DEPARTMENT OF APPLIED INFORMATION TECHNOLOGY

MAKING THE INVISIBLE VISIBLE TO BECOME INVINCIBLE

Towards a method for mapping a business ecosystem to design a digital business platform

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Abstract

Literature concerning business ecosystems, and digital platforms give an extended range of guidelines on how to design a digital platform and transit towards a digital platform business. The literature assumes and already existing knowledge of the business ecosystem, but few gives no hands-on recommendations on how to create this knowledge. This thesis proposes a new method to map a business ecosystem prior to evaluating business platform opportunities. The method was developed in two steps. Initially a literature survey was conducted to identify common denominators from the ecosystem and platform literature. This common denominators, actor, activity, and asset, where then used as a foundation when the method was developed and applied on a Swedish mid-size construction company. The proposed method facilitates these three common denominators and is based on four phases. The method has proved to be able to create the desired knowledge by, in three workshops, identifying more than 200 entities, and 850 connections in the examined ecosystem. The method has also proved to display the ecosystem with low complexity when it is presented in a two-dimensional manner, such as printed on paper.

Keywords: Ecosystem, Business ecosystem, Digital platform, Mapping, Transition, Foresight, Platform Economy, from Pipeline to Platform.

Introduction

The concepts of digital business ecosystems and digital platforms have a natural place and function in the emerging digital markets. As the number of success stories from the digital arena increases, the interest in digital opportunities has spread into the more traditional field of non-digital incumbent markets. This interest is justified, particularly in the cases where the companies have managed to explore and exploit previously unknown or impossible revenue streams and business strategies (Parker et al., 2017a; Wessel et al. 2016). Van Alstyne et al. (2016, p. 57, footnote added) express digital platforms and their ability to disrupt as

"*when a platform enters the market of a pure pipeline*[1] *business, the platform virtually always wins*".

To identify these new digital platform possibilities, it has been proven necessary to expand the previously established horizon of the organisation and include actors and functions that have been considered peripheral (Selander et al. 2013; Yoffie & Kwak, 2006).

In order to create the capability of foresighting[2] and, by that, to estimate the benefits, possibilities, and risks of a digital business strategy, it is necessary to explore the business ecosystem (Adner, 2006; Iansiti and Levien, 2004; Selander et al. 2013; Tiwana et al. 2010; Wessel et al. 2016;). The dynamics within a business ecosystem are well documented. Moore (1993) uses metaphors from the african savanna to describe how different actors and functions, e.g. predators and prey, intertwine to develop a functional ecosystem. Adner (2006) describes the importance of identifying which peripheral factors that influences what. Adner and Kapoor (2016) examines the shift from one technology to another in a digital transformation.

As exhaustive this literature might be, it tends to focus on how to design, govern, and evaluate a process in which the main functions of the ecosystem are already known (Leijon et al., 2017; Zhu and Furr, 2016), but gives little guidance on how to create an understanding of the existing ecosystem. The aim of this thesis is to develop and propose a method to create an understanding of a business ecosystem and the interaction of its functions. Once an understanding of the ecosystem is created the organisation will be better prepared to analyse how theories concerning digital platforms can be applied on their ecosystem.

Several proposals on how to map an ecosystem have been made (Adner 2006; Basole 2009; Laplume et al. 2008). This mapping tends to be complex, due to each entity representing several functions, making it hard to grasp the different aspects of the results (Scott, 1988). Some suggestions on how to minimize the complexity have been put forward, one such example is the use of three dimensional simplex structures (Abell, 1969). These proposals often demand the use of digital presentation and modulation systems, which might limit the accessibility.

By examining the concepts of platforms and business ecosystems, this study identifies and categorizes key components and common denominators within these fields. These components and entities are then grouped into categories and used as the foundation of the method. By analysing a business ecosystem using these categories, the method answers to the problems described by Abell (1969) and Scott (1988), as it lowers the complexity of each entity in a network, allowing a two-dimensional presentation. The proposed method also answers to the need of creating knowledge concerning entities

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[1] The classic value chain, where value is created in a linear series of activities (Van Alstyne et al. 2016)

[2] *"Foresight is not the ability to predict the future…It is a human attribute that allows us to weigh up pros and cons, to evaluate different courses of action and to invest possible futures on every level with enough reality and meaning to use them as decision making aids…The simplest possible definition [of foresight] is: opening to the future with every means at our disposal, developing views of future options, and then choosing between them"* (Slaughter, 1995, p.1, cited by Major et al., 2001, pp 92-93).

and interactions in the business ecosystem before considering ways to transit from a pipeline to a platform business model.

In order to develop, evaluate, and prove the use of the method, it was applied on a midsize construction company located in western Sweden. Today the company functions as a catalyst, where they facilitate the coordination between several stakeholders, such as property developers, subcontractors and architects. They also have in-house functions such as carpenters, economists, and human resources. The company has recently gone through a change process where they streamlined the internal administration and communication, and they are now in an early preparatory stage to examine if something similar is possible to do on their wider ecosystem.

The context of the method: ecosystems and platforms

A conceptual analogy for business ecosystems are natural ecosystems. Living entities, for example animals and plants, and non-living entities, for example water and dirt, interact and are considered linked through energy flows and nutrient cycles. This can be seen as a network of interactions between these entities and also their environment (Mack et al. 2000). Business ecosystems are built of stakeholders, referred to as actors in this thesis, that co-evolve (Iansiti & Levien 2004; Moore 1993). The co-evolution, described by anthropologist Gregory Bateson (1979) and cited in the work of James F. Moore (1993), is explained as the process where interdependent actors evolve in a mutual cycle. This co-evolutionary relationship is the foundation of both natural ecosystems and business ecosystems. Any changes in actor A, often demands changes in actor B and vice versa (Iansiti & Levien 2004; Moore, 1993; Wessel et al 2016;). This is something Adner (2006) and Adner & Kapoor (2010) highlights, the success of a firm's innovation is often dependent on the innovations of another actor within the same business ecosystem. Green (2005) concludes that ecosystems emerge from interactions between species, organisms and their respective environments.

Moore (1993) explains a business ecosystem as an interdependent community built of actors and resources, referred to in this thesis as assets. A reoccurring theme within business ecosystems is a complex balance of cooperative and competitive business strategies. Ecosystems is a collaborative effort of producing value that no single organisation would be able to, single handedly (Adner 2006; Iansiti & Levien 2004).

In every business ecosystems, there are keystone organisations that focus on improving the overall health of their respective ecosystem. This by providing predictable and stable assets, that ecosystem stakeholders utilize in order to build their offerings. The removal of a keystone organisation within an ecosystem can lead to a collapse (Iansiti & Levien 2004).

Nachira (2002) proposes the term digital business ecosystems (DBE), which is software infrastructure supporting vast numbers of interactions by users and services within and between organisations. This is built on Moore's (1993) ecosystem theory mentioned above. Nachira (2002) explains DBEs as something self-organising and adaptive, and that they are digital environments inhabited by digital species. These are services and information and other assets that express an independent behavior, although they interact and evolve and even becomes extinct following changes in markets.

Through the creation of platforms, new ecosystems arise consisting of the platform participants. These participants are connected through digital networks and utilizes the platforms resources (Parker et al. 2017b). An example of the joint concepts of platforms and ecosystems is Facebook. Where the social network platform connects third-party developers, providing offerings, with millions of participants, thus creating a business ecosystem across the business platform (Yonatany, 2017). To summarize, business ecosystems describes how entities interact and co-exist while platforms are a way for entities to act and interact.

The concept of platforms can be described through the case of the international music streaming platform Spotify. With its 140 million monthly subscribers in June 2017, Spotify offer music artists and record labels digital distribution of their music (Vonderau, 2017). For the subscribers, this service is offered in an ad-supported free version or as a monthly subscription for 99 SEK per month (Spotify, 2018). Spotify finances the ad-supported free version by personalized ad targeting, a service sold to advertisers (Vonderau, 2017), making Spotify serve several types of customers.

The interest in digital business platforms have increased as businesses seeks new revenue streams. However, the phenomena of platforms are not new. Van Alstyne et al (2016) gives the example of malls, linking consumers with several different merchants all in one place. He further explains that platform businesses bring these parties, for example consumers and merchants, together in high-value

exchanges. Platforms are characterized by interdependent and interactive relationship between the participators (Evans & Gawer 2016; Kenney & Zysman 2016). Their main assets are interactions and information. This is what constitutes the foundation of the competitive advantage and value platforms potentially create (Van Alstyne et al. 2016).

The building and scaling opportunities with IT has made platform infrastructure and assets simpler and cheaper. IT allows easy participation which improves network effects and also enables the ability of capturing, analysing and exchanging data to increase the overall value for all platform participators (Van Alstyne et al. 2016).

Several authors give examples of actions required to attempt the transformation from pipeline to platform (Van Alstyne et al 2016; Ghazawneh & Henfridsson 2011; Iansiti & Levien 2004; Kenney & Zysman 2016). Parker et al. (2017a) describes how the platform business has transformed the business landscape in three specific ways, *de-linking assets from value, re-intermediation, and market aggregation*. *De-linking assets from value* refers to the concept of allowing the assets to be used by someone else than the owner of the asset. By this the asset will be offered to the market in such a way that creates the most value. Airbnb is used as an example. In a traditional sense an apartment only created value when the owner uses it, by renting it out on Airbnb the apartment will create value for both the owner and the guest renting it. *Re-intermediation* refers to how the market for middlemen changes. In the beginning of the digital era it was expected that the middlemen would disappear and that the transactions would go directly between the provider and the consumer. However, time has proven the hypothesis wrong, and new middlemen in form of digital platforms have proven to be efficient and scalable, creating large values. The last phenomena presented by the authors is the *aggregation of markets*. By using digital platforms, a diverse and geographically decentralized market becomes centralized, which creates higher efficiency, and thereby value, both for the consumers and producers of services and products.

Development and application of the method

The cornerstones of the method to be proposed is based on common denominators from the literature on digital platforms and ecosystems. The method solely gives a map of the business ecosystem in which the focal actor exists, it does not give recommendations on how to execute the transformation from a pipeline to a platform business structure. The close relations between the literature and the entities in the method makes it possible to apply the platform theories deemed most beneficial for a successful transformation.

Developing the nodes of the AAA method

The first step when developing the AAA method was to identify common denominators from a broad spectrum of literature and theories concerning digital platforms and business ecosystems by conducting a literature survey. This was done, not only, to lay a foundation for the nodes in the method, but also to make the method applicable on business ecosystems from different fields and undependable of possible digital platforms. Keywords used in the literature survey were “business ecosystem”, “digital platforms”, “platform economy”, “pipeline”, “platform”, and “mapping”. The search was done using Google Scholar[3], Gothenburg University Library[4] and Chalmers University Library[5]. For further literature, the list of references in each article were used to generate a vast spectrum of literature whose authors were then used as keywords for further search. The result was analysed and compiled resulting in the three entities actors, activities and assets. These were identified as common denominators and key concepts, these are presented in table 1-3.

[3] Google Scholar: https://scholar.google.se/

[4] Gothenburg University Library: http://www.ub.gu.se/

[5] Chalmers University Library: http://www.lib.chalmers.se/

Table 1: Compilation of characteristic literature for Actor.

Actor		
Author	**Proposed concept**	**Implies**
Kenney & Zysman (2016)	Participants, platform owner.	Participants and platform owners are entities within a digital platform context. Where the platform owner is the intermediary which creates the terms on how participants interact with each other.
Van Alstyne et al (2016)	Players (owners, providers, producers, consumers)	Platform structures consists of an ecosystem including four types of entities: owners of the platform, providers which acts as the interface of the platform towards users, producers creating content and consumers wanting the content.
Benlian (2015)	Complementors, users	Complementors are the group of entities who invest time and effort to contribute to a platforms offerings. The example of application developers are given. These efforts are done in order to attract users.
Rong et al (2015)	Partners	*Partners* are direct and indirect entities within one's ecosystems that either exchanges or create value. Direct refers to adjacent partnerships with the entities, whereas indirect is non-adjacent, meaning there is one or several parties between both entities.
Gawer & Cusumano (2014)	Leaders	In the context of platforms, the platform leaders are organisations that, with success, establish a product, technology, or service and further reach a position where it is possible to influence the technological and business systems present in the platform. The leaders are central players within an ecosystem, but are dependent on investments and innovation from other organisations.
Cennamo (2013)	Users	The entity of participants which the platform mediates transactions between. For example, the producers of content and applications of a gaming platform and the game consumers.
Adner (2006)	Intermediaries, consumers	The intermediaries are entities involved within collaborative innovation ecosystems. These collaborative networks are networks of organisations which depend on each other, in a way of innovation. One organisations innovation is dependent on the release of others'.

Table 2: Compilation of characteristic literature for Activity.

Activities		
Author	**Proposed concept**	**Implies**
Dufva et al (2017)	Need, activity	Platforms provide services connecting actors around a need, or activity. This is done to more efficiently collaborate, allocate and use assets to co create value for each other.
Korhonen et al (2017)	Interactions	Interactions between producers and users is what create value for both involved parties and the platform owner. Examples of interactions are: "*people getting to know new people", "sports equipment rental",* and "*near-location messages"*.
Christensen (2016)	Job	What an entity seeks to accomplish within a given circumstance. These can be both regular and unpredictable jobs, such as cooking food or acquiring a mechanic to repair a car.
Evans & Gawer (2016)	Relationship	A platform is characterized by the facilitation of transactions between different types of organisations or individuals, or both, that would have difficulties to find each other otherwise.
Adner (2006)	Collaboration	Collaborations are forms of for example the release and development of complement products. This is what relationships of an ecosystem consists of.
Gawer & Cusumano (2002)	Collaboration	Mutual efforts to increase the "*size of the pie for everyone*" amongst entities within an ecosystem. This meaning a collaboration between entities to increase value for both, as well as the overall value of the ecosystem.

Table 3: Compilation of characteristic literature for Assets.

Assets		
Author	**Proposed concept**	**Implies**
Srinivasan & Venkatraman (2018)	Offerings, resources	Offerings and resources are the products of entrepreneurs in the context of digital platforms. An ability to adapt to technological change and to differentiate one's offerings and resources, are critical for survival and success.
Christensen (2016)	Product	A solution organisations sell, in order to solve a problem for a consumer. This can be both tangible and intangible goods.
Van Alstyne et al (2016)	Resources	Resources, in the context of platforms, are hard to mimic. These assets can be communities tied to one's platform, information and tasks, but also tangible assets such as cars.
Ghazawneh & Henfridsson (2013)	Platform boundary resources	The tools and directives developers act upon, provided by a platform owner. These are mainly in software terms and examples of these are: application programmable interfaces (API) and repositories.
Adner (2006)	Complement products	Interdependent products, one's product can be dependent on several other organisation's products, or called complement products, in order to be delivered. One firm's product, is another's resource. The interdepence of the products are mainly in terms of an organisation's product is a part of another's'. An example is that game developer's product, depends on the success and compatibility with a gaming platform. In this scenario, the game developer's product is a complement product.

When mapping an ecosystem, a node is a point in a diagram or a network where edges intersect. The nodes in the AAA method are actors, activities, and assets and can, based on the tables, be summarized as: an actor is a natural or legal person, living entity or organisation that can utilize assets to perform an activity. An activity is what an actor seeks to accomplish or achieve within a set circumstance. Assets are any tangible or intangible assets utilized to succeed with an activity.

Developing and applying the AAA method at Per Jacobsson Byggnads AB

Setting

The development[6] of the AAA method was conducted at Per Jacobsson Byggnads AB, referred to as PJ Bygg, a Swedish construction company operating on the west coast of Sweden. PJ Bygg has an approximate revenue of 350 million SEK and 110 employees. The company's core business is construction, including reconstruction, renovations and reparations, mainly in a business to business context.

The organisation operates in a traditional manner similar to a pipeline structure. Requests enter the organisation from potential clients via a vast number of channels, including digital solutions as well as phone calls and meetings. Once a request is considered interesting by PJ Bygg, the company starts a process to assess a possible business case and do inquiries to subcontractors. If PJ Bygg wins the contract, the next phase is to find the most suitable suppliers. If necessary, this renders in an adjustment of the original bid, which is forwarded to the client.

In the construction phase, PJ Bygg acts as the coordinator between both internal and external capabilities. Internal capabilities are mainly related to construction, such as project management, calculation, craftsmen and staff management. A minor part of the organisation consists of support functions such as economy, human resources and IT. The external capabilities are subcontractors that contribute with expertise ranging from architects, electricity and other vital competence needed for construction. Other responsibilities can, depending on the arrangement, include communication with authorities regarding construction and logistic permits, electricity, water and sewer. Once the construction is finished, PJ Bygg conducts aftermarket services, mainly concerning warranties.

PJ Bygg expressed a desire to remain named throughout the study. The study was proposed to the organisation as an opportunity to take part in the development of a method for mapping an ecosystem and the organisation was made aware of the risk of not being able to extract commercial value from the results. For the participants the study was proposed as voluntarily, both attending and contributing. All of the participants and the organisations accountable has verbally or digitally agreed upon taking part of the study. The participants are named using their titles throughout the study as the titles provide the relevant information for the case.

PJ Bygg was chosen as the setting for the method development as they had an expressed need to better understand their external contacts. This gave confidence to the study that enough access would be granted to the company, both in terms of time and knowledge. The overall strategy for the development of the AAA method, was to develop and apply the method as the mapping progressed, with the end result of delivering a map of the business ecosystem to PJ Bygg.

During the development of the AAA method, four stages crystallized. As the stages follows a necessary logic, they were loosely stated early in the development of the method to allow for a common vocabulary. The four stages, identifying focus, data collection, structuring and aggregating data, and identifying business platform opportunities, proved to be a sufficient way to explain and plan the execution of the AAA method, as the different stages requires different tools and mindsets in order to be performed. The end of each stage also gives an opportunity to reflect on the process of the mapping, and by that allowing for changes and improvements.

[6] In the autumn of 2017, a mapping of a business ecosystem using the nodes stakeholder, activity, and resources, was conducted at a Swedish company in the forest industry. The nodes lacked a theoretical foundation, and the workshops and mapping did not follow an expressed method.

In the following sections the development of the method is described. To bether create an understanding of the AAA method, each event is labeled both in its chronological order and with the corresponding stage of the AAA method. To understand the dynamics of the AAA method it is important to consider these stages as nonlinear. Moving back and forth between them, and conduct them several times, during a mapping of a business ecosystem is both vital and necessary.

First meeting - Identifying focus and strategy of the mapping

Initially a meeting was conducted with the Quality, Environment, and Work environment manager (QEW) at PJ Bygg to identify the focus and strategy of the AAA mapping. The QEW manager described a situation with complex and tedious communication and coordination efforts between PJ Bygg and their subcontractors, suppliers, clients, and authorities. One of PJ Bygg's main challenges lies within coordinating all of these parties, a clear and common view of these does not exist within the organisation today. Much of the knowledge and awareness is isolated within each function.

As the problem area was defined as a complex system of actors, the decision was made to focus on actors and their relations. At the time of the meeting, neither PJ Bygg or the QEW manager had any intentions or plans regarding a platform transition.

It was agreed for PJ Bygg to give access to approximately 15 employees á 2x2 hours, and a 2-hour session with the management team. The participating employees were picked in collaboration with the QEW manager to represent all aspects of the organisation, including finance, calculation, construction, middle management, after market, human resources, union representatives, and so on. When the method for data collection was discussed, the QEW manager proposed a method using pen and paper as some participants was less experienced working with computers, and a digital solution would most likely result in a lower rate of data collection.

The initial plan was to engage the same participants during each meeting, however, due to unforeseen circumstances, this was slightly modified and single individuals dropped out after the first session and new participants entered, this did not interfere with the knowledge composition of the participating groups.

First workshop - Data collection

The first day of data gathering consisted of three individual workshops with four to six participants in each. During each workshop the participants were split into two smaller groups to allow each participant to contribute with their knowledge. One researcher was assigned to each subgroup, to collect spoken data, and to follow their train of thoughts. The transcription of information was made using sheets of paper, taped together on a wall, creating large sets of canvases. Each node type was represented by a separate color. At the beginning of each workshop, unused papers were taped to the wall, allowing each group to start from scratch. This was done to minimize the risk of limiting the participants imagination and creativity.

At the beginning of the workshops the participants were introduced to the concept of business ecosystem, and the three node types. They were informed that they were taking part in the development of a new method, and questions about the method itself were encouraged.

During the first workshops most participants tended to focus on one node type, mostly actors, and connected these nodes directly to each other. Initially this was not discouraged, as it allowed for a creativity that otherwise could have been limited. Once the participants felt more comfortable, they were encouraged to define what activities that connected the actors, and what assets the actors had. Phrases like "what activity do you have to do with one actor in order to reach an asset", where used to guide the participants. This way of connecting actors to each other were used to focus on actors and activities, not assets and activities. This first embryo of connection rules was later to become the actor-activity focus. The necessity of forcing the participants to connect actors using activities was sprung

from the need to create an understanding of how the actors interact, as the emergence of an ecosystem roots from the interaction between species, organisms and their respective environment (Green, 2005). By only connecting entities to each other, the understanding of the necessary interactions, or activities, cannot form. The topic of connections and foci is described further in the chapter *Foci of the AAA method*.

Even though the participants developed the ability to connect actors using activities, the mindset of focusing on one node type were used throughout the entire data gathering as a pedagogical tool as it proved to be an efficient way to identify new nodes. Once the new nodes were identified, it became easier for the participants to explain how they were connected, and by that expressing the business ecosystem.

Noticeable during the workshops was the participants way of verbally discussing actors, activities and assets without adding them to the canvas. The participants also tended to continue to connect nodes of the same type. This called for the definition of three rules to help when structuring and aggregating the data. The rules were defined as: (1) if the data is added to the canvas by the participants, it is valid for data aggregation. (2) if the participants add nodes or edges that do not follow the rules of how to connect nodes, discuss with the participants until you, as the data aggregator, understand. (3) if the data is discussed, but not added to the canvas by the participants, it is valid for data aggregation. As a result, the canvas was seen as a pedagogical tool that worked as a catalyst to extrude data from the participants. Data collected according to the second and third rule were added by the researchers in the margins of the canvas.

First data structuring and aggregation - Structuring and aggregating data

The first day of workshops resulted in a total of 12 canvases. As PJ Bygg addressed their problem as a complex system of actors, the first step when structuring the data was to eliminate all of PJ Bygg's internal activities and actors from the data. Assets strictly used by PJ Bygg, without being made accessible by external actors were also eliminated. This was done accordingly to the concept of black boxing (Callon, 1986). Black boxing was also used to group different categories of actors and activities. This was mainly done to subcontractors considered by PJ Bygg to be in the same category, e.g. subcontractors working in ventilation and heating, but also to activities that had been described in a process manner, i.e. several similar activities put together in a line to describe a process, not an ecosystem. The workshops were not monitored continuously, resulting in nodes and edges being impossible to interpret during the structuring.

The remaining nodes on the canvases were entered into an Excel database and doublets were removed. When all the nodes were structured into the database, the connecting edges between the nodes were identified by using the canvases and entered into the database. This method of structuring the data was chosen to identify all nodes and edges, and to create a set of structured data to be used in the network visualization and analysis software.

During the first data aggregation, 125 nodes and 490 edges was identified, presented in figure 1. The process of structuring and aggregating the data consumed approximately 24 working hours.

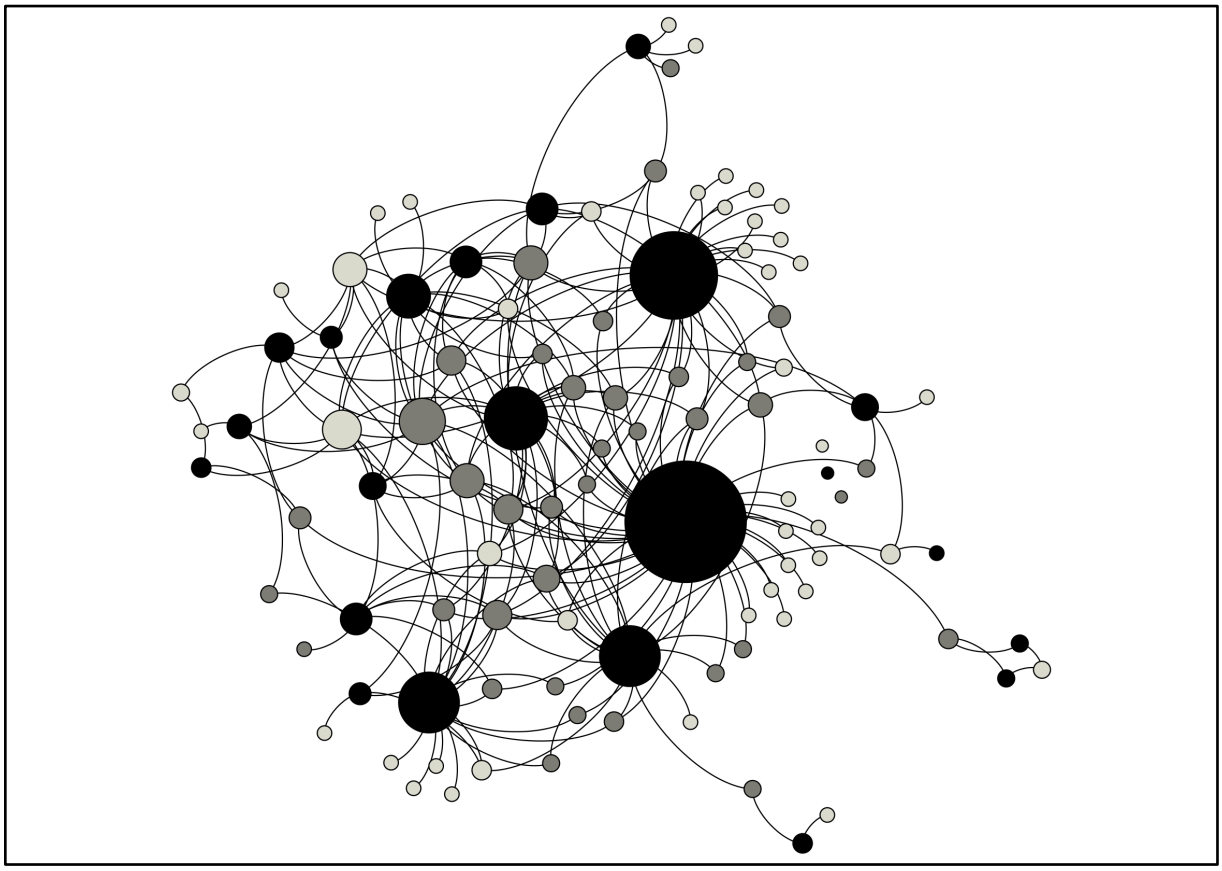


Figure 1. PJ Bygg's ecosystem after the first workshop. The nodes represent Actor (black), Activities (dark grey), and Assets (light grey).

During the study at PJ Bygg, the aim was to identify what activities connected which actors, an actor-activity focus. When the aggregation started, a discussion whether it was possible to create a similar focus using activities to connect assets, an asset-activity focus, arouse. This question resulted in several graphical simulations, and discussions on different implications such a focus would render. The conclusion was reached that, depending on the ecosystem, aim of the study, and what theoretical frameworks to use in the transition from pipeline to platform, different foci could prove beneficial. As activities serves as the intermediators, connecting the tangible, or intangible, actors or assets and the rest of the ecosystem, they will always play a vital role. Therefore, no need for a specific activity focus was deemed necessary. The topic of foci is discussed further in: *The foci of the AAA method*.

The network visualisation and analysis software Gephi (0.9.2) was used due to its availability as open source, and its ability to handle large networks. For this study the Force Atlas algorithm was chosen, as it is a time efficient tool to visualize clusters of nodes that intertwined in a particularly complex way. The settings of the Force Atlas[7] algorithm was tested to create a visual map that, when printed on A1 sized paper, gave the participants the opportunity to grasp the ecosystem in order to add more nodes and edges.

[7]Force Atlas is a force directed graph drawing algorithm used to create aesthetically pleasant graphs with minimum crossing edges (Kobourov, 2012). For the study the algorithm settings were: repulsion strength: 2000, attraction strength: 5, autostab strength: 80, gravity: 200, with the functions: rotate, noverlap, and label adjust.

Second workshop - Data collection

The second day of workshops were like the previous and took place one week after the first. The participants were divided into a total of three groups with two subgroups each. At the start of the workshops the participants were presented with the aggregated result from all the previous workshops, and this result was used as the starting point for each of the workshops during the second data collection. During the workshops a list of all nodes were posted to the wall, allowing the participants to get an overview of the nodes, without searching the entire map of the ecosystem. The participants were also reminded of the rules of how to connect nodes, the actor-activity focus, now explained more thoroughly in order to avoid any uninterpretable nodes and edges. As previously, the participants were encouraged to ask questions, not only about the objectives of the study, but also about the method itself.

During the second day of workshops the participants spent a considerable amount of time reflecting on the previous results. The participants tended to discuss in smaller groups, and quotes like "*I didn't think of that*" (a site manager), and "*we are doing the same job twice*" (discussion between a site manager and a person assessing prospectus) were noted.

Seeing the aggregated ecosystem gave new energy to several participants, individuals that expressed a belief that the ecosystem became complete during the first workshop, started to add new nodes and edges. As the rules of the actor-activity focus were more clearly defined before the second day of workshops, and the participants were able to draw conclusions from the aggregated ecosystem, they tended to follow the rules of the actor-activity focus more intuitive than during the first day of workshops.

The participants were encouraged to identify actors that were not directly connected by activities to PJ Bygg, but rather conducted activities with the same actors as PJ Bygg. The question "*who can influence the work of PJ Bygg, that PJ Bygg cannot influence?*" was used to encourage this train of thoughts. This gave a second circle of actors, actors that exists, contributes, and influence the ecosystem of PJ Bygg, without interacting directly with PJ Bygg. One example of such an actor are suppliers to the subcontractors. Although conducting activities directly with PJ Bygg, this question made some participants add governmental and municipality authorities, as they influence without giving the opportunity to react.

None of the second workshop sessions continued for the scheduled two hours. When the participants had no more nodes or edges to add the sessions were ended. None of the sessions was shorter than 1 hour and 45 minutes.

Second data structuring and aggregation - Structuring and aggregating data

The second structuring and aggregating of data was done using the same method as the first. No changes were done as the method proved useful in relation to the scope of the network.

Approximately 10 working hours were used during the second structuring and aggregation of data and resulted in an additional 73 nodes and 300 edges. The result of the structuring and aggregating can be seen in figure 2.

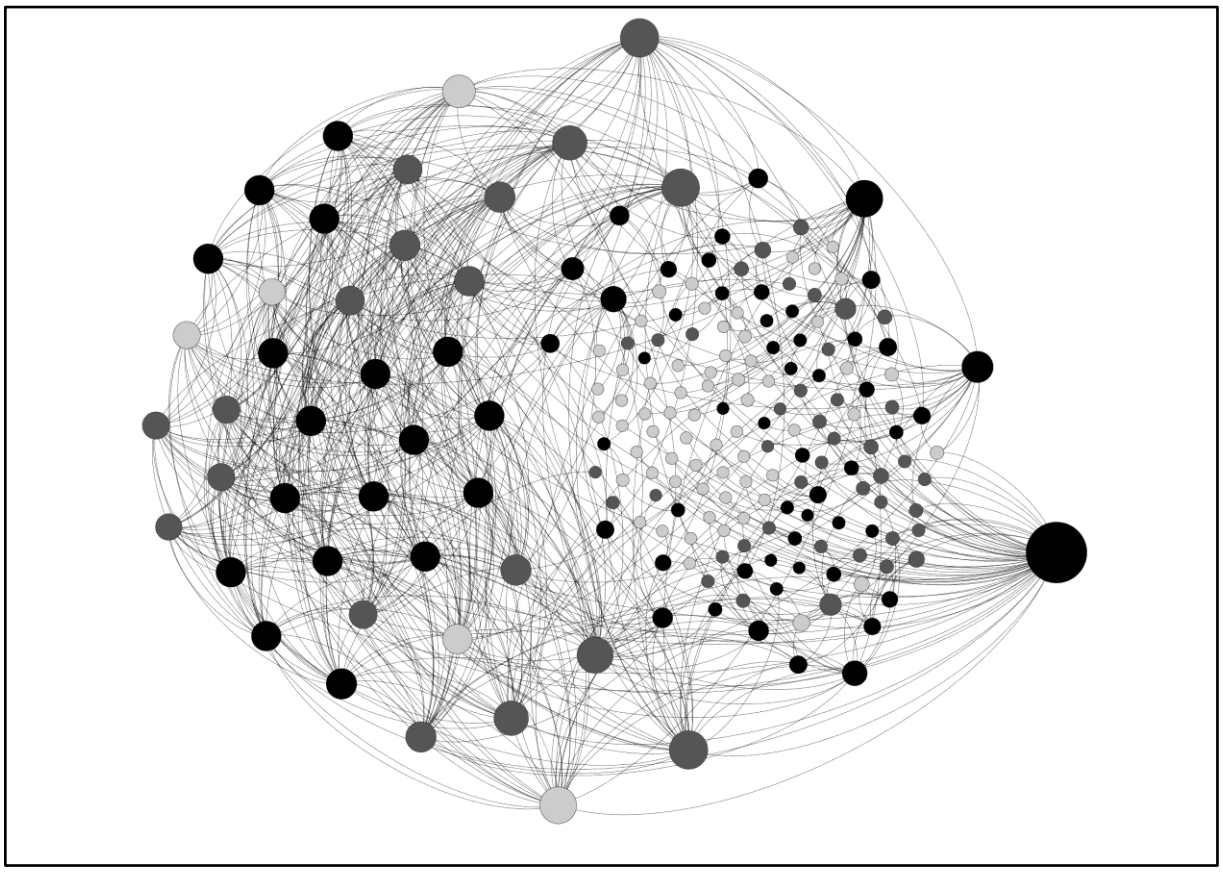


Figure 2. PJ Bygg's ecosystem after the second workshop. The nodes represent Actor (black), Activities (dark grey), and Assets (light grey).

Third workshop - Data collection

The third day of workshops had a complete new set of participants, CEO, QEW manager, a foreman and a representative from human resources. This called for a different setup of the workshop than previously, as several had expressed an interest in the map of the ecosystem. Therefore, the workshop began with an introduction to the study and to the actor-activity focus. The participants were not presented with the aggregated map, as this was assumed to draw attention from the data collection. Instead the participants were encouraged to start adding to the map from two activities assumed to be from their field of work, competition and public relations.

During the workshop the CEO had to reschedule, and the session was reduced in time. This led to the presentation of the aggregated map, and the participants was given approximately 30 minutes to add nodes and edges, before they had to leave the workshop.

The aggregated map was received with interest, to the degree that the participants forgot the objective of adding nodes. The CEO asked for any conclusions so far during the mapping of the business ecosystem, he also called for a company presentation of the final results.

Interview with the QEW manager - Data collection - Identify business platform opportunities

One purpose of the workshop with the management team was to identify and eliminate any flaws in the data aggregation. As the available time was reduced, this was compensated by an online interview with the QEW manager. Questions that had aroused during the aggregation, mainly focusing on the

properties of the black boxing of subcontractors, were discussed. The interview did not result in any discovered flaws or mistakes in the aggregation process.

The black boxing of the subcontractors did however catch the attention of the QEW manager. In order to fully understand the complexity of the business ecosystem, he proposed an expansion of the subcontractors instead of a black boxing. The proposed way to approach this was to collect data from the ERP system used by PJ Bygg. As the scope of the study did not allow such expansion, the idea was rejected.

Third data structuring and aggregation - Structuring and aggregating data

The third structuring and aggregating of data was done using the same method as during the first and second. No changes were done as the method proved useful in relation to the scope of the ecosystem.

The third structuring and aggregation of data resulted in an additional 7 nodes and 78 edges, and approximately 4 working hours were used.

Posting the aggregated business ecosystem - Data collection

The last collection of data was done by posting canvases with the business ecosystem at PJ Bygg head office and building sites, giving the participants the opportunity to add nodes or correct mistakes. In two weeks, no additions were made, and the data collection was cancelled. At this point the total was 205 nodes and 868 edges. The final map of the ecosystem is presented in figure 3.

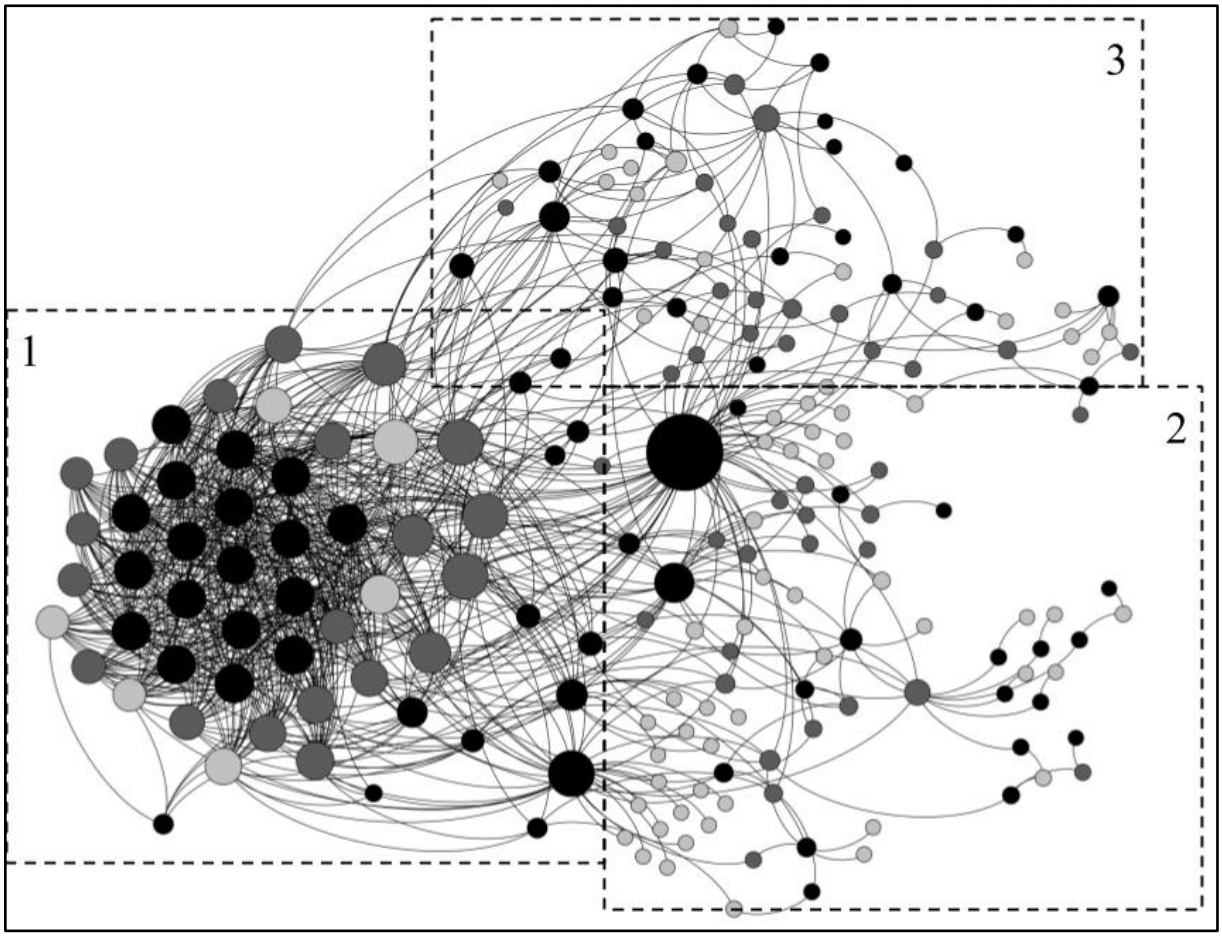


Figure 3. PJ Bygg's ecosystem after the third structure and aggregation. The nodes represent Actor (black), Activities (dark grey), and Assets (light grey). The dashed boxes represent core activities (1), support functions (2), and governmental functions (3).

Discussion concerning the development of the AAA method

Identifying focus

During the first meeting with the QEW manager it was concluded that PJ Bygg does not have any intention to transit to a digital business platform structure. This led to a discussion to find any major problem areas within the organisations business ecosystem. As a previous project on simplifying the internal processes had been conducted, the QEW manager presented the complicated structure of several subcontractors, authorities and so on, and that no one in the organisation had a full overview of the complex system of interactions. This led to two decisions, (1) focusing on external nodes and black boxing internal, and (2) focusing on activities and actors, not assets. The decision to map a business ecosystem without any intentions of creating a platform, is not to be considered a flaw, as the mapping can show previously unnoticed possibilities.

Data collection

It was beneficial to use the knowledge within the organisation, in this case provided by the QEW manager, to identify relevant participants for the study. As the participants changed due to unforeseen circumstances the dialog with the QEW manager proved crucial to keep the knowledge compositions of the groups.

The method of using pen and paper to transcribe the data worked well with the participants. It allowed for discussion across the subgroups, it was possible to ad papers as the map grew, and so on. The pen and paper itself was not perceived as a restraining factor.

During the second workshop, the participants started to lose momentum when the actors closest to PJ Bygg had been added. At this point only a few indirect actors, i.e. actors not directly connected to PJ Bygg by an activity, had been added. This called for some interaction in order to reach this "second circle" of actors, which constitutes an important role in the ecosystem. Once the participants realized how they could add these type of actors, several new actors, activities and assets were added to the map.

Some of the participants had extended discussion concerning nodes, without adding them to the canvas. It was not uncommon that the participants restrained themselves from adding the nodes because they did not know how to connect them to the network. To solve this issue, the participants were asked to write the nodes on a list, and then try to figure out how they were connected, often with help from the other participants. The same principle was used to extend a particular branch of the ecosystem, questions such as "*which authorities do you interact with*" was used to encourage the creation of lists, before connecting the nodes to the ecosystem. All these examples indicate the importance of interacting with the participants to get a creative atmosphere.

At the beginning of the second workshop, and during the third, it was obvious that the map of the ecosystem drew a lot of attention. During the second workshop this attention, and the following discussions, was beneficial as they created a sense of curiosity and understanding, that the participants used to continue the work. At the third workshop, with the management team, this attention was disadvantageous as it restrained the participants from focusing on adding nodes to the ecosystem. This indicates that the method of data collection needs to be altered between the sessions. Not only because of the participants role in the company, but also depending on the participants previous engagement in the process.

The last step of data collection was to post canvases with the business ecosystem at different locations at PJ Bygg. This did not result in any new nodes or edges. The reason for this is unknown, no follow up interviews have been conducted. As the second sessions of workshops ended before schedule, it is interpreted as none of the participants had anything to add, and that the nodes and edges that was possible to find with the chosen data collection method was added to the business ecosystem.

As can been seen by the development of the maps from each aggregation phase, it is necessary to reach a certain depth and width of the ecosystem in order to see how different clusters form. As can be seen in figure 3, clusters have formed. The three boxes in the figure represents (1) the core activities of PJ Bygg, including subcontractors, (2) support functions, such as finance, and (3) governmental activities and actors, such as agencies. After the first aggregation phase, the network where still at a size where conclusions considering individual nodes could be made, as the network grew it became more important to group the nodes to allow for a macro analysis.

Structuring and aggregating data

During the structuring of data, the nodes were identified and added to an Excel sheet. The nodes and edges were identified by manually reading the canvases, doublets were identified by using the search function in Excel. This was considered a sufficient method considering the scale of the ecosystem, and the number of workshops. If a larger set of data is collected, it will be necessary to use a more automated method. A combination where canvases and Excel is used simultaneously might be considered, or teaching the participants to work in the visualisation tool.

Throughout the development of the method it was discussed how to handle nodes which were similar or had similar traits. In order to deliver relevant results to PJ Bygg and to remain within the scope of the study, it was necessary to balance and prioritize what was explained and interpreted as important. PJ Bygg explicitly proposed a focus on actors and activities, which led to the decision to group subcontractors into every specific type of subcontractor, while grouping all types of knowledge into one asset node. As the business ecosystem surrounding PJ Bygg is asset heavy, the asset-activity focus could be considered the first-hand choice, however, it is the purpose of the study, not the ecosystem, that guides the choice of focus. PJ Bygg expressed a need to understand external activities and actors, which led to actor-activity focus.

When structuring and aggregating the data after the first workshop, it became obvious that the method of data collection had to be changed to minimize misunderstandings. This was done by encouraging the participants to make more distinct edges, and to better follow the actor-activity focus.

After the aggregation, an interview was conducted with the QEW manager to identify any flaws in the structuring and aggregation. It is necessary to identify and use such a control mechanism early in the study, to mitigate any methodological flaws in the structuring and aggregation of data.

Identifying business platform opportunities

When the final result was presented for PJ Bygg, a proposal to collect data from the ERP system to identify every individual subcontractor was put forward by the company. This proposal was in line with the objective of understanding the complexity of the business ecosystem. The scope of the study did not allow for such an extension. The circumstance that no more nodes or edges were added during the last data collection, indicated that the method of data collection needed to be modified in order to continue the mapping. If allowed by the scope of the study, using the ERP system to collect data would have been a way forward.

An opportunity to create an understanding of the diverse perspectives of the ecosystem occurred when the participants were presented with the map of the ecosystem during the second workshop. In hindsight, this would have been a good opportunity to invite the management team, allowing them to sit in and get a sense of the diverse perspectives within the organisation.

The proposed AAA method

The following chapter presents the proposed AAA method with its four stages and foci. The chapter ends with a flowchart, that visualizes how the AAA method is conducted.

Identifying focus

The first step of the AAA method is to understand the purpose and desired outcome of the mapping as this determines what focus to apply. If the organisation has an initial idea, start by analysing if this idea is actor or asset heavy, and use the corresponding focus. If this first analysis does not give any clear guidance, or if the organisation does not have any idea of where a platform transition can lead them, it is necessary to make an initial assessment of the ecosystem to identify if it can be considered to be asset or actor heavy, the corresponding focus is then applied.

Foci

It is possible to apply the AAA method with two different foci, actor-activity focus, and asset-activity focus. The different foci have different advantages depending on the purpose of the study and how the mapped ecosystem will be analysed. The actor-activity focus provides a better understanding of which actors and activities that are most significant for the ecosystem. The asset-activity focus, on the other hand, gives the opportunity to analyse which assets that are necessary to perform a specific activity, and by that, which assets and activities that are the most significant in the ecosystem. Because activities function as the intermediators between actors and actors, or between assets and assets, they will have a prominent position in both foci. The different foci do not proclaim any differences in data gathering or aggregating methods, only in how the nodes are linked to each other.

Using either of the foci is necessary to explain how the different entities in the ecosystem interacts. Connecting nodes of the same type directly to each other would only explain the existence of the nodes, not how they interact and contributes to the ecosystem. Explaining how a node contributes to the ecosystem is vital as a ecosystem depends on contributions and interactions (Green, 2005). This contribution and interactions is represented by the node type activity, which are a vital component in both foci.

Mapping with an actor-activity focus

The actor-activity focus approach to the AAA method gives the opportunity to better understand key activities and key actors. It also simplifies, compared to the asset-activity focus, the process of determining the owner of a specific asset and, by that, which actor to interact with in order to reach the asset. The actor-activity focus is based on the principle that actors connects to assets and activities, and by denying connections between assets and activities, and nodes of the same type.

Fig. 4 illustrates a small section of a business ecosystem. The nodes to the far right represents several resources owned by one actor. The actor is connected to an activity that connects to the rest of the ecosystem.

An actor-activity focus helps to create an understanding of which actors that are involved in an activity, and to determine key actors in the ecosystem. It also makes it possible to identify if there are

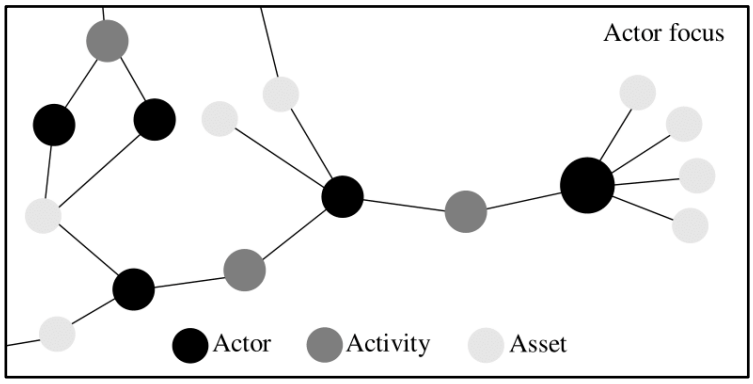


Figure 4. Illustration of an ecosystem using an actor-activity focus.

several different actions connecting the same actors.

Mapping with an asset-activity focus

The purpose of the asset-activity focus is to force an identification of relevant assets in the ecosystem. This is done by connecting assets to activities and actors. Connections between actors and activities, and nodes of the same type are denied. This implies that an actor or activity cannot be added to the map without first identifying the relevant asset.

Figure 5 illustrates a small section of a business ecosystem. The nodes at the far left of the figure represents several actors owning a specific asset. The asset is connected to an activity that connects to the rest of the ecosystem. As with figure 4, it is worth nothing that figure 5 represents a simple example, in a real-world ecosystem, the assets are most likely connected to several activities.

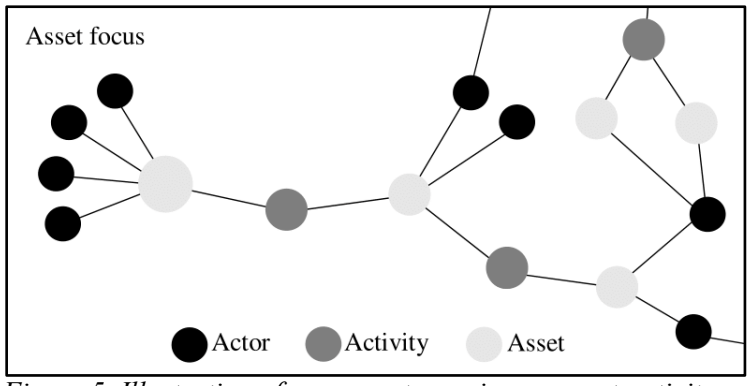


Figure 5. Illustration of an ecosystem using an asset-activity focus.

The asset-activity focus of the AAA method gives the opportunity to better understand which assets that are needed to perform a specific activity, and to determine key assets in the ecosystem. It also makes it possible to identify if an asset is necessary for several different activities.

Data collection

When designing and conducting data collection, it is important to ensure that the organisation itself conducts the explanation of the ecosystem (Horton, 1999). It is also important to allow the studied entities to be active and involved in the process of classifying themselves (Callon, 2006). This calls for interaction between the researcher and actors within the ecosystem. In order to gather the necessary data, and still stay within the scope of the mapping, the first step when designing data collecting operations is to determine which participants to involve in the study. One factor to consider is if the presented problem is from a specific branch of the organisation, or if it concerns several or all branches. Depending on the ecosystem, involving participants from other organisations than the focal organisation might be necessary. This consideration will function as a guide when deciding on participants in the data gathering. Once the participants have been identified it is possible to design the method of data gathering, e.g. workshops or interviews, and what pedagogical tools to use, e.g. computers or whiteboards. Throughout the data collection the researcher needs to evaluate the decided method, and if needed, change it between each session.

To simplify the data gathering process the concept of black boxing can be used. It is a way to simplify the mapping by grouping several nodes or part of the ecosystem into one node, or completely leaving them out (Latour, 1999). This can be done to keep data relevant, as decomposing sub ecosystem might not suit the scope or the available time.

Structuring and aggregating the data

Structuring the data is a vital step in the process of mapping a business ecosystem. The aim when structuring the data is twofold. First the data need to be structured to fit into a database. Secondly, once the data in the database has been aggregated, e.g. by using a visualisation tool, the data needs to

be structured to facilitate an analysis. If the studied ecosystem is small or simple, these three steps can be eliminated, depending on the design and outcome from the data collection.

When structuring the data, it is necessary to design rules that defines how data from different sources is to be interpreted and compiled. Such rules depend on the aim of the study, and the design of the data collection, and therefore needs to be reconsidered before every data collection session. The rules used when structuring the data controls factors such as if data discussed, but not written, during workshops should be taken into consideration, how data that does not comply with the focus rules should be structured and so on. When designing the rules, it is necessary to define a way to collect the data so the rules can be followed properly.

Before initiating the aggregation of data, the structured data needs a review to determine if the data has reached a desired quality and depth, if not, examine if the method of data collection needs to be modified before conducting further collecting operations.

The AAA method is designed to give a low graphical complexity of a business ecosystem in order for it to be displayed without using digital tools. However, the use of such tools is recommended when aggregating the data, as even the smallest business ecosystem tends to reach a level of complexity that motivates the use of any tool that saves time for the aggregator. Between every data collection session, the aggregated data functions as a guide to determine whether the collected data is sufficient, needs to be complemented, or if the data collection needs to refocus on an area that has not been covered.

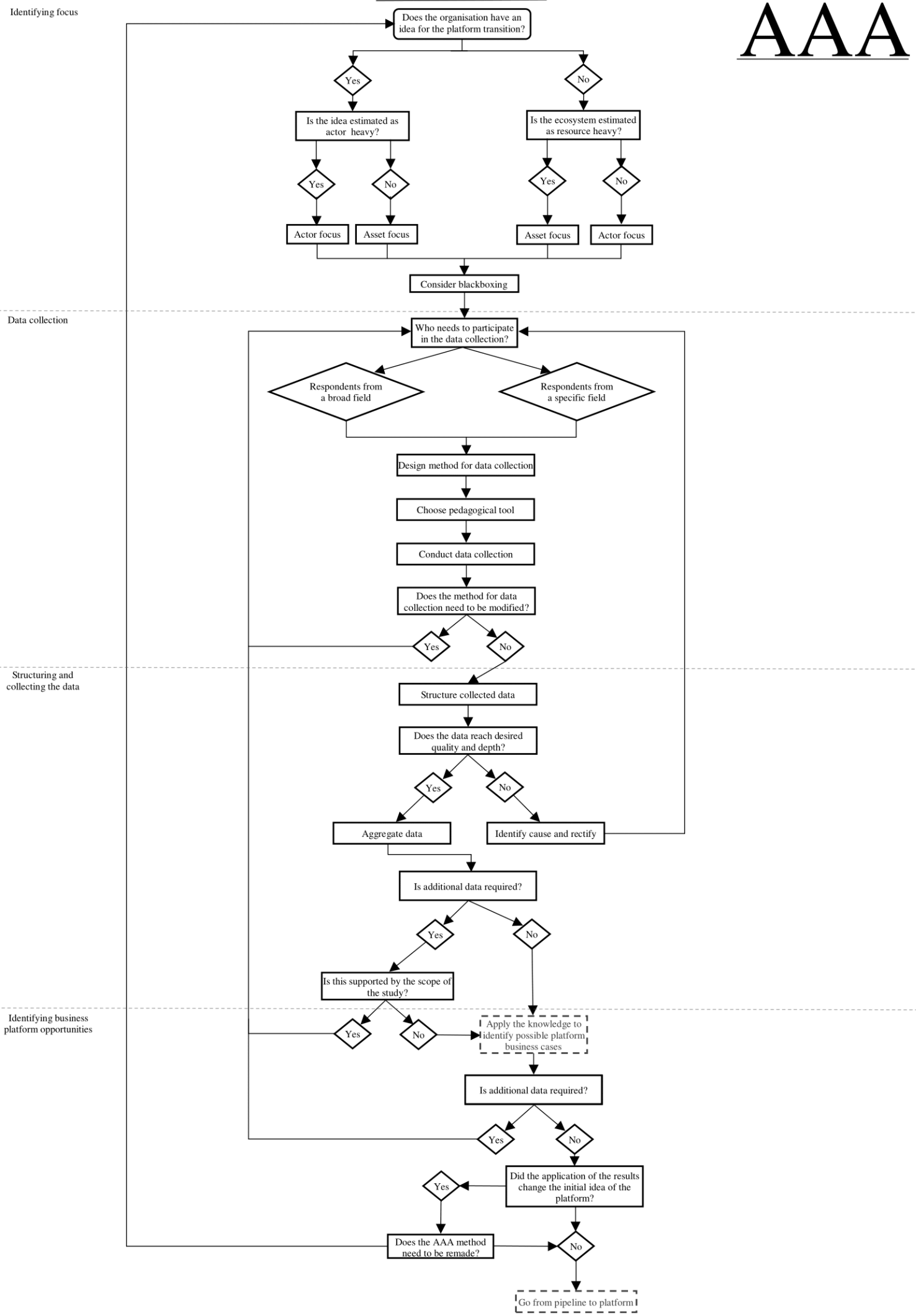
Identifying business platform opportunities

When the collected data is deemed sufficient, or if any other factor, e.g. time or access to staff, limits the data gathering, the AAA method continues by identifying possible platform opportunities. Gradually, as the process of identifying possible platform opportunities develops, the need to collect more data on the business ecosystem may arise, even if it at first seemed sufficient. This triggers new data collection sessions, which, depending on the need, takes the same form as previously, or gets modified according to the new need of data. Once a sufficient amount of data is collected, structured, aggregated, and analysed it is possible to determine if the original, or a new, platform idea is feasible in terms of economic viability, market conditions, and so on. Depending on the initial scope, a second, and expanded, session of the AAA method might be necessary in order to examine the business case further before starting a transition towards a business platform.

The AAA method does not give specific guidelines on how to identify possible business platform cases, or how the transition from pipeline to platform is to be conducted. However, the AAA method does give an enhanced understanding of the business ecosystem, which helps when applying theories and best practice during the transition.

A flowchart of the AAA method

AAA



Discussion

As the aim of this thesis is to present a new method, it does not follow a conventional thesis framework. Neither will the discussion. Discussions concerning the how and why have to a large extent been done under the captions *Developing and applying the AAA method at Per Jacobsson Byggnads AB*, *Discussion concerning the development of the AAA method*, and *The foci of the AAA method.* As some questions remains unanswered, the following chapter will start by addressing how the AAA method was developed, and how it answers to the need of a new method. This first section also proposes suggestions for future research, mainly with the purpose of further validating the proposed AAA method. The chapter continues by comparing some similarities between the AAA method and the stakeholder theory, and e3 value model, and ends with examples of how the AAA method can contribute to foresight.

The problem area was defined as a gap in the literature when transitioning from a pipeline to a digital platform strategy. The literature gives vast recommendations on how to identify opportunities, and how to perform a transition. However, these recommendations often presume an already existing knowledge of the business ecosystem. The AAA method fills this gap, not only by presenting a way to map the business ecosystem, but also by giving an end result that is tailored to fit the theories of business ecosystems and digital platforms. This, as the entities in the AAA method is commonly used in those theories. In the case with PJ Bygg, the AAA method resulted in 205 nodes and 868 edges, giving the organisation a detailed understanding of the ecosystem, which makes them better prepared when applying to analyze how theories concerning digital platforms can be applied in their context.

The second aim of the AAA method is to give the possibility to create graphics that can be presented and grasped without complex digital tools. Producing graphical pictures of the ecosystem is not necessary when using the AAA method, although it can prove useful during, e.g. workshops. By allowing each node to represent one set of information, instead of three, the node becomes easy to grasp. The pace in which the participants draw conclusions from the canvases in the second workshop, even though they had not seen all the nodes and edges before, indicated that the aim of low graphical complexity was met. It was further proved during the third session, when participants new to the concept of the method, understood and drew conclusions from the printed map, representing 198 nodes and 790 edges. The possibility to grasp the ecosystem also answers to the first aim of this thesis, as an understandable presentation of an ecosystem makes it more accessible, and by that more applicable.

The map of the ecosystem created at PJ Bygg has already come to use in an unanticipated field. At the same time as the mapping were done at PJ Bygg, the Swedish Work Environment Authority was investigating the psychosocial work environment for the site managers in the construction sector. The map of the ecosystem drew attention from the investigators, as it helps to understand the complexity of the work environment. The result of the investigation is still to be presented.

The AAA method was developed during the application at PJ Bygg and has not been applied in its final form through all the stages. This has some implications. The concepts of the actor and asset foci, were not used in the initial stages, neither was the concept of black boxing. This led to some extended discussions during the first structuring and aggregation of data and could have rendered in much of the data from the first data collection useless. As PJ Bygg expressed a will and need to focus on actors and activities the data collected during the first workshop proved to be useful in the later defined actor-activity focus. If the actor-activity focus had been defined before the first phase at PJ Bygg, the data could have become even more precise, however a more detailed description of the connection rules might have limited the participants motivation to transcribe data. To not have an early discussion with the organisation concerning black boxing proved to be a bigger concern, particularly after the first day of workshops. As the participants were encouraged to write everything that crossed their mind, the first day resulted in different granularity for different parts of the business ecosystem. Some categories

of subcontractors were represented by several nodes, while others were represented by one, this was seen throughout the ecosystem. This gave two implications. First it created some confusion about how to design the second workshop, as it was hard to determine if the granularity was due to different number of actual nodes. The second implication, which is related to the first, was how to dispose time during the workshops. If a black box had been defined, e.g. concerning authorities, more time could have been used on identifying, e.g. resources in the ecosystem.

The circumstance that the AAA method was developed during the application at PJ Bygg, and that no further application has been done, proclaims that the method needs further validation. The method needs to be tried and applied on different organisations in different fields. The need to examine the asset-activity focus is evident. The study at PJ Bygg quickly grew to a considerable number of nodes and edges. This made it necessary to use the foci rules to create an understanding for the ecosystem in order to tell what assets that belonged to which actor, and who conducted what actions. In a smaller ecosystem, or in a small portion of an ecosystem, the ability to keep track of individual nodes increases. This opens up for a third focus, a mixed focus, where both actors and assets are allowed to be connected to an activity. A focus like this would give the opportunity to, e.g., analyse what activities an actor has to conduct in order to maintain an asset. A hypothesis is that this focus would be hard to analyse in a macro perspective but might give useful knowledge in a micro perspective.

It is also possible to discuss if a map of an ecosystem is an objective and complete explanation. The design of the data collection, the enthusiasm from the participants, and so on, will always be a factor to consider. One way, although resource consuming, is to conduct an additional mapping, with another actor as the data source to add missing parts of the ecosystem. In the case with PJ Bygg, such an actor could be found among the subcontractors. An additional mapping will also bring insights in parts of the ecosystem that is transparent for the focal actor and create a better understanding of potential customers and clients, a detailed insight that might lead to new business opportunities (Christensen et al. 2016).

A proposal to future research is to examine the possibilities of adding financial transactions to the method. The knowledge of economic flows could help to identify keystone actors, but also assist when identifying how a digital platform could transform the revenue streams. Adding financial transactions calls for data collection from several different actors, as one actor most likely only have data on transactions to its adjacent neighbors.

Related approaches

When deciding to compare different methods of mapping, one has to decide which methods that are relevant to compare. In the section below, the AAA method is briefly compared with the stakeholder theory and the e3 value model. The stakeholder theory was chosen because the HR representative, partaking in the last workshop, specifically asked for the differences between the stakeholder theory and the AAA method. The e3 value model is used as an example to discuss the relations between the AAA method and software ecosystem modelling. The comparisons do not aim to thoroughly describe the theories, but to emphasis some similarities, and differences between the related approaches and the AAA method.

The stakeholder theory attracts vast attention from management researcher (Laplume et al. 2008). It emphasise the role of a focus actor, who can influence and be influenced by other actors, or stakeholders. The relationship between the central actor and the stakeholders are defined by their respective interest in each other. A problem with the stakeholder theory, that has been widely discussed, is how to define which stakeholder is more important (Laplume et al. 2008). This is a problem that is mitigated in the AAA method as the significance of every actor is defined by the number of edges it is connected by.

Another discussed problem with the stakeholder theory is how to define which stakeholders that actually influences the focus actor (Donaldson and Preston, 1995). In the AAA method, this question is present as well. Therefore, it is important to make the necessary limitations of the study in step one of the method. Is the study used to identify how a digital platform could simplify existing processes? Is the study used as a base for foresight to explore new revenue streams? When this type of questions is discussed early during the method, the problem of identifying who a relevant actor is becomes easier.

The major difference between the two methods is the application. The stakeholder theory aims to describe interest and goals different actors have. The AAA method, on the other hand, aims to create a knowledge of the ecosystem that is directly applicable on theories concerning digital ecosystem and platforms.

Similar to the AAA method, the e3 value model consists of actors and activities. The e3 value model gives the researcher an opportunity to highlight advantages within a software ecosystem, showing incentives for an actor using an API[8] (Horkoff et al. n.d.). The e3 value model focus on three viewpoints, the business value viewpoint, the business process viewpoint, and system architecture viewpoint, to explain how value flows and is created within the network (Gordijn and Akkermans, 2001). By emphasising the viewpoints, the e3 value model aims to improve the communication and understanding between the business side and the software development side of a development project (Gordjin et al. 1999). However, by using the viewpoints, the e3 value model becomes deeper in its analysis than the AAA method. In an early, exploratory stage, of a transition process, this deeper analysis might inhibit the mapping process, especially when striving to use the entities within the ecosystem to have an active part of the mapping, as it increases the complexity of the process. This is a circumstance that makes a method like the e3 value model more suitable in a later stage of the transition process, where the low complexity of the AAA method initially has been used to create a common knowledge of the ecosystem in large. This corresponds with the purpose of the AAA method, create an understanding of the business ecosystem to identifying relevant business areas, which can be explored and exploited further using more specific theories and methods.

Using the AAA method to create foresight

By applying the method to design a non-existing network, the ability to foresight is improved. For example, when designing a three-layered business model canvas, as presented by Joyce and Paquin (2016), the AAA method could be used to identify partners, activities and assets in the economic layer. It could also increase the understanding for the supplies and outsourcing, production, and materials in the life cycle layer, and the local communities, and employees in the social layer. The AAA method can also be used to identify entities that does not exist in the ecosystem. In the case with PJ Bygg, such an example is suppliers of charging equipment for electrical cars. This asset does not exist in the ecosystem today, but by adding it as an asset, and then identify what activity to do with which actor in order to reach it, will create new possibilities for PJ Bygg.

[8] Application programming interface (API) are a: "*sets of standardized requests that allow different computer programs to communicate with each other*" - (Encyclopædia Britannica Inc, 2016) The API functions as a way for a developer to request services, allowing the exchange of data and services among programs (Encyclopædia Britannica Inc, 2016).

Conclusions

This thesis contributes to research by proposing a method to create understanding of a business ecosystem. The method was developed and applied on a construction company, and is based on the nodes actor, activity, and asset, derived from the ecosystem and platform literature. By facilitating these three common denominators, it also contributes by lowering the visual complexity of the ecosystem. Finally, the proposed method fills a gap in the literature concerning how to map a business ecosystem, prior to examining digital platform possibilities. The two later contributions is also considered beneficial for the practitioner.

By this, the main contribution of this thesis, the proposed AAA method itself, answers to the need of creating an understanding of a business ecosystem and the interaction of its functions. This understanding makes organisations better prepared when analysing how theories concerning digital platforms can be applied on their ecosystem.

The method also contributes to the practitioners by creating an understanding of factors that affects the psychosocial work environment in the ecosystem.

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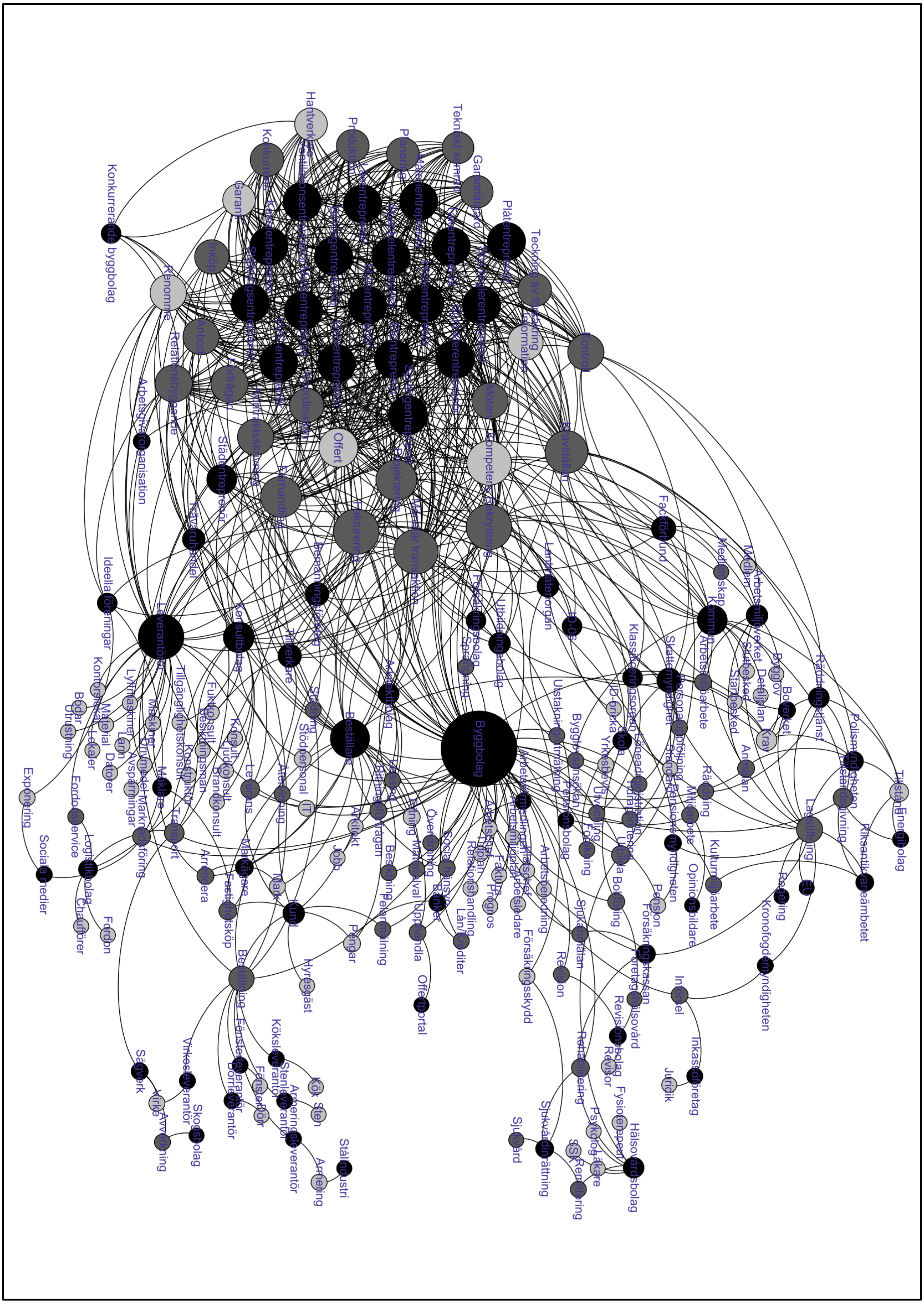
Appendix A


Konkurrerande byggbolag
Arbetsgivarorganisation
Ideella föreningar
Leverantör
Konsultbolag
Beställare
Byggbolag
Kommun
Lagstiftning
Exponering
Sociala medier
Logistikbolag
Chaufförer
Fordon
Sågverk
Skogsbolag
Stålindustri
Hyresgäst
Pengar
Kund
Offertportal
Försäkringsskydd
Sjukvård
Hälsovårdsbolag
Revisionsbolag
Pension
Opinionsbildare
Kulturarbete
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