using algorithms are exceeding human performance. This technology is integrated in many sectors nowadays for example transportation, health care, education, employment and workplace. There are also many chatbots who have automated customer service.

One example from engaged technology is where The Tesla team (2016) has made autopilot software which is making driving more safely. It is giving more confidence behind the wheel and making highway drive more enjoyable. Car can park and go to garage itself when driver have to squeeze in possibly tight garage.

Boddington (2018) shares many people concern, that workforce is replaced by artificial intelligence (AI) and it makes lots of people unemployed. Ethical issues because it affects people's wellbeing and employment. Questions about building ethic rules into the decisions that artificial intelligence (AI) devices are making on our behalf. That concerns Boddington (2018) especially when artificial intelligence (AI) is becoming more autonomous.

2.8.1 Human aware artificial intelligence

Now, as it becomes a central force in society, the field of artificial intelligence (AI) is shifting toward building intelligent systems that can collaborate effectively with people, and that are more generally human-aware, including creative ways to develop interactive and scalable ways for people to teach robots like stated by different authors in table 2 and in Figure 3 is stating, value propositions at United states based Artificial intelligence (AI) / Machine learning (ML) – powered digital health companies.

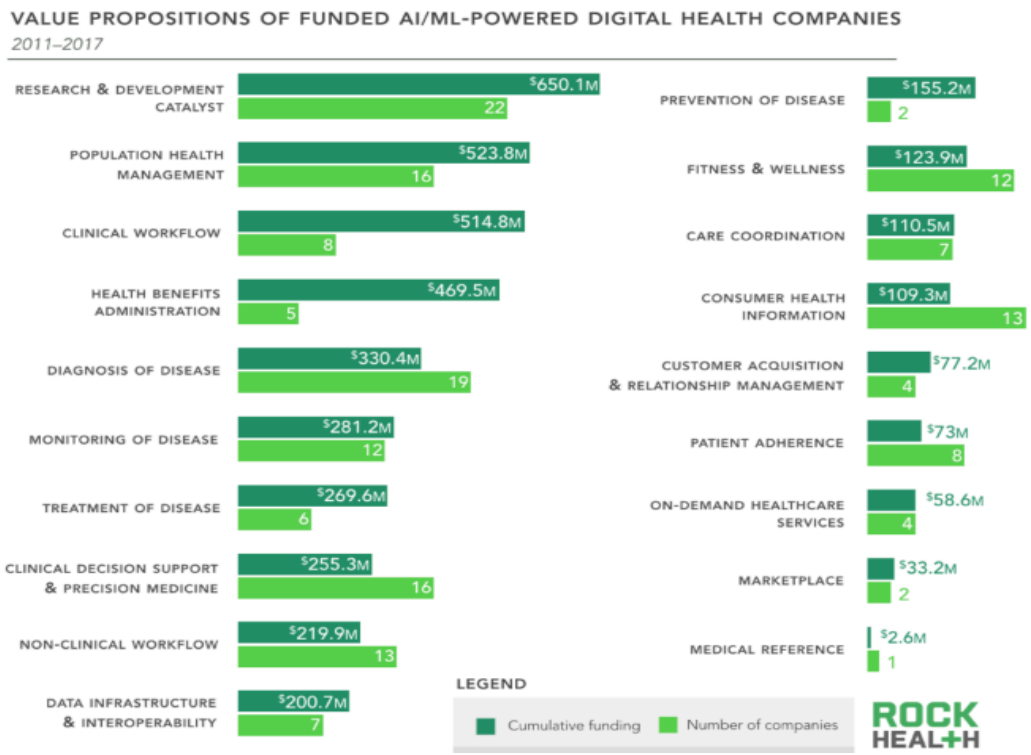


FIGURE 3. Value propositions of funded AI/ML-powered digital health companies (Zweig & Tran 2018).

Growth of funding has boosted thousands of mobile platforms who offer information, introduce behavior modification, or identify groups of "people like me." Combined with the emerging trend of more specialized motion tracking devices, such as Fitbit, and the emerging (inter)connectedness between the home environment and health-monitoring devices, has created a vibrant new sector of innovation to platform economy (Stanford university study panel 2016, 29).

In platform economy operates different kind of health care operators with help of artificial intelligence which are supporting physical, emotional, social and mental health. Here are few examples from these categories and how they could support our health care in future thru applications and mobile devices: (Stanford university study panel, 2016 ,30).

Life quality and independence

- Automated transportation support continued independence and expanded social horizons.
- Sharing of information help families remain engaged with one another at a distance, and predictive analytics is used to "nudge" family groups toward positive behaviors, such as reminders to "call home."
- Smart devices in the home help with daily living activities when needed, such as cooking and, if robot manipulation capabilities improve sufficiently, dressing and toileting.

Health and wellness

- Mobile applications that monitor movement and activities, coupled with social platforms will make recommendations to maintain mental and physical health.

- In-home health monitoring and health information access detect changes in mood or behavior and alert caregivers.
- Personalized health management help mitigate the complexities associated with multiple co-morbid conditions and/or treatment interactions.

Treatments and devices

- Better hearing aids and visual assistive devices mitigate the effects of hearing and vision loss, improving safety and social connection.
- Personalized rehabilitation and in-home therapy reduce the need for hospital or care facility stays.
- Physical assistive devices (intelligent walkers, wheel chairs, and exoskeletons) extend the range of activities of an infirm individual.

2.8.2 Artificial intelligence SWOT analysis of Finland

Artificial intelligence (AI) SWOT analysis of Finland is supposed to state readiness in national level to artificial intelligence (AI) business.

Strengths

• The smooth operation of the operators, the agile environment
• Highly educated and technology-friendly population
• Uniform and effective education system
• Finland is an excellent platform for piloting (limited and integrated market, abundant technology reserves and regulatory support)
• Promoting experimental culture in public administration has brought agility
• Widespread consensus that large and rapid changes are needed
• Rapidly growing startup ecosystem
• Companies and public organizations have undergone various structural reforms over the last few years
• Unique databases: availability and quality

Weaknesses

• Thin internationality: focus on domestic making, thin linkage and lack of international links, lack of global businesses, strong "Middle class" missing, not attracting people from around the world, foreign investment less control-oriented
• Cultural risk avoidance
• Decentralized resources, lack of economies of scale

Opportunities

• Transforming business: digital industry transformation, new solutions and business models, data services from export service business, co-ordination and steering of bioeconomic processes
• Public sector reform: managing health and care costs on artificial intelligence and platforms, improving processes, healthcare data stocks, wider demand for welfare at a rising standard of living Energy: renewable energy sources, more decentralized and more proactive energy systems

• Intelligent transport: electrification, mobility of service, management of total systems • Total security: increased security need for living standards, digital risks, importance of individual protection and privacy

Threats

• Lack of trust in know-how and financial success
• Reduction of ICT inputs has contributed to the decline in private investment
• Slowness and inefficiency of commercialization
• Reforms and stiffness of the labor market
• There is no courage to large-scale reforms

Finland has traditionally focused heavily on domestic in various sectors. The lack of international links appears for example, in research and development and innovations. Finland does not attract enough know-how from the world. Foreign investment has grown in recent years, but the figures remain clearly below the level of the comparing countries. Avoiding risks -culture is still deep in the Finnish operating environment, even millennials are cleansing their own paths fearlessly as the founders of startup companies as well as international experts (Työ- ja elinkeinoministeriö 2017, 29, 30).

2.9 Ethical framework in Artificial intelligence (AI)

Tadde & Floridi (2018) is stating the same as the other researcher that ethical problems are arising from Artificial intelligence (AI). Human self-determination and thinking is one of the most relevant issues on ethics and must solve urgently. Artificial intelligence (AI) is requiring regulation. This technology can be used for making lot of good as in United nations development programme.

Here are few ethical questions about artificial intelligence (AI):

What we want to upgrade with the artificial intelligence? Efficiency, experience, encounters ...?
What are the things and encounters that we do not want to give up after implementing of artificial intelligence? How are they protected?
Do we intend to increase or reduce the autonomy of an individual worker through the use of artificial intelligence?
Making decisions at artificial intelligence, what does it demand about people?
Should the development of artificial intelligence always be studied with at least the same amount of human effort and what does humanity mean to artificial intelligence?
When asked about recommendations from artificial intelligence, are we willing to make the right solutions based on them?
When an increasing number of organizational decisions take place with the help of data, what are the rights of people to their own data?
Is it our intention to evolve computer or can the assisted decision making be based on the machine challenging people to better thinking?
Artificial intelligence is making decisions, who is responsible for those decisions?

These questions need to be considered in advance when we want to harness the artificial intelligence (AI) to improve working life. Ethical point of view the main focus of artificial intelligence (AI) work should be on humans and on end purpose. After these criteria´s are solved, comes focus to develop better technical solutions (Mustakallio 2018).

2.9.1 Defense Advanced Research Project Agency

There is need for solve problems before they occur. Predictability is the word of today in problem solving. The Explainable Artificial Intelligence program of Defense Advanced Research Project Agency (DARPA) is great example. The goal of this program is to define new techniques to explain the decision-making processes. Goal of this program is understand how artificial intelligence (AI) systems work and this way designers and developers can improve the systems to avoid mistakes and mitigate the risks of misuse. Tadde & Floridi (2018) are stating that successful projects includes ethical impact analysis to assess artificial intelligence (AI) benefits and risks. This leads to defining guiding principles for an ethically sound design and use of artificial intelligence (AI).

To determine importance of this ethical work with the artificial intelligence (AI), for example President of United States budget request for Defense Advanced Research Project Agency (DARPA) to 2019 is 3.44 billion dollars. This year it was 3.17 billion dollars (DARPA 2018). This is giving lot of opportunities making ethically approvable artificial intelligence (AI).

2.9.2 Finnish ethical viewpoints in artificial intelligence (AI) work

“ Work in the age of artificial intelligence is report from Ministry of Economic Affairs and Employment and is a collection of four main articles that discuss the effects of artificial intelligence (AI) on general economic and employment trends, the transformation of work and the labor market, reforms on education and skills maintenance and ethics. “ (Ministry of Economic Affairs and Employment 2018, 52, 53) In this report Ministry of Economic Affairs and Employment gives key policy recommendations for ethics work considering artificial intelligence (AI). The most important subjects in artificial intelligence (AI) work raised from report:

- Ethical values which are base of our society
- Monopolistic and state-controlled practices should not exist
- Ethical aspects of artificial intelligence (AI) should have monitoring group who monitor technology development. Monitoring group evaluate pilots and supports the creation of rules. Assess practices in defining responsibilities in situations where a machine is making decisions autonomously
- Research of ethical artificial intelligence (AI) and use of data should be implemented on health sector ecosystem growth strategy
- Confirmation from societal heterogeneity and participation, meaning that all citizens have equal capabilities for participating discussion from artificial intelligence (AI)
- Opportunities of artificial intelligence (AI) should be well informed to all citizens
- European Unions (EU) General Data Protection Regulation (GDPR) regulations and possibilities are shown for the public
- Cooperation as seen key to the success before and will be it again in artificial intelligence (AI) context also.

In summary from these policy recommendations. Ignoring these viewpoints they will have straight effect on companies and institutions brand value. Artificial intelligence

(AI) solutions have huge potential in all sectors, both public and private sector so these viewpoints should take seriously.

2.10 Synthesis of theories

United States and Finnish government, European commission and individual researchers identifies same characteristics to platform economy in former researches. They say that platform economy is multisided economy which is value adding activity and makes business more profitable to companies because of the connectivity and from customer point of view platform economy allows more personal service because of data collected. Surprising is that in Finland first publication from government is 2017 although this phenomenon has been existing in some form from ancient Greece.

Former researches say that mapping and analyzing ecosystems are about identifying, testing and selecting options to create and capture value. It is about forming new hypotheses and defining how they can be tested and implemented. To achieve this, a new approach is needed that will help to navigate the complexity and uncertainties of the business ecosystem landscape. This came up in research also. University ecosystem needs to be mapped, tested and identified to navigate the complexities and uncertainties of the ecosystem.

Maaroof (2017, 6, 18, 30) stated that, use of big data will require collaboration of various actors including data scientists and sales staff By compining their strengths to understand the technical possibilities as well as how solutions are implemented in practice. According recent discussion big data should not be isolated. More important would be concentrate on the “ecosystem” of big data. Big data should not see as just data, no matter its size. Use of data was concerned for the interviewees in research. They were not optimistic for the use of data at the moment. They thought that General Data Protection Regulation (GDPR) were limiting too much of opportunities to use data.

Government and other public authorities have big roles in creating favorable conditions for creation, development and growth of digital platforms. Cities in Finland have been forerunners in making public data open and available. Public Private People (PPP) co-operation has big role in rise of platform economy in Finland. Above was great examples from Singapore and Japan were these collaborations are making more human centered and predictable society with Public Private People (PPP) co-operation.

3 METHODOLOGY

The implementation of this research is defined in this chapter. At the beginning is defined purposes of research and motives for choosing research methods. Then use of quantitative research method is justified. After this data collection methods are presented and finally interviews which was made to this research. I will explain how interviewees were chosen, how interviews were done and what were the questions to the interviewees.

3.1 Implementation of the research

In a human-centered and predictable society, services are constantly available, and people genuinely have access to services in accordance with their own needs. In this need ecosystems and platform economy play important role as enabler for new kind of connectivity. This connectivity makes possible different kind of coalitions of different industries. Digital ecosystems and platforms enable information share and industry coalitions that we cannot imagine yet. This was the motive to this research where I want to get more information about universities ecosystem in Tampere.

This research aims to give potential qualifications for further research work for Tampere city university ecosystem project which aims to clarify situation (life event) where new student is moving to new study town to study.

In this research I am researching university personnel opinions of university ecosystem. University personnel opinions are important in terms of students´ career in university, starting from applying to graduating and employment after graduating. Research aims to seek answers in these questions:

1. How could university personnel and its networks help new students to integrate to in their new home town?
2. Which service providers from university ecosystem would the staff of universities need in order to better support the student's progress, training and employment?
3. Which school data could support the ecosystem operators?

Based on well-known theories from digital ecosystems, digital platforms, Public, private, people projects and artificial intelligence (AI) and thru interviews are made the potential qualifications to the further research work for the life event project of Tampere city.

3.2 Qualitative research method

Since the mid 1980s there has been increasing interest in qualitative research within the information systems research community. Today qualitative research is accepted as being able to provide important insight into information systems phenomena. Qualitative research can be found in many disciplines and fields, using variety of approaches, methods and techniques (Myers & Avison 2002, 8).

Qualitative research is being produced in both business environment and academic institutions, quantitative research is held up as more scientific and consequently superior, despite it is inability to handle complexity (Cassell, Buehrins & Symon 2006, 171).

The basic idea is that you develop a theory about the world, derive implications of that theory that can be systematically tested in experimental research (or other forms of quantitative research), and then conduct research to test whether the implications are true or not (Willis 2008, 66).

3.3 Data collection method

According to Bernard (2011, 158) I was using written list of questions. Based on theory of Bernard (2011) from questionnaires styles, I choose semi-structured questionnaire on face-to-face interviews. Semi-structured questionnaire means that it doesn't have manuscript, so it gives change to ask follow-up questions. Another method was internet survey because there was limited time to get answers in this research and internet survey was the best option to answers fast in this given time period. Internet survey didn't give as great answer as face-to-face questionnaire because it did not give option to ask follow-up questions. As Guthrie (2010, 74) and Mathers, Fox & Hunn (2007, 8) these are the most time-consuming methods to gather and analyze data but was the best methods in this case to get answers from interviewees.

3.4 Interviews

In research I tried to get group of university personnel from management level to student affairs coordinator. Purpose was to get opinions from different stakeholders from all three campuses in Tampere. In research were received 33 respondents. They will be referred in answers by code R and number of the respondent for example R1, R2 and so on.

Face-to-face interviews were conducted with a semi-structured model, so the same basic questions were presented to all interviewees, but more specific questions during the interviews were also made. Internet survey conducted the same questions as face-to-face interviews but did not conclude follow-up questions. Face-to-face interviews were better way to get answers to the research and interviews lead interesting discussions with interviewees. There was option to answer in Finnish and in English in both surveys, but majority of respondents choose to answer in Finnish. After the face-to-face interviews the answers were transcribed in word-document and internet surveys were translated to English.

After the transcribed and translated interviews, they were coded. Coding was done by reading the material that was transcribed and coding different colors, for example issues related to student advisor we highlighted in blue. These citations from the text were extracted to Excel to their own entities.

3.5 Conclusion from research strategy

The research strategies were selected a methodological research method and the face-to-face interviews were made as qualitative semi-structured theme interviews. These methods were selected to get the potential qualifications from interviewees as broadly as possible in given time. Results are used to verify need for further research work at Tampere city university ecosystem project.

4 RESEARCH RESULTS

In this chapter, I go through the results of the research. The topics are supported by direct quotations from interviews. This chapter is divided in three themes because there were three questions.

When I was interviewing, I noticed that all campuses in Tampere had different practices how to implement students in working life and they had different way of handle working life services during studies. All campuses were agreeing that working life services should be implemented in studies that these services cannot be handled by only one person.

Next, I will go through the interviews question by question and pick up the observations that came from them. When I have mapped the observations, I can start creating conclusion based on previous theory and survey results.

4.1 University personnel and its networks helping students adjusting in study town

First question was, how could university personnel and its networks help new students to integrate to in their new home town. This question aimed to map university personnel opinions how they could help students adjusting in university and in the new study town.

"Networks can help a lot in adaptation to the university and home town. Community action and the unity of services are also important. The ecosystem should think of the so-called one-stop-shop principle that student could get help from one location. Ease of service and communality are the most important themes at the moment. The student community could be even more responsible for integrating new students into a new city." R32

Many interviewees felt that information from studies and new study town services should come from one source. University personnel, especially teachers felt that they do not have enough time for guiding students and felt that information is scattered at the moment.

All three campuses had more comprehensive services for international students. This is because of they are coming from different culture. Universities feels that is the reason for more comprehensive orientation although there were opinions that those services should be the same for all students.

"International exchange students and degree students have special services for these basic needs but in a different form as domestic students. Such a new type of thinking would be important to us if we wanted to become international. We need to get a new kind of thinking." R26

Common goal for university personnel is that the student would feel welcome and commit themselves to their own field of study and to their own study group. University personnel felt that other students and alumni's are important sources and peer support for new students.

Important theme between interviewees was importance of city planning. Tampere city should take in to account that that there are enough apartments for students in reachable destinations from universities, so students would not have to apply apartments during orientation period because it is affecting in human cognitive functions. If you apply for housing in the orientation period, it is difficult to get involved with your studies.

To help students adjusting to new study town beforehand, interesting suggestion from one respondent was to offer virtual tours to universities and into new study town for getting to understand from the actual environment and distances in the town.

4.2 Ecosystem service providers with the help of university personnel

Second question was which service providers from university ecosystem would the staff of universities need in order to better support the student's progress, training and employment?

The respondents were mentioning co-operation is important with substances that encourage students to attach into their own study town and substances from working life services. Table 4 is telling that collaboration at companies and co-operation with the city where the most important ecosystem actors to university students from the personnel point of view.

University ecosystem actors	Were mentioned
Collaboration at companies	9
City of Tampere	9
Tutors	8
Tamko	5
Student union	5
Housing services	5
Working life services	3
Other students	2
Health care services	2
Alumnies	2
Tamy	1
Opiskelijan Tampere	1
Nuortentalo ohjaamo	1
Kampus arenas	1
Updated curriculum	1
University web pages	1
More extensive feedback system	1

TABLE 4. University ecosystem actors

Respondents meant by collaboration at companies, that career thinking is important, and it should begin already during the studies. From the interviews came out that in some students complete a degree in their own shelters, do not know any employers who might be in contact after graduation, how to integrate more into working life and it cannot be that than work life services are based on one-man work.

"In the progress of studies would also help motivating more of work-type apprenticeships type to learn from businesses as early as in the first year (as in some universities in Germany, for example)." R15

There was consensus among the respondents that universities and working life should work even more closely together than currently. Working life services should be implemented on studies and students should familiarize to working life services as early as possible.

"Identification of competence could in the future go into curricula more intensively at the level of the whole degree and in the individual courses, so that the student can easily find out what knowledge the degree, major subject, minor subject, and individual study program produce. This would also make it easier for students to describe their own skills in job applications." R20

Companies should be a part of the campuses, it is more desired in the future. It is important for the students to hear the talk of working life from people who are already are working. By companies being in campuses, students can already hear, what employers are expecting from them and what are the demands of working life at the moment. This would lower the distance between students and working life. Students can also benefit by building networks from this collaboration.

City of Tampere and its 'services were mentioned many times in interviews. University, Polytechnic, Tredu, Adult Education Center and Police Polytechnic, there are 60,000 students in Tampere and residents 280,000 in Tampere. It means that the schools and the universities must have a very good dialogue with the city because we have such a huge clientele that is very important for the city. The fact is that there is still room for improvement.

"If students are taken into consideration (housing, wellbeing, hobbies, services, employment) during the studies from the city, it will contribute to joining the city, making employment and staying in Pirkanmaa more likely." R5

In interviews came out worry from students, whose studies aren't progressing at the speed as they should. University personnel thought that social counselor which is at the moment available only for international students should be available also for domestic students. Social counselor would help in difficult situations where student has problems with the studies and would help other staff because GDPR makes harder to intervene on students´ issues. For example, personnel cannot write on students´ electronic files that student is absent because of illness or they cannot add closest family contact information without family permission.

Solution to this matter would be that in the most difficult situations when a student has difficulties, non-educational stakeholders who can help the student would get also this student information and data. This would speed up the intervening process and work as preventive method for difficult situations.

Important service provider who was mentioned many times was Tamko and their networks and other student unions. They were felt as great information sources. Thru Tamko, students can find information about university ecosystem such as housing providers and information from activities in town.

4.3 University data helping ecosystem operators

Third question was which school data could support the ecosystem operators. This question was hardest question for many respondents because of the General data protection regulation (GDPR). Knowledge from the law was limiting their answers, because they are concentrating on what data cannot be shared. Those who thought that way did not think the limitless opportunities of shared data. Those who saw the potential, they saw many opportunities coming from shared data.

Respondent R3, R6, R9, R10, R11, R15, R16 and R18 did not understand the question or did not gave any answer. These respondents left their answer thru internet survey, so they might have needed more help with opening the question more widely. The ecosystem in this case refers to whole set of activities in this survey.

There is huge number of sources where data could come from; questionnaires for students, accumulation of credits and observations at the degree program level, job tracking, national feedback from students, such as questionnaires for bachelors and masters. The future university community must decide how this information, for example, about the progress of studies is used in all degree programs. The importance of completing the degree will increase in the future.

"With regard to the progress of the studies, in order to be able to monitor the student if the student has not progressed to the pace of the other course, there may be some kind of traffic light in such data so that in such situations proactively arrange tailored support for that student." R26

Interviewees stated that this type of alarm function/traffic light would also need for unsolicited tasks. Based on traffic light color/alarms in website university personnel would be able to pick up students who are in danger of being left behind. This way personnel could proactively react to the student situations.

"I am about 15 years ago tried to run the kind of idea that when a student goes to Peppi see his´/hers´ information so student could see from the information from previous students studying pace, where it has led and what kind of studies the student should still be taken based on the past data of graduates. The idea has come to me from e-commerce sites that investigate buyer's purchasing behavior. Based on the purchased or tracked product, the pages suggest that they buy certain products because others have bought or followed them." R27

This type of student behavior tracking system sounds fascinating, but will it work today as it would work 15 years ago. With little bit modifying and updating the idea to meet university student individual demands today, it would be good idea to investigate it more.

Data makes possible to build new type of student cards that it will work at the same time as buss card, library card and access card in different sport venues. With the data we can design cities and transportation more effectively. We can monitor Facilitate usage rates. Look, if it the class rooms utilization of rates are too high, and design facilitation more effectively and monitor what type of air is in the class rooms which has positive reaction to fluency and progress of the studies. When data could be used effectively and better combined from different sources, there would be a possibility to services to be created, that we did not expect before.

"At present, there is a lot of data that nobody is currently using in anyway. The problem now is that data is scattered, data is not exploited enough, and we have no intelligent systems that would do it for us. Unfortunately, there are even more pencil and Excel work in many cases. The ecosystem is certainly interested in getting the data that the education is sufficiently work-oriented and updated, that degrees would ensure employment." R32

4.4 Synthesis of results

The Research Institute of The Finnish Economy (ETLA) study backups that digital platforms provide greater accessibility, speed, efficiency and sometimes improved user experience, service and greater convenience compared to existing ones but research group members where not ready to share product sales data with other companies.

From answers came clear, that there is lot of data in universities and it is not exploited enough yet and used as effectively as it should. Thru the data there is huge potential for services, that university personnel maybe cannot see or imagine yet. Collected data could help for example integrating students in new study town, boosting process of student graduating, teachers to do their jobs more effectively and living in the city. With the help of data, we could build intelligent systems who could search the important data for us. Openness of the data and the six dimensions of data by Teixeira (2016) would be worth to investigate for university ecosystem network because respondents were not aware how they could use the data.

From the research came out that here was lack of ecosystem management because for example working life services has organized differently in every campus in Tampere.

Theory states that innovation and road mapping of new services are important factors for continuous development of ecosystem as City of Espoo example stated. The role of co-development increases when relationship scale between ecosystem operators grows. This is essential when companies and institutions are forming strategic relationships. The platform canvas helps mapping these strategic relationships.

Tiwana et al. (2010) found that evolution of platforms are depending from continuous dialogue of ecosystem operators. Operators in ecosystem as in university ecosystem as well are depending also from open share of data. When dialogue and data sharing is open, ecosystem operators are flourishing. Findings in research were simultaneous but in negative manner. University ecosystem network haven´t used enough their data and dynamics. They have not innovated their ecosystem enough, so by its´ current state, it will not serve future demands of university student who moves to new study town.

Presutti (2017) confirmes that in ecosystem is "living" constantly because the information flow is so rapid and it provides operators constant link to their customers and students, as in these case. Ecosystem operators can adapt to new demands and preferences much faster than in traditional business model. University ecosystem operators should also strive into constant information sharing and co-developing between network operators to serve better students who comes to study in Tampere.

5 DISCUSSION

In the last chapter I will be reviewing once more the study objectives and how the study was conducted. Thereafter, I will briefly explain once the conclusions, then think critically about how the research theoretical part was formed and how the interviews were handled. Finally, there are suggestions to what further research should include.

5.1 Discussion of results

When thinking future opportunities how we are making business and educating ourselves in future, I saw important to find out more about subjects as ecosystems, digital platforms and artificial intelligent (AI). This interest led to the creation of thesis. In the thesis reader is familiarized to the basic theories of these phenomenon's and research is meant to give perspective from university ecosystem at personnel point of view.

Research is focused to getting picture which state university ecosystem is at the moment, which kind of ecosystem operators are in it and how it should be improved to serve university student more personally.

At the beginning of the research we knew that university personnel are important stakeholders in university to student study success, graduating and getting employment after graduating. Research is limited to answer how in situation where new student moves in new study town, university personnel and its networks could improve university ecosystem to help student integrating to new study town.

Before the actual research, with the help of literature review and peer reviewed articles was created basic knowledge from subjects' ecosystems, digital platforms and artificial intelligent (AI). It's the basic information that reader would need to understand phenomena's which are supporting the study results.

The survey was conducted by interviewing 33 university personnel from all three university campuses in Tampere. The respondents consisted different stages of personnel from management to student coordinators. I tried to get as wide range as possible from university personnel to get different kind of opinions from the stage of university ecosystem. Respondents answered to same basic questions, but follow-up questions were made in face-to-face interviews because respondents felt subject interesting and wanted to know more from the subject and that led to follow-up questions. Face-to-face interviews took about 30 minutes. After the interviews were over, conclusions were drawn from every question.

5.2 Contribution to previous research

Like Viitanen et al. (2017) stated the common features to online platform are facilitation to value adding activities between users, collection on large amount of personal and non-personal data in order to upgrading and optimizing the service and user experience, networking effect between users, possibility to creation of new markets and markets of new forms and maximize benefits from usage of information and communication technology to achieve all stated above.

The research found out that this type of activity is needed in university ecosystem between universities and their networks to help university students integrating to the new study town. Respondents felt that by collection personal and non-personal data from university ecosystem would help all stakeholders in university ecosystem providing more individual services to students.

5.3 Conclusions to research question

Next I will give suggestions thru theory, peer reviewed articles and research results for original research question.

Instead of searching information from many sources for students, personnel were mentioning that intelligent system could collect the data on their behalf. This would solve that information could come from one source when artificial intelligence (AI) is finding just the right information which student is needing at the time and provide it to the student. This would release time to university personnel to other duties for example guiding students thru technological issues.

Another solution is to implement chatbots which are using artificial intelligence (AI) to answer written or verbal questions. Most known chatbots are Siri and Alexa. Chatbots could help in giving answers to most commonly asked questions and guide students to the right source of information.

From the research came out that avoiding risks -culture is still deep in the Finnish operating environment and we Finns are avoiding making mistakes. There should be ready tested model for us Finns that we encourage to start using it. This culture came out when I was interviewing personnel. There wasn't many who suggested that we should implement new technologies to help in information flow. Although there were a lot of criticism for information being scattered.

This culture has also noticed in Finnish ministry of employment and economy researches. They have registered that Foreign investment has grown in recent years, but the figures remain clearly below the level of the comparing countries. Avoiding risks -culture is still deep in the Finnish operating environment, even millennials are cleansing their own paths fearlessly as the founders of startup companies and as well as international experts.

Of course, there is lot of ethical issues to tackle in usage of artificial intelligence and by ignoring these ethical viewpoints there will be straight effects on whole ecosystem operators brand values. If the intelligent system is designed badly, it won´t serve its purpose and nobody wants to use it or feels it more annoying that helping stakeholders.

Public Private People (PPPs) co-operation is aiming into modernizing the infrastructure of cities and helping in making human-centered and predictable society. Respondents felt very important that this kind of co-operation with the city of Tampere and companies on the area should be used even more. Sharing data would support the public private people cooperation in Tampere. This was in line at former research and Tampere city should explore Singapore public private people (PPP) strategy even more. This project was also mentioned by one of the respondents in the research.

Singapore wants to open all interfaces equally to all service providers. This means that model that combines private sector leading companies and ministries for ongoing dialogue cross-administratively for developing customer-oriented digital solutions. This program is intended to demonstrate leadership and create a common level of knowledge base for joint and development work with the private sector.

5.4 Critical evaluation of the research design and implementation

This chapter examines and evaluates the reliability of the research selected background theories, research methods and the results obtained. The survey was conducted by interviewing people, so in the future, the same research cannot be repeated. This was recognized as a feature of qualitative research. Renewal is impossible because the interviews are closely related to the place, state and time. In addition, the characteristics of the interviewer themselves influence the results obtained. The reliability of the interviews was somewhat increased by the fact that they were reported very accurately, and the entire research process was described in detail.

In Finland there is not lots of researches from digital platforms and ecosystems. That fact led to find literature from foreign information sources. Lack of previous research led to go through a very large area of background information sources.

While the background theory was wide-ranging, it was not possible to get acquainted with all the elements precisely, but all of them were examined somewhat superficially. When I made my research, I came to conclusion, that digital ecosystems need to be investigated, more than digital platform as phenomenon.

When I went through the interview material it became clear that the research questions themselves were very wide, so the face-to-face interviews were long and extensive. This resulted in work on transcribing, but not much in the results of the research itself. This has already increased the urgent timetable, because there was only limited amount of time for analyzing results. Internet survey didn't produce as extensive results than face-to-face interviews, but answers were quicker to analyze.

5.5 Follow-up research

When digital platform is trending, the university ecosystem is looking for solutions brought by digitalization and artificial intelligence (AI) and based on the results that have been made in this research, there is a need for further researches.

This research was limited only on university personnel opinions from university ecosystem. Next follow-up research should implement university student opinions about university ecosystem and its networks. Students have different angle and perspective to university ecosystem and it needs to be investigated.

After going thru the results from university student point of view, would be useful to investigate businesses and other stakeholders in university ecosystem. Those who can provide employment, housing and health related services to university students and others, which are felt important in university ecosystem.

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APPENDICES

Appendix 1. Internet survey used in questionnaire

Korkeakoulujen henkilökunnan näkökulma siitä, miten opiskelijoita voitaisiin auttaa verkostojen avulla

PAGE TITLE

1. Miten koulu ja sen verkostot voisivat edistää uuden opiskelijan sopeutumista uuteen opiskelukaupunkiinsa? /How could university personnel and its networks help new students to integrate to in their new home town?

2. Minkä toimijoiden apua henkilökunta tarvitsisi, jotta voisivat tukea paremmin opiskelijaa edistymään, harjoittelemaan ja työllistymään/Which service providers from university ecosystem would the staff of universities need in order to better support the student's progress, training and employment?

3. Mistä koulun datasta voisi olla tukea ekosysteemin toimijoille/Which school data could support the ecosystem operators??