How to improve value towards third-party developers
An analysis of the open data platform Trafiklab

Anton Söderman
Abstract

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This thesis studies the open data platform Trafiklab, which provides open access to data regarding public transport in Sweden. The study is from the perspective of third-party developers and deals with the question of how they value creating mechanisms towards them can be improved. It is based on two different surveys and several interviews conducted with third-party developers using Trafiklab. The results show that Trafiklab needs to improve their documentation, communication, initial use, and change their perspective and role towards the developers using Trafiklab. To improve open data, in general, a greater focus on transparency rather than transparency is suggested.
Summary (In Swedish)

Detta examensarbete syftar till att skapa förbättringsförslag till en specifik typ av mjukvara utifrån använderupplevelse. Detta område är inom den öppna data branschen, öppna data innebär att man öppnar upp data så att vem som helst ta del och använda sig av den. Inom kollektivtrafikbranschen distribueras öppen data via en plattform som heter Trafiklab, som ägs gemensamt av branschens parter via en organisation med namnet Samtrafiken. Det är inom detta område som denna uppsats försöker besvara frågan hur Trafiklab kan bli mer värdefullt för tredjepartsutvecklare utifrån en multidisciplinär ansats. Detta kommer att genomföras genom att både försöka ta reda på vad för värde Trafiklab idag har och hur deras nätverk gör värdeskapande möjligt.

Detta projekt bestod av tre delprojekt som alla byggde på varandra. Först genomförde en förstudie att skapa en grund för vidare undersökning presenteras teori kring öppen data och plattform. En plattform är något som skapar en grund som andra aktörer kan bygga på, ett exempel på detta är Apples iPhone där andra aktörer kan bygga komplementerande applikationer. När man har plattformer som tillhandahåller öppen data är det viktig med en balans mellan kontroll och tillgänglighet, något som sammanfattas i teorin kring ”plattform gränsresurser”. Det andra delprojektet var utformades och genomfördes av en enkät, baserat delvis på en redan genomförd enkät. Detta leda till det tredje delprokelt till mer djupgående intervjuer med enkät deltagarna för att få en mer detaljerad bild av situationen.


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1. INTRODUCTION

Today the idea of open data is gaining prevalence, which is the idea based on making data and information available to every potential developer so that the information holders can focus on other things (Rudmark, 2013). This approach is also said to promote innovation as other actors than the data owners are more likely to find creative ways to utilize the data in new and different ways. Sweden was an early proponent of open data and ranked third in the open data barometer, just after the United States and the United Kingdom, in 2013 and 2014 (Web Foundation, 2015). However, in the latest report, they fell into ninth place on the list. The ranking has three different categories: readiness, implementation, and impact. While Sweden has a high ranking in preparation, they are behind in the other two categories. It is clear that in Sweden, the political willingness to work with open data exists, but that is not enough and Sweden needs to develop to meet the demands of the future. Open data is an important question to all Sweden since it has the potential to create value for individual and new jobs for companies which utilize open data. It can also be seen as a question of democratic, since it is taxpayers’ money that created the data in the first place, not to mention the Swedish state’s openness principle.

To look deeper into the question of how the ideas of open data can evolve in Sweden, a concrete example of an open data initiative is important. Such an example is found in the Swedish public transport sector. Today more than 700 000 people in the Stockholm region use public transportation daily and by 2020 it is forecasted that a quarter of all Swedes will live in the area. However, the demands on public transport have evolved with a new generation growing up with new technology and expectations. Most, if not all, travelers today have access to a mobile device with a constant connection to the internet. With this in hand, the traveler can get instant access to information about delays and keep their personalized timetable updated, through the Internet is quickly becoming the natural way of distributing public transport information (PTI) to the public.

However, the public transportation companies (PTC) might not have the optimal way for individuals to utilize the information and might not even know the best way to use the data themselves.

In Sweden, this is accomplished through the platform of Trafiklab, a service provided by Samtrafiken, which makes PTI available to third-party developers for free. Samtrafiken takes the data delivered from PTC and Trafiklab distributes it so that third-party developers can use it to develop applications. Trafiklab’s function as a service is that it gives third-party developers value. Value is simply put in what the third-party developers sees as being of value, which is of central importance.
This data distributed by Trafiklab is the basis for thousands of trips every day and therefore not only provides value to third-party developers, but also to individual travelers, and through them to all of the society as public transport can be used more efficiently. How this technical value-creating mechanism can be improved is therefore not only a technical question but a social one as well. Getting the most out of the service provided by Trafiklab, the open data platform, is therefore of general interest.

Since the area of interest here is how implementation and impact can be improved, this study will focus of Trafiklab from the perspective of third-party developers. Focusing on Trafiklab means that, in practice, the focus will be on understanding what third-party developers perceive as creating value for them and how that process can be improved. A focus on the data holder could also prove interesting. However, that would risk shifting the focus more on readiness, an area in which Sweden already excels.

1.1 Subject introduction

With regards to human-computer interaction (HCI) theory, the question is how to make the data distributed by Trafiklab as useful as possible. Usefulness consists of two different aspects: usability and utility (Grundin, 1992). They are both imperative to create a useful system, and one cannot work without the others. A highly useable system might not have the right utility to be helpful and a system with high utility might be useless since the usability is too small. Their relationship can be seen as usability * utility = usefulness, if either one of them is zero, it does not matter how high the other one is. However, in recent years there has been a greater focus on usability. Making sure that the system is easy to use, while good, it is not ideal for most systems. Instead, some argue for not losing sight of the equal importance of utility and not only focusing on usability when it comes to designing IT-systems (Tarkkanen et al., 2015). This thesis will, therefore, focus on more general utility can be improved, not how Trafiklab can redesign their website. Other definitions of usability exist, most notably the one by ISO (ISO 924-210). However, in the present context, only the one presented here will be used."

It has also been argued within the HCI community that the focus on the task, in this case, the task of using Trafiklab, is not enough to create an efficient system. It is also important to understand how utility issues are experienced and perceived differently by various users groups. This means the different users’ perspectives, motivations, social drives, expectations, trust, identity, social norm and much more. It also means relating the concept to work practices, communities, and different organizational social structures, but also economic and political drivers. This means that it might not be enough just to look at the relationship between Trafiklab and the third-party developers that uses it in isolation. It is also important to consider the context it exists in and surrounding actors. The opportunity for these kinds of multidisciplinary studies within HCI has been suggested before by, among others, Gawer and Cusuano (2014) who
suggests looking more into the question of innovation strategy, organizational behavior & network, and management of technological change being of particular interest.

Given that this thesis looks at Trafiklab about third-party developers, this project has an outside perspective, meaning that the thesis has tried to understand what third-party developers’ view as value is creating. Value creating mechanisms build value within and between organizations by improving or simplifying, in this case by improving third-party developers’ ability to work with Trafiklab (Rudmark and Eriksson, 2014). It has been suggested in earlier platform research that a deeper understanding of complementors, the actors that complement the platforms function, is of fundamental importance (Yoffie and Kwak, 2006). Most studies are also done on platforms on a larger, more quantitative level, and there has been less study with a focus on a personal level. A qualitative study with a focus on interviews could provide impressive results to the methodological side of exploring platforms.

Another reason for this being a particular interest is that fact that most platforms studies are based on platforms that combine the market and technical platform, with the topic of the Apple App Store and the Android markets being a favorite discussion topic (Ghazawneh and Henfridsson, 2013; Rudmark 2013; Eaton et al., 2015). Not all platforms are such comprehensive platforms, and it is interesting to look at a platform with a smaller scope. Another favorite topic is the open community platforms, which function as a place to show off work and get feedback and support from the community, working as a kind of free marketplace. It has been stated in earlier research that the focus has been on community founded platforms and not as much about sponsored platforms and how they differ from their free community counterparts as they evolve (Hargrave and Van de Ven, 2006). Very little is known about how open source communities’ evolution and design are affected by corporate sponsorship, which is how Trafiklab in funded.
2. PURPOSE

The purpose of this thesis is to take a closer look at open data in Sweden by studying the service, provided by Samtrafiken, called Trafiklab, which functions as a socio-technical value-creating mechanism, primarily for third-party developers, and how this mechanism can be improved. This will result in some suggestions of how Trafiklab value creation mechanism can be enhanced as well as a general pointer of how open data can evolve in Sweden.

2.1 Main scientific questions

- How can Trafiklab’s socio-technical value creating mechanisms be improved?

To answer the general question two sub-questions were created:

- What value does Trafiklab, as a platform, provide to third-party developers?
- How do Trafiklab's value creating socio-technical network look?

2.2 Delimitation

Since this project will be exploring a new area, it will focus primarily to find areas of concern and give a brief suggestion of how they can be solved. Given that several different areas of improvement can be found, detailed plans of action for every improvement would widen the scope of the thesis extensively. It will, however, serve as a basis for potentially other more specific studies into the area.

2.3 Structure of thesis

This section will detail the structure of the rest of the project to give the reader an overview of what to expect.

This thesis project consists of three different subprojects, all of them building on each other and gradually focusing the project on a particular area of interest. It starts with a broad approach at first that gradually narrows down with each project by using the insight gathered in the preceded subproject. This structure was chosen since it helped provide a structure to a project that dwells into several different methodological areas.

The first subproject is an explorative study into the field described in the introduction, both on an empirical level but also on a theoretical level. Its purpose was to limit the scope of the main scientific question and to create a framework for the other projects.

Based on the first subproject, it was decided that the best way to proceed were to conduct a survey of the users of Trafiklab based on a previously conduct survey. Its
purpose was to form a general overview of the user of Trafiklab and help find the area of interest within the user's views for the next subproject.

Based on the second subproject interviews questions were formed and interviews conducted with some users. Their purpose was to let users better elaboration on the areas of interest found in the earlier subprojects and to dive deeper into their experiences of Trafiklab.

All of this subproject and their results were then weighted together in the final discussion, to answer the scientific questions in the conclusions.
3. BACKGROUND

In this section are some key concepts that will be presented and discussed for easy reference. This section will then end with a more extensive discussion of public transport information.

3.1 Definitions in alphabetical order

**API**: API stands for Application Programming Interface which makes it possible for developers to use routines or data that is outside their code (Rudmark, 2013). One fitting analogy is to imagine a middle man between the programmer and the application. The middleman controls the data but also informs the developer of what can be requested and how to ask for it. The developers can then use the data given to them by the middleman in their program to provide a constant feed of information to the end user. APIs have traditionally provided the ability to access external code library and have now extended to be able to use a function from somewhere else. With Open API the access and use of the API is supposed to be open to everyone interested.

**Data and Information**: Data and information are two different things, which can clearly be seen from the following definitions:

“Data: A representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means.” (Menat, 2003)

“Data are formalized representations of information, making it possible to process or communicate that information.” (Menat, 2003)

Information, on the other hand, is defined as:

“By themselves, data are meaningless; they must be changed into a usable form and placed in a context to have value. Data becomes information when they are transformed to communicate meaning or knowledge, ideas or conclusions.” (Menat, 2003)

“Information has a meaning ... (it) comes from selecting data, summarizing it and presenting it in such a way that it is useful to the recipient.” (Menat, 2003)

**Samtrafiken**: Is a company collectively owned by most of the Swedish public transport sector, which develops and provides services to the public transport sector and end users (Samtrafiken, 2016). Their primary business is based around coordinating public traffic planning and travel payment. They also provide the service Trafiklab.

**SL and SLL**: SL stands for “Storstockholms Lokaltrafik AB”, meaning the Greater Stockholm public transport Company. They are mainly run by SLL, which means “Stockholms läns landsting” and means Stockholm County Council, and are the
government responsible for public transport in most of the larger Stockholm region (SLL, 2016).

**Software Platform**: Is defined as “The extensible codebase of a software-based system that provides core functionality shared by modules that interoperate with it and the interfaces through which they operate” (Tiwana et al., 2010).

**Trafiklab**: Is a community platform for open public transport data that provides data and APIs regarding public transport in Sweden (Trafiklab, 2016). Through it, it is possible to access tools to develop applications as well as take part of the larger Trafiklab community.

**Trafikverket**: Is the name for the Swedish Transport Administration, which is the Swedish government agency responsible for the long-term infrastructure planning for all transport inside of Sweden (Trafikverket, 2016).

**Viktoria Swedish ICT**: Is a non-profit research institute which focuses on research into automobile and transport sector in a relationship with information and communication technology (Viktoria, 2016).

**Open Innovation**: Is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, 2006).

**Third-party developers** Are those developers that on behalf of someone else’s develops applications, services of systems to satisfy the end-users of a given platform (Ghazawneh and Henfridsson, 2013). This can, for example, be someone who develops a game app for the iPhone so that Apple does not have to.

### 3.2 Public transport information (PTI)

PTI can be placed into different subgroups and are by SLL sorted into four different categories.

- **Basic information**: The fundamental traffic information needed to know the where, the when and the cost of traveling (Trafikförvaltning, 2016). This includes information about lines, stations, stops, departures, maps, rules, and contact info. Another thing to consider is that basic information should be static until there is a change, meaning that in the best case, there should not be unexpected variations in the information, which should instead be under the next category.

- **Interference information**: Is the information that should be made available when the basic information is no longer by the basic information. This could happen, for example when a train is delayed, or there is a building project forcing a bus to skip a station (Trafikförvaltning, 2016). Where the line between
basic and interference goes is not always visible, for example, a building project might force a change to the timetable that lasts for years and could then be considered basic information.

- **Crisis information**: The information of what to do with some crisis, for example, a fire on a bus or a train stopping somewhere in the Swedish wilderness (Trafikförvaltning, 2016).

- **Other complementary information**: Is all the other information that cannot be sorted into the other categories and might not be as important to every traveler (Trafikförvaltning, 2016). This includes things like safety information, market intelligence, information about the companies, information about service and marketing.
4. Subproject one: Pre-study

This section will detail the first subproject of the thesis. First, the purpose of this project will be presented, followed by the method used. Finally, the results will be presented in the form of a more detailed description of Samtrafiken, Trafiklab, and their respective purpose. This will then be followed by introducing the theoretical tools for the project that will be used in the other subproject but primarily in the final discussion.

4.1 Purpose

The goal of this project is to create an impression and of study object and the field concerning open data platforms. This will lead to a better understanding of the area, and how best to proceed to answer the main scientific questions in the next.

This was done in two ways: firstly by studying the interworking of Samtrafiken and Trafiklab and its role in their network. Secondly, research into potential theory was also conducted for the purpose of creating a theoretical framework to base on which to build the final discussion.

4.2 Method

In the method section theory will be discussed regarding general theory regarding the information gather made as a part of this subproject. The first method on a higher level will be examined in relation to human-computer interaction (HCI) since it is where this project is academically, and then step by step move closer to explaining how the information gathering took place.

4.2.1 Methodological background in HCI

Senger and Gaver (2006) argue in their text “Staying Open to Interpretation: Engaging Multiple Meanings in Design and Evaluation” that the practice in HCI to look for single problem and a unique solution is complicated and should be replaced with the notation that multiple interpretations can co-exist, and a system does not need to be built on one single correct interpretation. Their arguments are based on three main pillars; the first being the fact that computer use has spread beyond the easy to control constrain of the workplace, into everyday life, and become something much broader. The second reason is that because of the influence of the humanities and the art has brought with them interpretation beyond the HCI traditional scope of utility and usability. The third reason is the result of the sociology of technology, which says that even a single interpretation is made, is a complicated process among a variety of social groups. They argue that “No single one of these perspectives may necessarily be “correct;” instead, all may be useful in highlighting aspects of how systems are understood, used, and find roles in individual’s and community’s lives.” Another argument is that many technologies are interpreted flexibly and therefore lends themselves to different interpretations than those
intended by their makers. There point about design is that “Systems that are open to interpretation do not need to be tailored to fit every possible niche audience; instead, the same system may support many ways of experiencing and acting in the world.” Moreover, that the challenges for HCI then “…becomes, not to decide upon and support a particular, correct interpretation of a system, but to incorporate and balance multiple, perhaps conflicting interpretations and processes of interpretation in design and evaluation”. Greenberg and Buxton (2008) presents a similar argument in their text “Usability Evaluation Considered Harmful (Some of the Time)” where they argue that “the choice of evaluation methodology – if any – must arise from and be appropriate for the actual problem or research question under consideration.” They argue that premature usability evaluation of early design can eliminate many promising ideas before they have the chance to flourish.

The important thing to keep in mind in this thesis is that a method, while being a useful tool, should not, in particular in the HCI field, be something that that restrict the project and forces it to fitted into a specific category. The argument is even more relevant given the subject matter of this thesis, a technical platform, and a relatively new concept in and of itself. The most important part to remember going forward from a methodological perspective is to remain open for several different points of view while conducting the study and evaluating results.

4.2.2 Grounded theory

Lazar et al., (2010) argues that today there are so many variables involved in HCI research that the method of reducing the problem to a laboratory like setting leave out relevant information and does not allow you to understand what is happening entirely. Instead, he suggests a multi-modular approach where several different techniques are used combined with a better understanding of new socio-technical systems. He also argues for the importance of using an interdisciplinary approach to research, but also warns of the difficult doing such studies in today’s research community. Since the fundamental for this thesis is a combination of various qualitative and quantitative data sources and interviews, such a broad mindset is important to keep in mind. Because of this, an explorative study approach was selected on a general level (Dudovskiy, 2016). An explorative study’s purpose is not to offer final and conclusive answers to existing quests but rather to help provide a better understanding of this field. This means that the researcher has to be open for a change of direction as the results new data collected during the project.

However, since using an explorative study approach can be seen as a bit broad, a more accurate method for the data collection was also selected. Because of the grounded theory approach was chosen (Corbin and Strauss, 2015). The grounded theory work in the way that as data is collected, it is also analyzed and coded using a grounded format theory format, which means that it is broken down, conceptualized and then put back together in a new way. This process is summarized in figure A below.
Figure A: Model of the grounded theory in practice (Based on, Kluge, 2000)

The main advantage of the grounded theory is that it allows the research to focus on initially, on finding out more about a particular area without having set expectations on a result (Carins and Cox, 2008). Given the earlier discussion, this is a valuable trait in this thesis. Another inheritance advantage is that theory development starts as soon as there is data to analyze, even though it might not be excellent at first. However, this means that initial interviews can be quite different from interviews later in the project. Another distinct advantage for this project, in particular, is that it recommended being used for a field that is conceptually immature and when integrating interdisciplinary knowledge into the field. When it comes to critique of the grounded theory, one major compliment is that they can very subjective, because of its emphasis on reflection. It has also been argued that research not be as repeatable as other studies. These are both very valid points, and the best way to counter them is to be as transparent and open of how the study was conducted and the decisions affected the study.

In summarizing, since this is quite an explorative study in a new field with a possible interdisciplinary learning outcome, it was natural to select a grounded theory approach in this subproject.
4.2.3 Information gathering

The material, on which this subproject was based on three different kinds of sources. These will be presented briefly bellowed followed by an extended discussion of each category.

- The first category consisted of information around the various actors and used within the Trafiklabs network. This consists of documents, report, and the websites of involved actors. The writer also participated in the 2016 Trafiklab Meets-up lecture, which’s a slide are available online.
- The second category consists of academic literature and articles to build the theoretical and methodological framework for this thesis. It has also helped with providing extra depth when necessary.
- The third and final category consist of three interviews with people working at Samtrafiken and Trafiklab, which were performed in the initial phase of the thesis.

4.2.4 Academic literature sources

The academic literature sources were primarily used as the theoretical basis for this thesis. There were found based on keywords such as HCI, platforms and open data. They were based to a high degree from the research of one Daniel Rudmark of Viktoria Swedish ICT. Rudmark had studies of open data and platforms before, especially relating to public transport. While his work was a real empirical source initially, theoretically he was mostly useful as he helps by referring to other theoretical research in the field. This was done by studying his research and the sources he used, and by having him recommend some papers and areas of interest. Another person found by these means whose writing, which was in particular useful, was Dr. Kevin Boudreau of Harvard and London Business Schools, who research are into innovations and platforms. In summary, the search for academic literature sources was following a long breadcrumb trailed originating from keywords and researchers described above.

4.2.5 Document research sources

The document research sources were used as the basis for the initial study of Trafiklab, but also during the interview period to gather more information based the information from the interviews with third-party developers. These sources consisted to a high degree of the website of the respective organizations covered and the official documents available to them. Some reports were also given by the thesis supervisor directly which helped to narrow down the initial search.
4.2.6 Interviews

Interviews were seen as a way to complement the document research sources mentioned above. It was also chosen since this entire project is also based in part, by its very nature, on a degree of ethnography. Ethnography is a combination of interviews, participations and observation (Carins and Cox, 2008). Its main function is to use deep immersion and participation in a specific research context to develop an understanding that would not be possible with other research approaches. Ethnography, when described in relationship with HCI, is “…often used as a first step, to understand a group of users, their problems, challenges, norms, and processes, with the eventual goal of building some technology for them or with them” (Carins and Cox, 2008).

Ethnography was used primarily during the initial study of the field as described by the grounded theory above. However, three interviews were conducted as a part of this for a purer information gathering phase, as can be seen in Table 1 below. The first interview had a free-form structure while the other two had a semi-structured approach, with questions based on lacking information in the document research sources. This method is the most common way of gathering information in explorative studies (Dudovskiy, 2016). Since interviews are used more extensively in subproject three interview methods are discussed in greater detail in its method section.

Table 1: The interviews conducted with person working at Samtrafiken

<table>
<thead>
<tr>
<th>Name (fictional)</th>
<th>Role</th>
<th>Date</th>
<th>Format of interview</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person 1</td>
<td>Technical project manager</td>
<td>2016-02-29</td>
<td>Face-to-face</td>
<td>Free-form</td>
</tr>
<tr>
<td>Person 2</td>
<td>Marketing director</td>
<td>2016-03-22</td>
<td>Face-to-face</td>
<td>Appendix C</td>
</tr>
<tr>
<td>Person 3</td>
<td>Delivery director</td>
<td>2016-03-22</td>
<td>Face-to-face</td>
<td>Appendix C</td>
</tr>
</tbody>
</table>

4.3 Results: Samtrafiken and Trafiklab

This section presents the information gathered as part of this subproject, consisting of a description of Samtrafiken and Trafiklab. In the chapter after this, the theory that was compiled as a part of the subproject will be presented.

4.3.1 Samtrafiken

Samtrafiken is an organization that consists of around 35 employees and which main purpose it to make public transport easier, more accessible and reliable (Samtrafiken, 2016). This is done primarily by developing services for the public transport sector and
by providing knowledge and data. They are owned jointly by 38 different traffic companies and can because of it act as an unbiased party and an arena for dialog and deal with the larger questions for the while public transport sector. Person 2 also emphasize that Samtrafiken is primarily a collaborative organization and a meeting point for the public transport sector. He mentions the fact that Samtrafiken bases its decisions primarily on three factors:

- Needs to have the support of at least three of the different owner companies
- Will be something that benefits the sector as a whole, not only be to the interest of a business or lead to a big a focus on specific areas or regions
- Will be cost effective.

Samtrafikens has four main services they use to fulfill their goal: ResRobot, Resplus, Statistic products and Trafiklab (Person 1). While this thesis is mostly interested in Trafiklab, we will give a brief description of their services and how they relate to Samtrafiken. Trafiklab will be dealt with more extensively later on but the important part to remember is that Trafiklab is considered a service that Samtrafiken provide to fulfill their other goals.

ResRobot is a travel planning service that collects all of Swedes public transport information at one place, available through the internet and as a separate application for smartphones and together with ResPlus provides around 85 % of Samtrafikens income (Person 2; Samtrafiken, 2016). The future of ResRobot is in doubt according to Person 2 who acknowledges that is it mostly a way to show off that they can offer competitions neutral traffic information, in line with their mission statement. However, he states that it is an excellent tool for booking longer tripper through Sweden.

Their next service is ResPlus, which is a service which makes it possible to travel all the way to Sweden on the same travel guarantee (Samtrafiken, 2016). Person 2 considered ResPlus and related payment service as having more of a future then ResRobot since it provides something that is hard to offer by other actors since it requires a lot of administration and trust. Both services are however according to her not intended for use by actual travelers (Flodén, 2016).

Their statistic products take the shape of delivering specific data to organizations for a price (Person 2). This data can concern the specific area of particular information that requires a more extensive research and preparation before it can be used by external parties. However, this part is small and shrinking since a lot of the information is offered by other parties.

4.3.2 Samtrafikens Responsibility for PTI

Samtrafiken has been commissioned by the Swedish government agency for transport to compile traffic data from Swedish traffic companies (Flodén 2016). This was to realize
the idea in the government act in (STF 2010:1065) “Take position as responsible for national registry for traffic data called “Riksdatabasen and stores in a technical system called IVU.pool ” (STF 2010:1065) to cater to international law (Samtrafiken I Sverige AB and Trafikföretaget, 2016). As a traffic company, they are required by government regulation to give information about their schedule both to the local public transport authority and to Samtrafiken (TSFS 2012:2 & 2012:72). This information has to be delivered at least 21 days before the traffic in question starts. This data is then presented in a competition-neutral way through the web-based traffic planner; ResRobot and through open APIs through Trafiklab. This process is summarized in the figure B below. What is important to realize about this process is that it is complex and takes much effort, before it can be distributed by the service Trafiklab.

![Figure B: The GTI process (Based on, Samtrafiken, 2016)](image)

This is regulated through the “Gemensamma system för trafikinformation”(GTI) meaning Joint system for traffic information (Samtrafiken I Sverige AB and Trafikföretaget, 2016). In this Samtrafiken tasks in the matter is defined as:

- Receive the information that public transport companies gives about their offering and make sure that the information is then supplied through the GTI
- Maintain and further develop an environment for data storage and processing
- Provide and expand the national registry for traffic stops, changing times
- Provide a channel that gives third-party access to the data in the GTI
- See to that a public, free, natural and non-discriminatory traveling planning service is provided to travelers in the form of a website
- Take a cost-based fee for public transport companies for the providing of GTI. The cost for GTI will be competitions neutral and non-discriminatory.
- Treated public transport businesses in a non-discriminatory and competition neutral way.

Samtrafiken also commits to:

- Receive the delivery from the public transport companies about their offering.
- Quality checks the information about the public transport operators offering delivered to Samtrafiken by examining if the information is logical consistent and looks complete and give feedback to the companies, either through putting the information out or communicating that the information has been received and will not be rectified by Samtrafiken.
- Handle incoming information about the public transport companies offering which, based on Samtrafikens perception, has enough quality, through loading into GTI
- Export the information about the public transport operators to a web page for information to travelers; and to
- Provide information about the public transport operators to aggregators.

The public transport operators on their part commits to:

- Deliver information about their offering by regulation about public transport information, 2012-01-19, TSFS 2012:2, from the data of 2012-02-01 and by Samtrafikens complementary instructions.
- Being responsible for the quality of the delivered information about their offering
- Have resources to correct faults and errors in the delivered information, and to
- (Through testing against the out channel that the public transport companies offering is presented in, make search control the information about their offering)

This data is delivered in an agreed format called “Transportformatet” or, when delivering smaller data, the information can be sent in Excel format or another program with the same format as Samtrafikens instructions information (Samtrafiken I Sverige AB and Trafikföretaget, 2016). The data sent shall contain the following particulars:

Administrative information

- Name, organization number and address
- Contact details in regards to the one responsible for the delivery
- Receipts, periodicity, extent and the time for the delivery

Traffic data

- Lines, distance, announced line numbers and in occurring cases announced line names
- Tours, line numbers
- Tour properties (pre-booked tours, boarding, comfort, accessibility)
- Periods, the periods the deliveries relate to
- Running days, the days in the delivery relates to
- Mode of transport, bus, express bus, tram, train, boat, ferry, subway
- Provider number

Stops data

- Public transport company stops name
- Stops geographical coordinates
- Stop municipality code

Samtrafikens plan in self-service

- Changing time for own traffic

4.3.3 Trafiklab

Trafiklab was created in 2011 by Samtrafiken, Viktoria Institute, and SL to promote the creation of better traveling services (Trafiklab 2016). Trafiklab main tasks consist of promoting and providing better access to public transport information. This is done by opening up traffic data for third-party to take part of and develop new innovations services that themselves could not think of or have the resources for.

Trafiklab is in a powerful position in the network as they, to a degree, control what information is handed over to third parties as well as how that information is distributed, both in how it is packaged and through which systems it is being circulated. This affects what third parties can develop as there are limited to by the data and therefore also affects the end users. Therefore, Trafiklab has an indirect power of how and what information is distributed to the end users and therefore how useful the information is for end users.

4.3.4 Trafiklab the technical platform

The platform of Trafiklab is reached through their web portal (www.trafiklab.se) where you can become a member to get access to raw data and API as well as look at projects being developed by other members(Trafiklab, 2016). The services offered include the following Trafiklabs API:s.

- **GTFS Sweden.** Makes it possible to download a data file with all planned public transport in Sweden in Google's GTFS format. The information comes directly from Samtrafiken, which is clearly stated. They also offer a beta on a newer version of this API.
- **ResRobot – Trip planner.** Makes it possible to plan trips with all of Sweden's public transport
- **ResRobot - Pole Schedule 2.** Gives access to the time of arrivals and departures for specific stations in Sweden
- **SL Stops and lines 2.** A document with technical documentation describing how external parties can get access to SLs semi-static information for all different forms of transport. These APIs only offer information on the larger Stockholm area.
- **SL Location Lookup.** Makes it possible to gain information about a place by using a part of the locations name
- **SL Real-time information.** Gives access to Real-time information regarding public transport run by SL in the Stockholm area.
- **SL Trip Planner 2.** Makes it possible to get travel suggestions inside the Stockholm area using SL traffic.
- **SL Fault information 2.** Gives access to information about current and planned fault and disturbances in SLs traffic
- **SL Traffic situation 2.** Provides information about the present state for SL traffic.
- **The Swedish Transport departments open API.** Provides access to the current traffic information about both train and road traffic. At the start of the collaboration Trafiklab were also responsible for the direct service and development of the API-platform but because of changes in technical infrastructure, the respective organization decided to maintain the service on their own. However, they still present the API and their documentation on the Trafiklab webpage. (Andersson and Stenberg, 2013)

In addition to this, every API has a page for documentation and the other project using the particular API as well as a command window to try out the functionality of the APIs. In addition to their APIs, Trafiklab also offers links to other relevant APIs provided by different actors. To be able to use an API a need a specific key that is provided for free after creating an account on the site. The APIs has a status site, which shows the following information, see figure C (Trafiklab, 2016):

- Uptime (Availability)
- Response time (Performance)
- Response time per country
- The possibility to get access to historical information
- Servers status for the last seven days
Figure C: Operating status for the last seven days with the outage of the SL Real-time information (Status, 2016)

It is also possible to sign up to get Service announcements from Trafiklab through an RSS-feed.

One problem with the current data delivery is that it is more to adjust for longer trips since having access to all of a countries timetables is not as useful if someone just wants to travel within a single city. This might be since Samtrafiken has a responsibility to collect and merge the all the public transport data in Sweden (Samtrafiken, 2016). This is one of the reasons why some Swedish public transport companies have API platforms of their own. There is not a clear distinction of where Samtrafiken stops and Trafiklab begins, which will be elaborated on in the next chapter.

4.3.4 Samtrafiken versus Trafiklab

The distinction line between Trafiklab and Samtrafiken is not obvious to see or to grasp. This is in part by design, since Samtrafiken wanted Trafiklab to appear separate from their other activities (Person 2). This was since they did not want it to carry with it the perceived stigma of public transport being old-fashioned. Trafiklab also has its website and even though Samtrafiken and Trafiklab website does have some links to each other, from an outsider the connection is not evident (Trafiklab. 2016; Samtrafiken, 2016). Trafiklab has been described as a service among others that Samtrafiken provides (Person 2). This means that while the service that Trafiklab provides in unique, it would not be possible without the rest of Samtrafiken. There is also no one working just for Trafiklab and no Trafiklab department. Because of this, to be able to understand Trafiklab, we must first look closer at Samtrafiken.

Samtrafiken has 37 personal hired directly, but also has numbers of consultants and other partners as part of their organization (Allabolag, 2016). They primarily develop services for traffic companies and travelers which are owned together by 38 different traffic companies, which makes it possible for Samtrafiken to work as an independent part of the dialog between different actors. Samtrafiken views themselves as an innovation actor through Trafiklab that they describe as “a development platform and an initiative for open traffic data” (Samtrafiken, 2016). Their goal is “making public transport to the first choice for all trips within Sweden”. They also describe their
primary mission as “…making public transport traveling easier, more accessible and more reliable “(Samtrafiken, 2016).

From interviewing personnel working at Samtrafiken, we find that there are different views of what Trafiklab is. One claims that that Samtrafiken primarily is a focal point or forum for the public transport sector used for discussing and solving common problems (Person 2). Its functions are described as threefold (Samtrafiken, 2016):

- Being a community for system developers
- Help developers to find available data sources and get access to them
- Help traffic companies to open up data

For a summary of the difference between Trafiklab and Samtrafiken, see figure D below.

![Diagram showing the distinction between Trafiklab and Samtrafiken](image)

*Figure D: A figure that shows of the distinction between Trafiklab and Samtrafiken and how Trafiklab gets its information (Based on, Samtrafiken, 2016)*

4.4 Results: Theory

In this section, the theory used for the interview preparation and analysis will be presented. It will consist of three general themes. First a short discussion centering on usefulness, followed by a debate on the platform and open data. Finally, we will go more in depth with a presentation of the main analysis model: the boundary resource model.
4.4.1 What is usefulness?

In regards to IT-systems usefulness can be divided into two categories, utility, and usability, as discussed in the introduction (Grundin, 1992). Utility means the system can do what it was intended to do, while usability is how well the intended function can be used. An example of this is a word processor that is excellent at changing the font size but is a chore to write in or an online service that is great to use, but is not available most of the time because of its faulty online component.

In the text “Must evaluation methods be about usability? Devising and assessing the utility inspection method” by Johannsen and Hornbaek (2014), they argue that a focus on utility is necessary because of the practice of developing highly usable system that is not useful, or used and that usability tests might not lead to the building of the right system.

Another study called “Are We Testing Utility? Analysis of Usability Problem Types” by Tarkkanen et al., (2015) suggests a similar problematic relationship between usability and utility, arguing for three primary factors describing functions relating to utility:

- **Missing:** An element of the system necessary for the user is not available
- **Unnecessary:** An element is not used or noticed by the user
- **Inadequate:** A required element is present, but the implementation is not sufficient in practice.

It is clear that the research considering utility inside of the HCI field is not as far along as other areas, and therefore research will have to move outside the confines of HCI and move towards a more socio-technical approach.

4.4.2 What is a platform?

There is today several different definitions of platforms, in different fields, from product development, technology strategy, industrial economics, information managements and information technology (Gawer and Cusumano, 2014). They exist in several different industries and companies, but seem to be more prevalent in high-tech industries based on information technology. Many underlining engineer frameworks emphasize that digital platforms exist in socio-technical settings, where other aspects then the technical affects the platforms’ evolution and success. Gawer and Cusumano (2014), argue for the existence of two different kinds of platforms: external and internal platforms.

**Internal platforms** are defined as “a set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products” (Gawer and Cusumano, 2014). They are described as being what was first referred to as the term platform, and take the form of standardized parts that can be used in several different products. With these various parts, someone can easily and without
much cost adjust a product based on the customers’ needs, with the sum of the offering being the platform. An example of this is Microsoft Windows, which serves as a building block, that benefit from its many users and all the Windows-compatible software (Gawker and Cusumano, 2002). This kind of platform has been compared with supply chains with the key difference being that the actors developing complementary innovation do not necessarily buy from or sells from each other and do not have to be part of the same supply chain.

**External platforms** are defined as “products, services or technologies that are similar in some way to the former but provide the foundation upon which outside firms (organized as a “business ecosystem”) can develop their complementary products” (Gawer and Cusumano, 2014). There are elements shared between the two kinds of platforms, the most obvious is that both provide a foundation with a set of common reusable components or technologies. Also that they both seem to lend themselves to becoming a “dominant design”, meaning that as a platform becomes dominating as it develops into a stable core, which allows innovation around this core that becomes an industry standard of some sort. However, the main difference is the fact that the external is accessible to other actors, which means that the platform is open to a degree.

In this thesis, the subject of concern is an external platform, and when referring to a platform, it will mean an external platform if not otherwise stated. However, the two different kinds of the platform can sometimes overlap, and it does also show where the discussion of platform begins.

### 4.4.3 Describing a platform

A platform can at a general level be described as “offering a set of technologies for generating derivative product and services, which are complementary to the platform core” (Ghazawneh and Henfridsson, 2015). This can, for example, be a technological standard to simplify for developers and customers. For example, the DVD standard makes it possible for developers to focus on developing DVD players while making it possible for users to watch the same movies on different DVD players. In this case, the platform core is the DVD format itself, and complementary products are different DVD players.

Baldwin and Woodard (2008) take their definition a bit further, and describe a platform as “a set of stable components that support variety and evolvability in a system by constraining the linkage among the other components”, they also stresses the point of the common ground for a platform, being the reusing of core components to save resources. A common structure is also identified to help describe the architecture of platforms, consisting of two main components:

**Core components**: A set of elements whose design is stable (Baldwin and Woodard, 2008).
**Complementary components:** A set of elements that compliment the core and are allowed to vary to a greater degree than the core (Baldwin and Woodard, 2008). These components serve and complement each other and the core which creates an interest for actors, other than the platform owner, for the platform to be successful. For example, app developers on the iPhone have a stake that the app store is perceived as reliable to get people to buy their applications. This effect is one of the unique aspects of the platforms as it becomes more useful the more people use it (Gawer and Cusumano, 2014). However, of importance is the fact that this feedback loop has its limitations as to how many participants may discourage additional firms from investing themselves into the platform, no need to develop a fourth candy crush clone on iPhone (Bourdreau, 2012).

The interaction between these two kinds of components is through an interface that regulates both core and complementary components (Baldwin and Woodard 2008). This interface needs to be versatile to not constraint the complementary elements. Yet it must also be stable since the platform got components that depend on it. The interface can be seen as the middleman giving information between different entities that does not have to know or be affected by each other’s existence, which in the case of Trafiklab, consists of APIs. The conflict between control and freedom alluded to here is central to this thesis and will be discussed in greater detail later on.

Building on this, the idea presented by Baldwin and Woodard (2008) Tiwana et al. (2010) relates the concept of platforms to software and defines a software-based platform as”…the extensible codebase of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate”. This kind of platform has been denoted as a digital platform for some researchers, but in this thesis, we will stick to just the word “platform” (Ghazawneh and Henfridsson, 2015). In these platforms there are modules which connect to the platform and add functionality and value to it; in general terms, an application is a complementary component. The platform together with a collection of modules forms a platform ecosystem. Architecture can be seen as the conceptual blueprint of how the ecosystem is supposed to look. These ideas are summarized in figure E below.
However, there are different views of how this ecosystem is supposed to be looked at. Ghazawneh and Henfridsson (2015), when comparing their view of the ecosystem with Tiwana et al. (2010), argue for a more socio-technical view where the actions of complementors affect the evolution and success of the platform to a greater degree. In this thesis, both of these perspectives are important as a platform is viewed as an interplay technological architecture as well as different actors.

While these are the fundamentals or platform, there are many more aspects relating to platforms that need to be discussed. In the next section, different kinds of functionality of a platform will be presented followed by a discussing of open data and how it relates to platforms.

### 4.4.4 Platform functionality

Based on the general definition of a platform given above, a platform can look severely different and have severely different functionality. Based on this research, three broad categories of the different functionality that platforms offer to emerge.

- **Development functionality**: Functions that give developers’ access to specific tools that make it possible to build upon the platform core to develop applications of their own (Ghazawneh and Henfridsson, 2015). One example of this is the Apple Xcode development package that allows developers to develop applications based on the Apple platform that is compatible with various Apple products.

- **Marketplace functionality**: Functions that allow developers to distribute their application to end users through a marketplace, in most cases for monetary compensation of some sort (Ghazawneh and Henfridsson, 2015). A traditional
digital application marketplace facilitates functions such as application delivery, trust-related features, and payment transfer which enables any application to be used on the computing device that supports the platform. Another function of the marketplace is an intuitional infrastructure such as legal and regulatory functions. One example of this is the Apple App Stores, which is a marketplace where developers can sell their product and get reviewed by users. Apple also facilitates the possibility of updating application, allocation and, as seen above they also provide development functionality through the Xcode framework.

- **Community functionality**: Functions that allow interaction between different developers, platforms owner, and other involved actors (Ghazawneh and Henfridsson, 2015). This communication can take the form of discussion forums, support discussions, real life meetings and the option to share work with other members of the community. One example of platforms with community functionality is the Linux Foundation which is a discussion forum based on the open source operating system Linux.

Apple is somewhat of an extreme case, being one of the biggest companies in the world which specialize in providing great combined experiences, however far from all platforms are intended to give all three different kinds of functionality. In many cases, it makes more economical sense to focus on one of these functionalities and letting a complementary component developed by a third-party be responsible for providing another function. When the users of a platform are few or spread out, it might make sense for the platform owner to provide all three functions to help promote its platform and help the surrounding ecosystem develop, at least at first.

### 4.4.5 Open Data

Open data is, at its core, the idea that data should be available freely to everyone to use how they please, without restriction from control mechanisms like patents or copyright (Auer et al. 2007). However, there is no universally accepted definition Rudmark (2013) provides a good definition of open data based on two main principles: “all who want to use the data source and that it is possible to reuse the data source in new applications with no or small restrictions.”

Some argue that to study open data innovation, you need to capture all the complexities of modern society (Andersson and Stenberg, 2013; Boudreau and Lakhani 2009). The basic idea behind open data is that a single actor cannot and will not create all potential innovation possible from their available resources. To enable this beneficial openness, it is necessary to ease restrictions on use, development, and commercialization of information and make outside actors a part of the innovation process, to the benefit of everyone involved (Boudreau 2010). These actors, then use the information to complement the service of the main company to create value for customers, are called complementors in much of the scientific literature (Baldwin and Woodard, 2008; Tiwana et.al 2010; Ghazawneh and Hendfrinsson 2015; Gawer and Cusumano 2014).
The advantages that open data provide are even more pronounced when customers’ needs are not entirely documented and when distinct parts of the process can be separated (Boudreau and Lakhani, 2009). In recent years it has become all the more common for different organizations, and particular public ones, to open up their data to stimulate innovation and growth.

While there are many advantages of open data, there is a balance to be struck between openness and restriction. Not all data can be made available. For example, a doctor may not make their patient’s journal open data since it would invalidate the patient’s integrity and go against doctor-patient confidentiality. Another example is Apple, who might not want another company to copy their product, but still wants developers to create an application for their system; they, therefore, choose to make their development tools open to the public, but not their hardware and core software. There is a tradeoff between using the network effect and extracting profit from the platform (Eisenmann et al. 2009). This balance between openness and restriction will be elaborated later on.

Now having established platforms and open data, the discussion moves on to how to manage openness within a platform.

4.4.6 Managing openness as a platform

The relation between openness and platforms is pretty self-explanatory since a platform is a great way to distribute data and information, how exactly the two concepts relate is worth exploring in greater detail, which will be done in the coming

With a platform, the idea of openness is central. A proposal on how to define platform openness was given by Eisenmann et al., (2009) “…if the contribution, the development, the usage, and the commercialization are not restricted, or if all existing restrictions are reasonable and equally applied to all participants”. However, there are different ways to dimensions a platform can be considered open (Gawer and Cusumano, 2014). Eisenmann et al. (2009) illustrate two separate strategies when it comes to opening up a platform: horizontally and vertically. The first refers to giving up some control by giving other actors access to the platform. Vertically, on the other hand, is giving third-party developers access to the development platform and sales market. The tradeoff within a vertical open platform is to find the right degree of diversity in relation to control, between retaining and relinquishing control. This tradeoff is elaborated by Benlian et al., (2015) and connected to the fundamental trade-off diversity vs. control, presented by Boudreau (2010). He argues that a platform that relies on ongoing innovation after a while start relying on other mechanisms than in the initial phase. This takes the form of diversifying, which provides the platform with a broader pool of external knowledge for contributors. External knowledge needs to be actively applied, which requires effort and investment (Benlin et al. 2015). This can take the form of coordinating resources, as not to waste effort and knowledge, and regarding the content
of platform, making sure that the applications developed do not differ too much from what was intended.

West and O’Mahony (2008) offer a different take on the concept with two different types of openness when discussing sponsored open source communities: Transparency and Accessibility. The first is the extent to which it enables third-party developers to understand how to create and distribute through a platform as well as to follow the platforms evolution and governance. Accessibility, on the other hand, is how and to what degree, a platform provides the resources that allow developers to contribute without facing restrictions. In summary, accessibility is how developing, and commercializing application is supported or constrained. Privately sponsored open source projects have an easier time offering transparency then accessibility, which is something that can affect a community’s growth. These two concepts help flesh out the idea of platform openness.

Boudreau and Lakhani (2009) discuss the different advantages of having external innovators organized in a competitive market and collaborative communities. They argue for three issues being of critical importance when making the decision on how to open up a platform to outside innovation through a platform:

- The kind of innovation that will be turned over to external innovators
- The motivation of those individual or organizations
- The nature of the platforms business model

The first issue asks the basic question, what is the best way to tap into the external resource, with a competitive market or a more collaborative community (Boudreau and Lakhani, 2009). If the development process is more based on cumulative knowledge, then collaborative communities have inherent advantages. This is because communities are oriented on creating solutions that transcend the individually available knowledge. They also tend to create a culture of sharing, cooperation and broad agreement. On the other hand, if the innovation problem is best solved by broad experimentation across a set of technical approaches, then a competitive market has its advantages. Such a market also seems to promote experimentation and diversity since it will not be as clear what work has already been “done” by others. Since the participants have an incentive to differentiate them and to protect what they develop, it helps with maintaining heterogeneity. Not that a community does not, but the different approaches promote various points of view. These differences are highlighted in figure F below.
Competitive Markets

- External innovators supply variants of mix-and-match, substitutable components
- Governance is formal with orientation towards arm’s length, rule-based, contractually orient and market relationships
- External innovators primarily have competitive relationships among one another
- Profit motive is central to driving distributed innovation
- Value captured by the platform owner is possible through direct contracting and licensing with external innovators

Collaborative Communities

- Potential contributions of external innovators range from mix-and-match offering to coproduction
- Governance is information with orientation towards highly socially embedded, nor-based interactions
- External innovators primarily have cooperative relationships among one another – with a substantial amount of technology sharing and deliberate spillovers
- A range of extrinsic and intrinsic motivations may drive external innovators activities
- Value capture by the platform owner might occur only through enhanced demand for the platform that is powered by the external innovations.

Figure F: The differences between competitive markets and collaborative community's
(Based on, Boudreau and Lakhani, 2009)

In a cooperative market, actors are wary of getting locked into a platform that might change the rules later on and in a community there can cause concern about the work not being used as it was intended. Eisenmann et al., (2009) expands on the idea of a two-sided market in relations with a platform by defining what platforms does as being comprised of the users’ (both end users and developers) whose transactions are subject to the network effect and the intermediaries that facilitate users’ transactions. This takes the shape of a two-sided network where developers provide complements to the platform. They both are in relation to the platform as an intermediary. The platform, in this case, has two sides, a platform provider who serve as the users’ point of contact with the platform, and platform sponsors who do not deal with users but have control over the platforms technology and may determine who have access to the network. This can be viewed as another way of describing the platforms’ ecosystem. This view of platforms is summarized in the figure G below.
A platform can be open to different degrees according to the two-sided platform model; some examples of this are given in figure H below.

<table>
<thead>
<tr>
<th>Role</th>
<th>Linux</th>
<th>Windows</th>
<th>iPhone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand-Side User (End User)</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Supply-Side User (Application Developers)</td>
<td>Open</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>Platform Provider (Hardware/OS Bundle)</td>
<td>Open</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>Platform Sponsor (Design &amp; IP Right Owner)</td>
<td>Open</td>
<td>Closed</td>
<td>Closed</td>
</tr>
</tbody>
</table>

The second issue asks the question of what the motivation there is to participate in the innovation process in the first place (Boudreau and Lakhani, 2009). Past research has found while motivation can vary highly, they can mostly be found in two categories; intrinsic and extrinsic, with the former are favored in collaborative communities and the latter are more favored in competitive markets. Figure I below shows an overview of the two categories and their attributes in the form of a Venn diagram.
Wherever you are in figure I, one of the simplest motivators is money. However, there are also motivators like learning the skills or developing technology to make their use of it easier (Boudreau and Lakhani, 2009). On another note, the benefits of participating in a community can be more long term as participation might help establish you in a network or signal other actors in the network, like potential employees. The fact that people are motivated in different ways affects the decision about what kind of model, collaborative community, or competitive market is most favorable in any given case since it will affect what kind of users are drawn to participate (Boudreau and Lakhani, 2009). A correct organizational mechanism must also be implemented to take into account the motivations of the desired participants as not to be counterproductive. Communities in particular need mechanisms to both encourage and facilitate knowledge exchange and the same time as, making sure to prevent profit seekers from exploiting communal knowledge. A competitive market, on the other hand, makes sure to support profit-seeking individuals and to ensure the direct flow of income to external innovators.

For a better understanding of individual developers, we look at Bergvall-Kårnborn et al. (2011) who suggest four different motivational profiles for smartphone developers. While this study is not about app developers, a big part of them are:

**Believers:** These developers have strong opinions about how things should be, guided by a set of principles. These principles center around open source, they want both application and source code to be freely accessed by whomever; however, it might also take the form of loyalty to a platform like Apple, for example.
**Business opportunists**: Value primarily a big customer base and high sales numbers. They want to make sure to utilize as many tools as possible to not miss any opportunities. They want to ensure to reach as many users as possible. For this group, open source is not important as long as it does not increase porting effort costs.

**Easy riders**: For these developers, a low barrier to entering is a big motivator. Many of this group put up their development as a side activity or to just keep their skills up to date. These developers value a low commitment in both time and money and do not see the prospect of earning money as a requirement.

**Pragmatist**: These developers are mostly focused on working in a practical environment. They want access to an effective and efficient development space with good distribution channels. They are also more likely to stay on the same way of doing things because it is easier to concentrate on one thing at the time. Pragmatists are the biggest of the four groups.

Lastly, we have the matter of what business model to use when opening up for innovation and becoming a platform. Here a central question is “Who sell what to whom? How exactly does the end users get access to and use the products?” (Boudreau and Lakhani, 2009). With this distinction, three platform models can be divided into three categories: integrator, product, and two-sided.

![Diagram of platform business models](image)

*Figure J: Shows of three different kinds of platform business models (Based on, Boudreau and Lakhani, 2009)*

As shown above, in figure J, the integrator platform model sets the platform for the external innovators and customers, which gives the platform a relatively high amount of control. With the product platform model, external investors build on top of the already existing platform (Boudreau and Lakhani, 2009). The platform has a degree of control through the technical design and core technology, but it is the external innovators that interact with end-users. With the two-sided platform, both customers and external investors can interact with each other and the platform facilitating the communication or transaction between the two. The platforms can however still impose a degree of control through regulations and rules.
There are also factors that can be applied in specific cases, like, for example, if a platform has a monopoly on the market (Boudreau and Lakhani, 2009). In that case, a company might get away with imposing tight control even on a collaborative community, but in that case, they must make sure that their effort will not be exploited and prove to an external investor that they will not abuse their power. Deciding between market and community approach can be so hard, that some choose to try to use aspects of both. These approaches do, however, come with significant cost and risk and should, therefore, be deployed with much caution, and with much attention given to the governing mechanism, and to maintain a balance between ownership and autonomy (Tiwana et.al, 2010).

To sum up, given everything said in this section, it is important to remember that an organizations’ innovation strategy does not have to be set in stone. The approach should still be tailored to the specific context of the business as open innovation is far from blindly giving up control and hoping for the best.

Now an understanding of how platforms are controlled has been established; now it is time to move on to main theoretical framework for this thesis analysis.

4.4.7 Boundary resource

Ghazawneh and Henfridsson (2013) present the case for the focusing of a platform owner should shift from developing applications to providing resources that support third-party developers in their development work. They call these resources platform boundary resources. Boundary resources can take the form of software tools, APIs, regulation and other ways through which the platform owner can interact by arm’s length with third-party developers.

Ghazawneh and Henfridsson (2013) emphasize the important to “transfer capability to users” which leads to the development of complementary applications; however, they identify the tension between platform control and stimulating third-party developers. They identify that prior studies of platform boundary resources, such as APIs, have been lacking and to that end proposes a theoretical model “…for using platform boundary resources for cultivating platform ecosystems through third-party development.” This model is shown in figure K below:
In figure K above, the term Boundary resource design refers to the platforms owners’ process of developing new, or modifying, boundary resources based on a balance between external actors and control concerns. Boundary resources may both be designed to empower third-party developers to extend the platform and to address control concerns. Boundary resource use refers to the third-party developers using, for example, APIs in developing applications that utilize the platforms’ capabilities. Some of the platforms’ boundary resources might be mandatory, but most of them depend on the third-party developer’s design choices.

The model also finds two main boundary resource design drivers. Resourcing and Securing.

Resourcing is the process through which diversity and scope of a platform are improved, often by expanding the ecosystem of actors, and therefore, secure new resources, knowledge, and capabilities. This builds on third-party developers’ developing of applications based on boundary resources designed in response to the developers, needs that lead to heterogeneity in knowledge resources. Securing, on the other hand, is the process through which the control of the platform in enhanced. This can partly do to make sure that developers do not risk causing damage to the platform and its service, for example, making sure that app in the App Store does not result in the
store to stop functioning as intended. The boundary constraint model puts emphasis on the importance of both factors to maintain a balance in focus to improving a platform ecosystem. Both resources are necessary for understanding since it provides a coherent model with defined concepts for looking at the actions of different stakeholder that take part in the process. By balancing the two, the idea is to achieve a mutually beneficial equilibrium between the involved stakeholders.

4.4.8 Application of the Platform Boundary Resources

Through Ghazawneh and Henfridsson (2013) case study of the Apple iPhone, they found insight in how resourcing and securing can manifest in different parts on the platform ecosystem. These can be summed up in the terms self-resourcing, diversity, regulation, and sovereignty securing:

- **Self-resourcing** is when “…third-party developers act to develop new boundary resources as a response to a perceived limitation of existing boundary resources”. This term offers a construct to help analyze third-party developers ways of using the platform to help application development independent from the platform owner. This construct might be of particular use for a platform that focuses too much on securing. (Ghazawneh and Henfridsson 2013)

- **Diversity**, on the other hand, is the conscious action taken by the platform owner to diversify the platform and stretching the platforms’ boundaries. This construct is useful to study how third-party developers can help a platform owner to move beyond its traditional industrial setting. (Ghazawneh and Henfridsson 2013)

- **Regulation based securing** builds on the platform owner securing the platform through administration rather than technical restriction (Ghazawneh and Henfridsson 2013).

- **Sovereignty securing** refers to the platform owners action to keep control over the platforms evolution and “avoid becoming a substitute platform for application developers”. (Ghazawneh and Henfridsson 2013)

Ghazawneh and Henfridsson (2013) argue that the boundary model enhances earlier platform literature …“ by providing a theoretical account of the interface between platform components developed by external parties.” They also state that it proves a way of close studying the action taken by a stakeholder in third-party development. Another argument for its use is that it provides a basis where the conflict between resourcing and securing can be studied, this conflict is essential for a lot of platform and community literature reviewed in this project. They argue that the limitation of their work is that it is based on a case where the subject is considered extreme, the Apple iPhone platform which was chosen as an ideal case to generate theoretical tools might not be as generally applicable. Therefore, further studies and application of the models
are necessary. A particular direction they present is to investigate the boundary resources from the perspective of third-party developers.

Another study by Eaton et al., (2015) uses the model also criticizes some aspects of it, like that fact that it is not clear how boundary resources are created and how they develop over time. It also argues that the model gives a privileged position to the platform owner who is depicted as the primary designer of the boundary resources. While they admit that self-resourcing in part covers this aspect, Eaton et al., 2015 still claim that the model is based on the relatively simplistic dialectic relationship between a platform owner and third-party developers with emphasis on the dominant role of the platform owner. To counter this, he argues for viewing the service system as “…evolving webs of complex and overlapping relationships among distributed heterogeneous actors artifacts, with an explicit attention to the role of power and influenced exercised” with a bigger focus on the structural arrangement in complex sociotechnical relationships. The way of accomplishing this is through innovation tuning.

4.4.9 Innovation Tuning

Eaton et al., (2015) argue that the process by which boundary resources is created and evolves can be described as something they call tuning. Tuning is the interplay between human and material practices that through the resistance and accommodation that occurs when humans try to use technology. Innovations are created by multiple different actors with different interests which lead to innovation rarely being a singular entity. Innovation is not inevitable and rather a molding process of technology that plays out in the tuning process.

Eaton et al., (2015) argue that boundary resources must be understood as they evolve and collide with artifacts in different technological and organizational contexts instead of being viewed as a matter of creation by platform owners. This applies in particular when the tuning process involves a service system with multiple actors. In short, she suggests focusing instead on the duality between one resource owner and a group of complementary developers to a distributed view of boundary resources. This would help broaden the different actors involved in the process and their local tuning procedures. This means that to understand boundary resources one must look beyond the two-sided relationship between developer and resource owner to provide a deeper understanding of the complex socio-technical process. Her research also argues for the importance of the role that power plays in understanding the innovation process in service systems.
4.4.10 Operationalization

The theory regarding platform and open data will be used in two ways. Firstly, it will be utilized as the basis for the survey which will be described in greater detail in the method section. In short, it will be used to create a dimensional model from where a suitable interview sample will be chosen. These sections will also be used together with the boundary resources model to answer the scientific questions of the thesis.

What is unique about this study, on a theoretical level, is the fact that it studies the third party developers at a personal level, something that is lacking according to Yoffie and Kwak (2006), arguing for a deeper understanding of them as individuals are crucial for an efficient platform governance. This was also stated by Benlian et al., (2015) that argues for studying platform openness on a developer level in part because of the prevalence of independent individual developers when it comes to open data platforms.

4.5 Conclusions

This subproject showed an accurate relativity picture of the interworking of Trafiklab and Samtrafiken and their differences. This provided an understanding of Trafiklab and provided and, with the help of the theory, created a foundation for moving on to focusing on the users of Trafiklab. The theory will be used in part in the next subproject and as a whole in the final subproject.

What this explorative studied showed was that the experiences of users were of great interstress to give a full picture of Trafiklab, which helped decide the direction of the next subproject.
5. Subproject two: Survey

This subproject details the creation and executions of a survey to Trafiklabs users. This is done with the help of a framework created from the theory from subproject one and a survey conducted previously on Trafiklabs users in 2014.

5.1 Purpose

This subproject has as its objective to create an overall picture of Trafiklabs users by doing a survey. This survey will use the theory presented in subproject one as the basis for the questions. This survey will also help to find participated for the interviews in the next subproject.

5.2 Method

Surveys were chosen as an easy way to gather a general understanding of the perception of Trafiklab across a broad part of the developers using it.

This thesis used two surveys: one conducted by Trafiklab in 2014 and one carried out in the context of this thesis, which is called Survey 2014, and Survey 2016 respectively. Information regarding these two surveys is summarized in the table below:

<table>
<thead>
<tr>
<th>Potential survey participants</th>
<th>Survey 2014</th>
<th>Survey 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>86</td>
<td>40</td>
</tr>
</tbody>
</table>

The first survey was obtained through the thesis supervisor at Trafiklab. The survey was conducted with the purpose of creating a picture of the users of Trafiklab and how its service can be improved. Since the survey was not performed as a part of this survey, its design will not be discussed, and the results merely used. This purpose aligned with that of this thesis and was therefore seen as a useful complement to the interview. There is however roughly one and half year earlier than this thesis, things might have changed in the intermediary time. The second survey was conducted with two purposes: to get a picture the users of Trafiklab and to form the basis for the interview sample. This process is discussed in greater detail in the coming sections.
According to Survey Research Methods by Floyd and Fowler, a survey consists of two primary components: Sampling and question design. Sampling will be discussed in the next section, and the question design will be considered in under category 5.2.2.

### 5.2.1 Sampling

The sampling, in this case, was pretty straightforward: a message was sent out by email to all registered users of Trafiklab and was then encouraged to answer the survey to help improve Trafiklab. This important to reiterate since the total memberships were the entire potential sample and the actual sample used was the developers that choose to answer the survey, no developer that decide to respond to the survey was ignored. This applies to both surveys. It was in this email stated that an interview was the end goal of the survey, but that it could still be helpful for the study if they participated in just the survey, as to reduce nonresponses (Floyd and Fowler, 2010). It was important that every user to Trafiklab got the chance to see the email and therefore make sure that the sampling is comprehensive. Since all users of Trafiklab need to create an account, a valid assumption is that all users had the chance to participate, and therefore the sampling was fair. A separate discussion on the interview sample will follow at the interview stage.

### 5.2.2 Theory: Third-party-developers dimensions

By using primarily the theory of “Managing Outside innovation as a platform” and Rudmark (2013) study of Trafiklab called “Att öppna datakällor för tredjeparts-utveckling - rekommendationer för kollektivtrafikbranschen” with the survey performed by Trafiklab a framework was created.

Based on the survey conducted by Trafiklab (2014) it is visible that Trafiklab caters primarily to different groups of developers, mostly working in the private sector and smaller groups in the public sector, students and self-employed. From this three basic categorize was deduced: private developers, free developers, and public developers. This category related to what kind of work from the developer subscribe to and what that entails, private developers might have more resources and less freedom while public developers might be constrained by government rules but might have more of a say than private actors. Another related categorizing is made by Rudmark (2013) as market-driven actors and non-commercial actors. The first is described as someone who can pay, demands support and is used to working inside of already long established formats and languages. The latter, on the other hand, expects low barriers to entry and free access. They are also used to having less support and more often realizing on communities and are most of the time sole developers or active inside universities. Reflecting on this, it would be an advantage to have responded from all three different categories as to not only focus on the private sectors. It is also possible that student and self-employed might be working on unique ideas for the future.
The conflict between freedom and constraints is clear to see from deduction of the material. As discussed in in the theory there are different motivations among the various developers, described as extrinsic and intrinsic. Both perspectives are worth investigating and this also related to how community oriented or market oriented the interviewed might be, and want Trafiklab to be. This is also emphasized by Bergvall-Kåranborn et al. (2011) where two of the categories presented closely match these different categories, the believers, and pragmatist. The two other categories could also be matches up with the easy rider being intrinsic and a business opportunists being more of an extrinsic. These could be seen as subgroups on the extrinsic and intrinsic scale and worth looking more into. However, it is important to remember that they originate as four distinct categories and might not be directly applicable.

Based on Trafiklabs survey and the Trafiklab meet up the conference, two more categories could be defined that correlate to the extrinsic and intrinsic motivational profiles. There are those who mainly use and want API for easy development and those who want more data and it to also be more detailed to develop more advanced function. These two groups are called API-developers and Data-developers. This difference might also come from different approaches, not only a preference for API or data, by more programming oriented developers and more system/design oriented. This is supported by Rudmark (2013) who finds the same categories in his study of Trafiklab. He says that API-developers are those who stumbled into the area, and found the APIs easy to use and want more of that as well as stable and long-term operation of the APIs. On the other hand, the data developers mostly developed for their own needed and at a later date become popular among other travelers. Among these there where a deeper understanding of the transport information and therefore wanted more raw data to create new innovative solutions.

Another important factor is how much developers coupled to Trafiklab and its network, how strong their relationship and connection are. That there is different in a relationship along these lines can be clearly seen by looking at the survey, and an interview with a person working for Samtrafiken, where for example three high skilled third-party developers were used for beta testing an update due in April 2016 (Person 1). These developers had a particularly high position to affect Trafiklab in comparison with someone who never directly contacted the organization. Individuals who are very familiar with Trafiklab and have ongoing cooperation might also have a different view and say a different thing than someone with a much looser relationship. Therefore it would be interesting to look at developers on the basis of strong coupling and loose coupling, in relation to Trafiklab.

These different perspectives discussed in this section are summarized in the figure L below:
5.2.3 Question design

In this section the question asked in Survey 2016 will be presented and discussed. The issues of the survey were based on categorizing the responded according to the framework from the previous section and summarized in figure L. This was made as a way to have a theoretical basis for the questions, as well as a way to try to measure how the different third-party developer using Trafiklab look. The issues themselves were designed to be answered quickly and encouraged the responded to make stark choices since the main purpose was not to gather information but collect information for the interview sample, and to validate the framework. Simple questions were also chosen to hopefully get as many answers as possible since longer surveys might be off-putting. Because of this, most of the questions gave the responded two or three options to choose between and sometimes space to elaborate. Many questions had a first general issue and the followed by another more detailed question afterward. Question design was a difficult process because of a lack of experience. Therefore, before the survey was sent out, it was reviewed by the thesis supervisor and subject reader.

The questions were designed to measure a different aspect of the third-party developers’ dimensions. They will below be presented one at the time followed by the aspect it covers.
**Question: Do you use Trafiklab?**

1. With compensation for work performed (it is my job):

2. Without compensation for work performed (private, hobby or volunteering):

This question was made to measure on the market-driven versus non-commercial actors scale by asking if the developers used Trafiklab commercially or not.

**Question: If you receive compensation, how do you receive compensation?**

1. Employee of private company:

2. Employed in the public sector:

3. Self-employed:

4. without compensation:

5. Other:

This question is based

This question was made to measure how the most market-driven actors looked and to get an understanding of how they are distributed among a different kind of employment.

**Question: If you do not receive compensation, what is your strongest motivation?**

This question was made to cover the most non-commercial actors and to help understand what motivates them. This was also made to in part get an impression if there shows off a more intrinsic or extrinsic attitude, which could help validate the framework in figure L. This question was let the developer give an open answer, since how different developers are motivated can vary so much, all of them could not be stated and still keep the simple approach that this survey had goal.

**Question: If you have to choose, do you prefer:**

1. Good development tools (e.g., better and easier to use APIs):

2. Access to more raw data (e.g., access to more comprehensive data sets):

This question was made to help measure where the developer stands on the intrinsic and extrinsic scale and how it related to preferring APIs or data.
**Question: Do you see yourself mainly as:**

1. A market-driven actor:

2. A non-commercial actor:

This question had as its main goal was to clearly place the developers on the market-driven actors versus non-commercial actors scale.

**Question: What is most important to you if you have to choose:**

1. Creating innovative and creative services:

2. To create stable and well-functioning services:

This question was designed to measure the developer on the scale of intrinsic versus extrinsic on a more ideological level. It also related to being market versus non-market driven.

**Question: Are you driven mostly by:**

1. Self-initiative (e.g., develop your own ideas, or that you need a particular function):

2. External influences (e.g., by developing a market need or that you are given the task to develop something specific):

This question was designed to measure the developer on the scale of intrinsic versus extrinsic from the perspective of the drive of individual developers.

**Question: Do you see Trafiklab mainly as:**

1. A community of developers:

2. A provider of data and APIs:

This question was primary to get a feel for what the developers think of Trafiklab and to be able to compare it with how Trafiklab sees itself. Its secondary purpose was to help measure the developer on the intrinsic versus extrinsic scale.

**Question: Do you see anything that Trafiklab developed more in the direction of:**

1. A community (more dialogue functionality):

2. A marketplace (more focus on the presentation of the services developed):
This question supported the previous question by letting the developer look towards the future. It was also to help answer this thesis main scientific question.

**Question: How strong relationship do you feel you have to Trafiklab:**

1 given as Weak (e.g., using their services, but not much more than that)

5 given as Strong (for example, taking part in their activities)

This question was made to measure the developer on the strong or weak coupling scale. This one was extra important since it was hoped that it would be possible to get the opinion of someone that might not have such strong opinion of Trafiklab.

**Question: What is your main driver for developing applications with specific Trafiklab (e.g., need for your work or that you like challenges)**

This question was stated to help deepen which kind of coupling the developers has to Trafiklab but also but contribute to gather there better motivation, which contributes to elaborate where on the extrinsic versus intrinsic scale the developer are.

5.3 Result

Below, the questioned based on the framework in figure L and the results. The questions that were the answered were open; summaries are written. There was a total of 40 replies to the survey.

**Question: Do you use Trafiklab?**

1. With compensation for work performed (it’s my job): **17.5 %**

2. Without compensation for work performed (private, hobby or volunteering): **82.5 %**

**Question: If you receive compensation, how do you receive compensation?**

1. Employee of private company: **15 %**

2. Employed in the public sector: **2.5 %**

3. Self-employed: **7.5 %**

4. without compensation: **70 %**

5. Other: **5 %**

**Question: If you do not receive compensation , what is your strongest motivation ?**
Summary: When looking for the motivations of the people working without compensation, which was the majority of the developers in the survey, a couple of trends were found. One of the most prominent is the fact that most seem to be driven by curiosity, fun, and interest for the technology, which is illustrated in the quotes below.

"Fun hobby project."

“Curiosity and information retrieval.”

"Technique. Public data. Linked data sources to give users an even higher value than each source individually."

There also seems to be interested in providing tools that others can find useful.

“Be able to use my service myself, but also others to be happy for it.”

Question: If you have to choose, do you prefer:
1. Good development tools (e.g., better and easier to use APIs): 50 %
2. Access to more raw data (e.g., access to more comprehensive data sets): 50 %

Question: Do you see yourself mainly as:
1. A market-driven actor: 30 %
2. A non-commercial actor: 70 %

Question: What is most important to you if you have to choose:
1. Creating innovative and creative services: 42.5 %
2. To create stable and well-functioning services: 57.5 %

Question: Are you driven mostly by:
1. Self-initiative (e.g., develop your own ideas, or that you need a particular function): 75 %
2. External influences (e.g., by developing a market need or that you are given the task to develop something specific): 25 %

Question: Do you see Trafiklab mainly as:
1. A community of developers: 5 %
2. A provider of data and APIs: 95 %
**Question:** Do you see anything that Trafiklab developed more in the direction of:

1. A community (more dialogue functionality): **52.5 %**
2. A marketplace (more focus on the presentation of the services developed): **47.5 %**

**Question:** How strong relationship do you feel you have to Trafiklab:

1 given as Weak (e.g., using their services, but not much more than that)

5 given as Strong (for example, taking part in their activities)

![Figure M: Show the results from the question: How strong relationship do you feel you have to Trafiklab.](image)

**Question:** What is your main driver for developing applications with specific Trafiklab (e.g., need for your work or that you like challenges)

**Summary:** When looking for the motivation for why developers use Trafiklab, a fair number of interesting statements was found. Several people refer to the simple fact that it is necessary for their work or to get the information they need. While some of them were from those that receive compensation for their work, it also expanded to the other group. This highlights the fact that Trafiklab has a monopoly position when it comes to public transport information in Sweden. Other than that, the passion clearly shows for both open data, public transport and how it can be improved.

“It's fun to learn new things. Curiosity drives innovation.”

We can also see some specifically technically functionality where one developer refers to the security of using Trafiklabs APIs instead of an unofficial APIs.

“Easier access and feels more secure than using unofficial APIs.”

We also get some first suggestion on improvement of Trafiklab in:

“Fun and challenging to build applications related to public transport. Would like to have more and more stable solutions to ensure real-time location, speed and more for specific vehicles.”
5.4 Sample and Results discussion

In general, the third-party developer's dimensions shows two major area of weakness when applied; the most obvious is perhaps the fact that survey sample leans heavily towards a weaker coupling with Trafiklab. This can either because of the third-party developer's dimensions is lacking and or poorly implemented or be because most developers have a weak coupling with Trafiklab. That is certainly a possibility and something that is worth keeping in mind. However, to counter this, it was decided to the outside of the survey make contact with one developer, with one particularly strong relationship with Trafiklab, for an interview. Also discussing with people working with Trafiklab should help elevate this to a certain degree (Person 1; Person 2; Person 3).

The second major weakness with the third-party developer's dimensions is the fact that most users do not consider Trafiklab to be a foremost a community. However, while this is the case, around half of both samples would want Trafiklab to develop towards a community and around 50-75% of both samples show signs of community oriented of the Z-axis. So rather this shows us that the community developers might be more prominent in the developers themselves, they just don’t consider Trafiklab primarily a community. This fact tells us more about the view of Trafiklab then it does the third-party developers dimensions.

In summary, the survey shows that the third-party developers using Trafiklab are rather well distributed but clearly showing a general weak connection with Trafiklab. This will be elaborated on in the data section of this thesis.

At first, the intention was to compare the survey results with the results of the chosen for the interview. However, only 11 interviews developers were interviewed and of them, only eight had filled in the survey. Because of this, such a comparison would not realistically show the interview person characteristics and could be implemented as initially planned. However, in general, an adequate distribution of different types of the developer was achieved. These results were still useful as a compliment to the interview as they gave an initial picture of the different developers. It was also quite useful to use as a kind of update to Trafiklabs 2014 survey which is used in combination if the data section.

5.5 Conclusions

The results of the survey show more areas that can be interesting to look closer at, which were essential for the formulating of questions in the next subproject. Based on this, some the ones that conducted the survey were selected to take part in more detailed interviews which will be done in the next subproject.
6. Subproject 3: Developers

This section presents the interviews with third-party developers, primarily in the form of a description of third-party developers using Trafiklab and how they view the platform. The first sub-question of the scientific question: “What value does Trafiklab, as a platform, provide to third-party developers?” will be answered by a description of what Trafiklab offers developers.

6.1 Method

This subproject had 11 interviews with different third-party developers. The interviews were both face-to-face and by Skype, however, the questions were the same.

6.1.1 Motivation for choosing interview

There are both pros and cons when choosing interview as the primary way of gathering the information your study (Dalen, 2015). The clearest advantages are that you can go much deeper and are a lot more flexible in what information you gather, matching the grounded theory described above. You might be able to collect date that would otherwise be hard to capture. The cons of the other hand are that they require skill to manage as well that they can take quite a lot of time and be resource intensive. It also limits the numbers of participants of your study, which makes the sample selection all the more important, which is the main reason why such weight was put on it.

Interviews were chosen because it was expected to be the best way to gather the data necessary to analysis the broad questions the thesis aimed to answer. (Carins and Cox 2008) With interviews, the project remained open for new perspectives and, perhaps most importantly, is also that much more probable to gather interesting information. Surveys will also be used to a degree since it will both use preexisting survey, but also by the initial survey in the sampling process. There is also hope that triangulation will be used to overcome some of the biases resulting from a one man study. Triangulation is to use that several information sources to make sure that the gather information is valid. Using the two surveys helped to the component for the shortcoming of interviews with a much bigger sample was used. A focus group approach was explored, but there are some reasons why such an approach was not chosen. One reason is that it might limit the responses on certain stakeholder in the network and make it harder to distinguish different perspectives. It might also make the gradual expansion of knowledge along the interviews harder since the focus groups would have to be done a relative few times, maybe only once. Developers might also be less inclined to criticize how Trafiklab works with the people working with it presently. However, the biggest reason is that it would take a lot to plan and skill to coordinate. Most people are busy with other things, do not live nearby or have other things to do, which means that only certain people will come. Doing induvial interviews make it easier to adjusting to
different people needs and time schedules, with interviews being possible through Skype and Phone.

6.1.2 Interviews in different stages of the thesis project

Interviews can be used in several different steps of a thesis project, they can be utilized in the first step, for initial exploration of the field, they can be used a way to elicit requirements at the end of a project (Carins and Cox, 2008). It can also be used to evaluate the reaction to something in the middle of a project life cycle; however, the border between different types of interviews does not have to set in stone. In this project, interviews were conducted for initial exploration with Samtrafiken personal to gather enough information, which was useful in the following interviews. Then they interviewed were used as the prime source of third-party views on Trafiklab.

6.1.3 How were the interview conducted

Several different types of interviews can be conducted with various amounts of structure (Carins and Cox 2008). More structure means it will be easier to conduct and interpret interview, but there is less opportunity for insight during the interviews. The choices of the structure are most of the time separated into three distinct categories, full structured, semi-structured and unstructured. Full structured take the form of more or less orally presented surveys, while unstructured has initial questions and topics but no pre-defined scripts. Semi-structured is the middle ground with pre-specified question serving as a starting point but there is much room for clarification, discussion, and digression. The question might be very, similar to that of a fully structured interview, with the key difference being that: in a semi-structured interview, the interviewer can feel free to let the conversation go where it may. The downside of the semi-structured interview is that it becomes increasingly hard to manage and to organize the gathered information.

In this project, semi-structured interviews were the most often used technique (Carins and Cox 2008). This is to ensure that the interviews were able to express their needs as fluid and open as possible, by the grounded theory, yet we still need some structure to make the results applicable in the thesis. It is a good strategy when looking for deeper insight, not focusing on comparing responses among individuals, which make keeping it unstructured on the right path to go. Another reason is to give the interviewer a chance to educate the interviewer about the field they know allot about. However, unstructured interviews were used initially, to get a grip on some question during the initial exploration. However they could have almost be called discussions, but they border between the two is up for interpretation.

If possible, face to face interviews was conducted as to make sure to easier pick up on any non-verbal cues as well as provide more immersion in the situation of the interviewed. However to remain flexible and in that way reach more people, phone and skype interview was also an option.
Accommodating the interview of the third-party developers request there was also a document describing the project in short for the interested party to gain a better understanding of what it is about and what will be expected of them. This will take the form of a consent document that they were asked to agree to before the interview, this paper can be seen in full in Appendix C. This included the promise that all interviewed would be anonymous in the final report, which is why the interviewed names are not stated. This was also recommended by the thesis subject reader. While not all people interviewed took part of this document, to be fair and consistent, they were also made anonymous. Because of this, they are all referred as “he”, no matter their actual gender. These interviewed are shown in Table 3 below.

Table 3: The interviews conducted with third-party developers. For questions see Appendix B

<table>
<thead>
<tr>
<th>Name (fictional)</th>
<th>Organization(if one was stated)</th>
<th>Date</th>
<th>Format of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer A</td>
<td>Hogia</td>
<td>2016-04-11</td>
<td>Skype</td>
</tr>
<tr>
<td>Developer B</td>
<td>Forefront</td>
<td>2016-04-13</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Developer C</td>
<td>Ascom</td>
<td>2016-04-15</td>
<td>Skype</td>
</tr>
<tr>
<td>Developer D &amp; Developer E</td>
<td>Xeq Systems AB</td>
<td>2016-04-15</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Developer F</td>
<td></td>
<td>2016-04-18</td>
<td>Skype</td>
</tr>
<tr>
<td>Developer G</td>
<td>Nobina</td>
<td>2016-04-19</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Developer H</td>
<td></td>
<td>2016-04-19</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Developer I</td>
<td></td>
<td>2016-04-26</td>
<td>Phone</td>
</tr>
<tr>
<td>Developer J</td>
<td>Nobina</td>
<td>2016-04-28</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>Developer K</td>
<td></td>
<td>2016-04-29</td>
<td>Phone</td>
</tr>
</tbody>
</table>

6.1.4 Interview sample

The interviews with third-party developers using Trafiklab, where based sampled primarily from the survey, from which eight were selected. Out of the other three, one was recommended by an interviewed developer; one was come along during a double interview, and the final served the purpose of interviewed a developer with a strong connection with Trafiklab, as described earlier.
6.1.5 Interview process

For the interviews, interview questions were created. For the Samtrafik interview, they were made separate but for the Trafiklab interviews they were the same questions. These questions are based on the initial study as well as the theory. They followed the following general structure in their executions (Carins and Cox 2008).

- Background: Asking the interviewed for their background and their experience of working with Trafiklab and development
- Letting off steam: Asking east general question to help the interviewed relax, get more comfortable with the situation.
- Addressing issues: Covering any matter that has not naturally been dealt with during the earlier steps. If it has already been addressed, then the questions will not be asked.
- Tying up/debriefing: Sum up all the issues to make sure that all the necessary information that the participants can give has been dealt with. Also a reminder of what will happen with the information that has been gathered and checking for the possibility for follow up.

During the interviews, paper notes were taken to catch the most important insight, in particular such that might be non-verbal. They were also recorded as resource to double check statements and write quotes, this will however be voluntary and it was stated in the agreement that no one, other than the interviewer, will listen to it and it will be deleted a set time after the project have been completed. A summary of the interview was written as soon as possible after the interview was performed, this was however limit the number of interviews that can be conducted on any given day since it will take time to write and as to not mix interviews together. These summaries are also limited to the interviewer eyes.

6.2 Results: Third-party developers using Trafiklab

In this section greater detail is used to describe the third-party developers that works with Trafiklab and what their needs are. This will be based primarily on the interviews, but also the two surveys from the previous subproject. First the topic of Trafiklab as a community platform will be discussed, since third-party developers options proved crucial for the creation of a correct picture of this. This will be based on the interviews with various third-party developers and the survey described in subproject two. These statements by third-party developers are their opinions and should be treated as such. This will be followed by the results which sums up the main areas of concern, based on all three subprojects.
6.2.1 Trafiklab the community platform

Trafiklab describes itself as “a community for open traffic data” (Trafiklab, 2016). Through it you can access public transport data for Sweden as well as APIs, which is an easier way to access information than through the raw data. The community portion of Trafiklab consists primarily of three functions, the forum, the projects and the Meet-ups.

The forums are based around that developers can ask questions that are then answered by Trafiklab, Samtrafiken and SL. This forum has been described as having somewhat of a question and answer feel (Developer F; Developer G). However this had not been described as a bad thing and preferable to a more of a discussion-oriented forum since it makes it easier for developers not asking the questions to find the right information (Developer C). The forum is also, according to some developers, the way they get status information about the API, for example if a API doesn’t seem to be working the forum is where they check if others are having the same problem and if Trafiklab is aware of the problem. The forum is however not featured prominently on the site and according to Person 2 it’s because they have not found a person with the right technical and community skills to properly manage the forum.

If you want to use a specific API on Trafiklab, you also need to create a project on the site (Trafiklab, 2016). Then other users can see their project and you can check what other developers are doing with the API. This step has been described as one of the few hurdles to when working with a project, since you might not always know what you plan to do with the APIs when you start out, you might just want to experiment (Developer F; Developer I). However at the same time, the feature of being able to look at other people’s project is viewed as being valuable by third-party developers. For example, one third-party developer was developing application for a brand of smart watches and liked to be able to check what kind other application were develop for that brand (Developer I). However, while not a major problem, it is something that should be looked over since it might not be used in the way it was intended.

The Meet-ups are another important part of what makes Trafiklab a community (Trafiklab, 2016). The Meet-Up is an event where Trafiklab present what they are doing as well as inviting other actors to talk about what they are doing. It is also a chance for different players in the sector, Trafiklab and third-party developers to meet up and discuss and highlight various relevant topics. From having attended one such Meet-up, it is clear that discussion between these actors is needed (Trafiklab Meetup, 2016). All developers who were interviewed seemed positive to the event, even those who had yet to attend. One developer stated “What you can focus in on is to reach out to a broader front through meetups where together we talk wider mashups of APIs - even outside the traditional public transport” (Survey 2014). This is a sentiment shared by other developers who would want more opportunity for discussion among developers during these Meetups, even though they also state that the presentation also is an excellent way to get information about what is going in and around Trafiklab (Developer B; Developer
D; Developer K). Perhaps another event focusing just on this aspect would be preferable? One developer stated that, while talking about improvements to Trafiklab: “What you can work on to reach out to a broader front through meetups where together we talk wider mashups of APIs” (Trafiklab Survey, 2014)

Trafiklab being a community is a statement of which there seems to be quite accepted as around half of the survey agrees that Trafiklab is a community (Survey 2016). Also several of the interviewed agree that the community part is one of Trafiklab strengths. However several admit that they are themselves not that active in the community. One third-party developer admits that while he uses the forum to get information, he rarely if ever post himself (Developer F). Another says that he has never actually used the forums, but he can see that they might be useful if he runs into any problems (Developer K). In general, it seems that most developer have a loose relationship with Trafiklab which correlates with the results of the survey (Survey 2016)

6.2.2 Third-party developers and Trafiklab

Based on the interviews and the surveys, most developers are pleased with Trafiklab and the services it offer on a basic level. When compared with other governments sponsored agencies and foreign actors, Trafiklab is seen as a prime example of a successful open data initiative.

When asked what Trafiklab is “The world's best inventions. Ensuring that collect public data in one place is the way to go.” (Survey 2014)

“You are unbelievably good, there is no doubt” (Survey 2014)

“Keep up the good work!” (Survey 2016)

However what is also apparent is that Trafiklab has areas where improvement is necessary to better meet the needs of third-party developers. During the interviews developers had to clearly ask for negative things about Trafiklab to get them talking and at that point a more complex picture emerge. Most of them do have complaints and things they would like to see improvements on.

Since Trafiklab has a monopoly position it is natural that many developers that want to use the kind of public transport data that Trafiklab provides. Most developers seem to find their way without much hassle when they need that information, the most common way being through Google (Trafiklab 2014). For example, one third-party developer wanted to be able to get quick access to when the buses nearest to him departed after going to the gym (Developer B). To do this he found Trafiklab and developed an application that covered those need and the released it to the public, a path many third-party developers using Trafiklab seems to take (Survey 2014; Survey 2016).
80% of all developers stated that they worked without compensation, with many third-party developers doing their job with Trafiklab on the side of regular job (Survey 2014; Developer B; Developer I). Some are also entrepreneurial companies with a small numbers of workers (Developer I). However far from all developers using Trafiklab is the entrepreneurial developer, its services are also used by larger companies. For example Hogia, who used it when developing their real-time tracking system in Stockholm, because it provided them with a quicker access to data to run their simulations (Developer G; Developer A). While they might not be as numerous as the independent ones, they do have a lot more resource and therefore work under different circumstances.

6.2.3 Functionality for third-party developers

From the survey conducted by Trafiklab in 2014, the most requested features were related to getting access to more APIs, documentation and more stability in service. We will go through them all in part here.

In regards to APIs, one commonly requested feature among a group of developers is getting access to more of raw data behind the APIs, so the third-party developers themselves can use the data they need and get a better understanding of how the APIs works. Many developers are driven by passion and interests, and not only to develop useful travel application but to see what is possible when you experiment with the data.

However, there also another group of developers who like APIs, which has been discussed in the method where a distinction between API-developers and Data-developers where made. From the survey conducted on that basis, it would seem that there is around a 50/50 split among the different kind of developers. There are not a certain answer why this is the case, but one theory is the simple fact is that developers are different and are developing different services with different needs. This distinction confirms the assumption made in the third-party development dimensions. What is important is not to lose focus on either of these; however it should be kept in mind while moving forward, since both groups are clearly present in Trafiklab.

With both of these groups in mind, the importance of both offering data and APIs becomes clear. Some of Trafiklab services do this already, for example, ResRobot and the GTFS file offer the same information, but on different levels. Trafiklab should work more towards offering all their information on both of these levels. This is in particular important when developing functionality in a long-term perspective and more data-driven innovation. To do this, an idea is to make sure that all future APIs developed at Trafiklab has this two-sided functionality. This process could also be easier if it were possible to more openly see the interworking’s of APIs, both to make it easier for interested third-party developers to use them and serve as a way to initial users to get started (Developer H; Developer K). This is illustrated in figure N below.
Figure N: Showing of the different layers of data and API

6.2.4 Documentation.

Documentation is traditionally a collection of documents describing how something works, in this case software. However, it is not just a bigger group of records that the third-party developers want, based on the interviews and surveys. Actually the traditionally documentation has been significantly improved in recent years, which might be a direct result of the survey conducted by Trafiklab in 2014(Developer C; Developer F). However there are still areas of documentation in a broader sense that could be improved.

There has also been request for more documentation taking in the form of more code examples (Survey 2014; Developer D; Developer E). One suggested way would be to highlight different projects that Trafiklab agrees follows good practices, solves a particular difficult problem or is just interesting (Survey 2015; Developer B; Developer G; Developer H). This would hopefully help developer get started and could be useful for the community, so not every developers need to figure out how every particular API works. It would also help by conveying how each API can be used, which might not be immediately obvious (Survey 2016; Developer F).

There has also been a complaint with the data structure, both on a formal level and how it is implemented (Survey 2014; Developer A; Developer B; Developer H, Developer E). Some have suggested that Trafiklab should try to promote some best practices in working with the API and data, which could be helpful for the sector as a whole since it would create more unity. It could also help if the API worked the same way among themselves by having the same structure, so not each “API becomes a silo”(Developer H). However, it has also been acknowledged that it is important that each API can stand on their own, as not to hinder innovation. This is a difficult problem, and a balance has to be worked out between the two.

One way of elevating both problems from the two previous paragraphs was suggested in the survey conducted by Trafiklab in 2016. “Work more on the community between people using APIs such as discussion forums for each API.” If more effort were put into developing smaller sub-communities around the different APIs, it would hopefully
become easier to organize both examples and best practices. For example, everyone
developing Realtime functionality could have a forum where they together could solve
the problem with the moderation of Trafiklab. How exactly they would be organized is
an outside the scope of this project, but what is important is that such functionality
would be of value to third-party developers.

6.2.5 Similar problems for different third-party developers

One of the most interesting facts deduced from the interviews where the fact that a
group of interviewed third-party developers had the similar problem with the same API
and had a similar suggestion on how to solve it. Of these, two developers were
independent, and two were part of the major organization in the public transport sector
mostly dealing with busses (Developer A; Developer F; Developer H; Developer J).
What was found out was that all four had had a problem with the API SL Realtime.

One of the larger developer and one independent developer had an issue related to a
particular bug that caused an issue in the in the application of the API. The first
developer talked about that he got a quick response that Trafiklab were aware of the
problem in the forum and even had an email conversation, but had not heard anything
for two months (Developer J). This caused them a significant problem in their
development of their new application and forced them to change their solution to take
into account this issue or delay the launch. They asked for information about what
development was happening and offered help if they would be asked for it.

The other large company had a problem in regards to stability where the downtime was
too large to meet their customers’ needs. He would welcome better communication and
dialog with Trafiklab to solve these problems and offered to help to work on a solution
them. “…as an organization is they are not used to drive a system that is supposed to
work 24 hours a day and 365 days a year”(Developer A).

One independent third-party developer who worked with applying his service used in
Dublin, San Francisco and other large international cities found the API to be lacking in
stability to such a degree that he is not sure if he will keep on working on the beta
version for Stockholm (Developer F). What he needed was information about what they
would be doing to improve the situation to know if it was worth investing his time in.

What is interesting is the fact that, all, but in particular the larger cooperation, expressed
the desire to work together with Trafiklab to help solve these problems (Developer A;
Producer J). While the indvivial developers offered to help, their resources are limited
while one of the larger companies proposed to put a developer full time to solve it or
taking in an external developer to assist in resolving the task (Developer J).
These examples of third-party developers highlight two areas of importance that Trafiklab should focus on: Stability and how information regarding stability is communicated.

### 6.2.6 Communication in relation to stability

"It can go up and down, however, much you want, as long as you are told" (Developer H)

In regards to communication, there seems to be a demand for more transparency in Trafiklab. As seen in the example above, a big problem seems to be a lack of communication in regards to how they deal with issues regarding the stability and operating status of their APIs.

When talking about the problem of communication in general, one developer stated that the while Trafiklab were quite fast on an initial announcement that there were aware of the problem and working on it, they were not forthcoming with what they were doing to fix the problem (Developer K). This is a problem that several other developer reports having where the insecurity creates problems for them (Developer B; Developer F). They do not know if it is worth investing their time into learning an API, or what kind of functionality might be released in the future. They want to know more about how Trafiklab will look in the future. Things like roadmaps and more of a dialog, for example, would help achieve this. As of right now there exists an insecurity that might stop many potentially great innovative applications from coming into existence.

In regards to stability, there seems to be an understanding among third-party developers that service goes down sometimes, but the problem is that there is no dialog. When something goes down, most of the time, it is up to the developers themselves to ask if anything is wrong with the APIs. Even though there are an operating status and service announcements RSS feed, according to some third-party developers the main way of getting this is through the forum (Developer F; Developer H). They did this by checking if anyone has asked a question about the problem and if not, asking the question. Then hopefully Trafiklab will become aware of the problem and then fix it and provide any updates along the way. As stated: “There exists a general maintenance side today, but it tells me nothing, it tells me that they are alerted, but I do not know if it has been received by Trafiklab.” (Developer H). The fact that the forum is used as a way of getting critical information is not helped by the fact that it is difficult to keep track on what someone posted in the forum. This would in part be elevated by having API-specific forums, and help with creating API specific sub-communities. However, the question and answer format are still preferred by some developers compared to a more discussion-based forum. As one developer with a close connection to Trafiklab stated “It is hard to know what to do if something goes down, which makes it feel less serious. I would even be willing to pay for some kind of assurance that things would work. Would like to know more about what they are working on and how they work with their
own operating problems. I would also like it to be open when there is staff available when something goes down. It would be quite nice to know about if there is only operational staff available during office hours Monday to Friday, making it easier to know if it is worth investing in.” (Developer H) The very same developer also stated that while he considers himself having a good dialog with Trafiklab about these issues, since he has a close connection with the ones working with Trafiklab, he acknowledges that it is now available to all third-party developers. One the note of stability, according to one third-party developer who has been using Trafiklab from the start, it used to be a lot more unstable since they used a proxy server, but it has been vastly improved in recent years (Developer H). This can confirm that there are comments of that nature in the forum from by Trafiklab conducted in 2014.

In summary, better communication and a better dialog with third-party developers to build trust for the Trafiklabs services. This is of particular importance for the developers that have already invested time into using Trafiklab and depends on it. One way to accomplish this is by seeing the third-party developers more as a resource.

6.2.7 Using the third-party developers as a resource

“Many have requested centering stations, which has not yet been published. However, now SL decided to make their app with that will have the station centering, and I think that is a rather backward, rather than look to those who work with the data and the requirements they had for several years and instead release it in conjunction when they plan to use it. This is something that makes it difficult for third-party developers to plan for themselves. So are third-party developers to be seen as a resource or tool, in this case, it feels more like a competitor” (Developer H)

Today there exists many applications using the data provided by Trafiklab to third-party developers, but that does not mean that the public transport companies have stopped developing an application on their own. There is nothing wrong with this in itself, but the problem is when it means that the companies neglect their interests of releasing open data to third-party developers. While this is to a degree outside of the control of Trafiklab, they cannot only control their APIs directly. However, this is a limited view on Trafiklabs position in their network and the role they could potentially play in representing third-party developers and serve as their voice towards the rest of the public transport sector. This idea emerged from the impression that third-party developers are positive towards the idea that Trafiklab serves more like the voice of the third-party developers towards other actors in the public transport sector. Trafiklab is already in a good position to do so and, to a large degree do this already. However, things can be improved since it seems to be something with value for third-party developers. This would also not only create value for third-party developers but more importantly for end users and society as a whole. This is because getting companies in the transport sector to open up more of their data means better and more functionality in an application that can be used by travelers. One developer working for a larger
company says that their business is already lobbying towards the larger public transport company (Developer J). It would, however, be useful if they could coordinate their effort. This could be done if Trafiklab were more transparent with how they worked with their lobbying question and had more of a dialog with their third-party developers about it.

It is also important to remember that third-party developers are those who might be most familiar and most skilled with the APIs and data. Not to mention the fact that they might have the most innovative and out of the box ideas that can help provide new functionality for the travelers everywhere. If Trafiklab can harness this skill and innovative fire into its position in the network, then the actual potential of open data can be released.

One suggestion that goes a bit further was a proposal made by developers, making Trafiklab development processes open source (Developer J). The proposal was to let all of the community and everyone interested get together in a team lead by Trafiklab to develop together, or solve particular issues. This would enable everyone that want to keep track of development and make concerned parties a direct part of the development process, which would hopefully help with the experienced lack of transparency. While this was only directly suggested by two third-party developers, it is still something that most third-party developers probably be positive since many of them seem to be believers in the concept of open data (Developer H; Developer J). A lot of the problems with Trafiklab discussed here would, in theory, be solved. However, it is important to emphasize that it would not necessarily solve all problems immediately and might be very hard to implement in practice. However, it is something worth consider inside Trafiklab when moving forward into the future.

6.2.8 Play with Trafiklabs APIs

Another issue that might easily become is the discussion of more seasoned Trafiklab developers is how to provide it for new users.

This is motivated by the fact that a significant part of the developers who uses Trafiklab start to work with it by circumstance, which there are several examples of that has been discussed before This is also motivated by the results of the survey in subproject 2 and how it lines up with the third-party developer's dimensions framework. In the result we can see that most developers using Trafiklab do it without compensation, two-thirds are non-commercial, and around half value creating an innovation product, not to mention the fact that ¾ base is driven by self-initiative. This places a significant portion of Trafiklab users as possible believers, as described by Bergvall-Kärnborn et al. (2011) in the theory. Moreover, these developers seem to agree on the fact that it is important that it is easy to get started when using Trafiklab, and several third-party developers highlight the importance of being able to “play around” with Trafiklabs APIs.
Trafiklab is already very easy to get started with as a developer and pretty easy and fast to get access to the API (Developer F; Developer J). However this area of difficult is not for dedicated developers to get access to the necessary tools to utilize Trafiklab, but for the new users who stumble on Trafiklab and want to try as fast as possible out what Trafiklab has to offer. Most people using Trafiklab stumbled onto Trafiklab somehow, most because they wanted to solve a problem with their life. These developers could just have well have done something else then, which is why it is important that Trafiklab appears as attractive as possible towards new developers, so they do not slip away to play somewhere else. This could some kind of test delivery of the API functionality, or a way to easily grasp how each API function and what is possible to do it (Survey 2014; Developer D; Developer E).

Trafiklab has already taken steps towards this with the console window where someone can try out APIs and their functionality but is clear from talking with developers that have not been probably communicated.

It is, however, a significant step in the right direction. One suggestion from a third-party developer is to have an entirely open key, open for anyone but limited to set amount of calls each day as not to misuse it. The main point is that it needs as easy as possible to start “playing around” with the data.

Another small matter is when creating an account, there is a need to create a project and to know specify which API you intended to use, which might be a problem if you do not really know which APIs you intend to use or what you plan to do with it, making it harder to play around with an API (Developer J). While still seen as a minor problem, it is important to make it as easy as possible to get started and something to consider as Trafiklab develops. As stated by one developer “First you want to try it, and then you figure out a use for it. Still later, you get as far as you have a project to register.”(Survey 2014). This is important since if they do not get started to develop, they might as well move to work on other applications for different services.
6.3 Summarised results

In very brief summary, the surveys and the interviews show several relevant results that can be summarized in some different areas of interests. These areas are seen as being in particular important when it comes to improving Trafiklabs value-creating mechanism. These areas are summarized in the list below.

- The impression of Trafiklab by third-party developers are in general good, and most developers are in general satisfied with the value that Trafiklab creates for them.
- Some third-party developers value both data and APIs; because of that both of these perspectives need to be considered by Trafiklab.
- The documentation needs to be improved and evolved to meet the needs of third-party developers better.
- The communication towards third-party developers needs to be enhanced to provide more transparency. In particular with regards to stability issues, support and roads maps towards the future.
- Trafiklab could make more use of the third-party developers and see them more as a useful resource.
- Trafiklab can evolve to more become the voice of third-party developers towards other actors in the public transport sector.
- It needs to become easier to get initial access to the APIs offered by Trafiklab to be able to experiment more to promote creativity and innovation.
7. DISCUSSION

This analysis has as purpose to try to answer the main scientific question stated in the purpose of this thesis: How can Trafiklab’s socio-technical value creating mechanisms be improved?” It also discussed the results from all three subprojects, by primarily using the theory from subproject one and the results from subproject two and three detailed third-party developers view of Trafiklab. This discussion leads to a few general guidelines of how open data can evolve in Sweden, which will be presented primarily in the final conclusion section.

To start with the analysis: the terms presented in the theory will be used to describe Trafiklab and its surroundings, which will answer the second sub-scientific question of the thesis: “How to do Trafiklab’s value creating socio-technical network look?”. This will also make it easier to apply to the theory later on and contribute to creating an understanding of what Trafiklab is by firmly establishing and defining Trafiklab as a platform. Afterward, a theory will be used to formalize and argue on how Trafiklab should change to create value better for third-party developers based on the establishment of Trafiklab nature in the section preceding it, meaning that section 7.1 will be relevant for the rest of chapter 7.

7.1 Open data ecosystem of Trafiklab

If a theory regarding a platform were to be applied on Trafiklab as a platform, then firstly the core components of Trafiklab would be the API and its’ community, as the community is one of Trafiklab’s biggest strengths. This goes back to the statement from earlier that Trafiklab offers two distinct kinds of functionality: development and community. Moreover, while you can easily argue that Trafiklab is primarily a technical platform, it is evident from the data that its community is its most distinctive feature and most likely where the most potential lies. Therefore, the two features are placed on equal footing as the platform’s core components. The fact that the core needs to be stable is highlighted here as a change in any API would cause a problem for the developer and in how strongly developers are affected when APIs are not stable enough. This because of they many of their apps need constant access to Trafiklab’s APIs to work properly.

The complementary components or modules are then the different application developed by third-parties. The interface can be defined on a purely technical level as being the APIs that third-party developers use to access the open data provided to them by Trafiklab. However, given the results of this study, it is clear that it is not primarily on the technical level the problems lays, therefore, taking a step back when talking about the interface is in order. If the interface is considered as for how third-party developers access Trafiklab, it becomes clear that it is primary through their website. The distinction is important since a problem might be on a technical level behind the
scenes of the site, or a problem might be how the technology is communicated through the site.

If Trafiklab is also defined as an open platform and part of a larger network, then Trafiklab is the platform provider. Third-party developers are primary on the supplier side of users, but this is not static since many developers start off in that category. In this case, Samtrafiken can be viewed as the primary platform sponsor, since they do a lot of the work and sponsorship that makes Trafiklab possible. This is clearly illustrated in the GTI-process that is necessary for Trafiklab to be able to publish the GTFS files for all of Sweden’s planned traffic, but also by being the one that provides resources in the form of money, space, and personnel.

Other actors that help with making Trafiklab possible can be viewed as belonging to this platform sponsors category. These are the actors that own Samtrafiken and provide them with resources as their governing body, but also all the public transport companies that have to provide their timetables with the GTI-process. The Swedish government could also be seen as an actor in this category. This category is quite diverse as different organizations provide various forms of sponsorship and it would be a whole different project to clearly identify them, which is why this project has focused on the platforms sponsors in relation to the third-party developers.

If Trafiklab were to be compared with what is suggested by Boudreau and Lakhani (2009), then Trafiklab can be viewed as both a product and a two-sided platform. Because external innovators need to use Trafiklab to be able to create their applications before they can provide them to the customers, it can be considered a product platform. However, on a technical level, it is also a two-sided platform since Trafiklab provides the data that the clients ultimately use, meaning that a problem with the platform of Trafiklab must result in a problem for the customers, so the end users still depend on Trafiklab. This point is important to remember since it means that Trafiklab has a responsibility towards end user to ensure their services are working.

To summarize the points made regarding Trafiklab as a platform and how its surrounding ecosystem look, Figure O has been created. It summarizes what has been discussed above and presented in the data section.
Figure O: The Trafiklab platform and its ecosystem
The figure above shows what the network surrounding Trafiklab looks like as a platform and describes it using platform theory and terminology. It will hopefully help to give an understanding of the complex process going on around the platform of Trafiklab that most third-party developers using Trafiklab might very well be unaware of. Take note of the “chain” leading back from Trafiklab through Samtrafiken to the platform sponsors.

7.2 General theoretically founded inquiry

Regarding usefulness, according to Tarkkanen et al. (2015) definition, the biggest problem is not that anything is missing or directly unnecessary, Trafiklab fulfills both of these criteria. Rather the problem lays in the fact that some of the functionality offered inadequately. Therefore, the issue in regards to Trafiklabs is to find ways to improve already existing services.

From the data gathered, a general theme emerges regarding Trafiklabs core as an open data platform. This goes back to the Wests and O’Mahony’s (2008) view that open data openness consists of two concepts: transparency and accessibility. It is clear that Trafiklab offers excellent accessibility when it comes to its data, even if there are areas worth improving. However, it is clear that the real area of importance is in regards to transparency as a, according to third-party developers. This transparency issue is two folded: firstly is the transparency relating directly to Trafiklab. This transparency has been discussed in the data section and relates to such matters as communication and seeing third-party developers as an important and useful resource. Secondly, we have the transparency issues that does not directly relates to Trafiklab. The transparency is what stands behind Trafiklab, namely Samtrafiken and the public transport companies that own Samtrafiken, this link backward I choose to call the chain.

An example of how increased transparency could be helpful is, for instance, if several third-party developers ask for the same function. In that case, Trafiklab could investigate their requests, and make inquiries among their platforms sponsors, to check if it would be possible. This could help the platforms sponsor to provide more functionality, and if impossible, they can at least tell the third-party developers why. However, to make this possible, the actors in the chain would have to be more open towards giving this kind of answers themselves. Moreover, Trafiklabs role, in this case, is to serve as gatekeepers and decide how to weight different information from third-party developers and choose how to fulfill their request best. Samtrafiken is in a unique position to facilitate communication and interaction back through this chain. This is because they are a part of the chain, both through the GTI-process and ownership. However, it would also serve Samtrafikens stated goals, which is to make public transport easier, more accessible and reliable and serve as an arena for dialog between companies. Can Trafiklab provide access to these actors and serve as the voice of third-
party developers in the network? That is a question for the different organization that has the final say when it comes to Samtrafiken.

While I do not want to suggest that transparency is the answer to all Trafiklab’s problems, it does have the potential to help alleviate a lot of the issues described in the result section. It would help with the problem relating to documenting, and give third-party developers a bigger role to play. Most important however it would assist them with the critical issue of communication. With more transparent communication, third-party developers would be able to feel more secure in the work they are doing, and get a bigger understanding of the work that Trafiklab does. Trafiklab today has its limitation, but if they were more transparent about them, then third-party developers would find it a smaller issue. This also applies to open data in Sweden in general.

In summary, it would be great if Trafiklab were more transparent about themselves, and could provide access to its platforms owner in the form of the different public transport companies, which are also its owners. What I want to emphasize on is that I do not think that this would be easy to accomplish. However, I believe that it should be one of the long-term goals of Trafiklab and Samtrafiken in moving forward.

7.3 A platform boundary research approach to the theoretically inquiry

In this section, the theoretical model called: boundary constraints model, is applied to the case of Trafiklab, by viewing Trafiklab as a platform, and what it provides and could provide as platform boundary resources. Then Trafiklab has two major ways of controlling the resources they provide; that is resourcing and securing. It represents the balance between opening up and maintaining control.

The main idea behind platform boundary resources is strongly linked to the concept of open data. It is based on the foundation that instead of developing applications, the platform owner should focus instead on providing their resources to developers, just as Trafiklab already does. What is important is the mindset that Trafiklab provides a resource for others than themselves. To control these resources given to third-party developers the platform uses different securing mechanisms. The main point here is that open data does not have to represent a total loss of control but also a chance of securing mechanisms.

The suggestions of letting third-party be a bigger part of the development process represent a big case of resourcing and therefore needs to be met with an increased securing. However, since the technical aspect has to have a high degree of open resourcing to be effective, what I proposed is a regulation based securing. This could, for example, take the form of a developer participated having to sign some contract, or that Trafiklab has the final say when it comes to disagreements.
Trafiklab must also on a general level start to understand that they are the center of a complex network. As stated with the concept of tuning, the innovative process which Trafiklab are in the heart of is a lot more complex than just providing API to third-party developers. The main reason for this is because of Trafiklab's community, perhaps its greatest strength. This tuning process happens between different users, between users and Trafiklab. The next step, however, is to widen the tuning process even further back in the chain. Ideas from individual third-party developers need to travel back the chain, through the platform providers, primary platform sponsor and all the way to the platform sponsors. This is to enable as great as possible innovative tuning and to make sure that the innovation happening between third-party developers and Trafiklab can have the greatest potential impact. Trafiklab’s role, in this case, is facilitating communication up the chain, as previously described. Self-resourcing is important in this regard since developers are already developing work around on their own when Trafiklab does not provide the solution they need. However this ability to self-resource is limited because of two factors:

- Capacity to coordinate effort among third-party developers is constrained by the Trafiklab platform and interface
- Trafiklab having a monopoly position means that some data just is not available through any other means for third-party developers.

This means that Trafiklab has a bigger responsibility than other platforms since the third-party developer’s self-resourcing ability are limited. However what is clear from this study is the fact that there is a willingness among different levels of third-party developers to self-resource. However, because of this, Trafiklab needs to actively work with diversity to widen the scope of the platform. It is important in this context to remember that after its launch, the platform owner to a degree loses control of what the platform is. This sovereignty securing is not necessary, since as a user, Trafiklab will have a monopoly position on the particular information that they offer.

While resourcing its platform, it is also important that Trafiklab not loses control, so regulation based securing might be a useful tool. What we have seen is the fact that most developers find the current administration restriction to be quite reasonable. With added access and control, the third-party developer would most likely be willing to concede a bit more of regulatory control. However, despite that, it is still important that it also become easy to get a first easy access to “play around” with the tools. When making it easier to “play,” suggestion is resourcing; opening up, on a level a making sure to secure on another. The resourcing is towards the newer users, who need an as small as possible hurdle when starting while the most seasoned developed can deal with the securing in the form of having to register an account. The problem with new users seems to relate more to the interface than the platform itself, as such functionality exists but developers still ask for it. In summary, make the website as easy as possible for new users but keep some security for developers in it for the long haul.
7.4 Suggested modification of the platform boundary resources model

If I were to suggest an expansion of the concept of platform boundary resources, as proposed by Ghazawneh and Henfridsson (2013), it would be to link it even closer to open data by expanding it also to cover the aspect of accessibility and transparency and an increased focus is put on third-party developers themselves. Such a model would put a greater focus on the platforms owner themselves as they have a vital role to play in their relationship with their platform. However, at the same time, such a model does only actually work with a better-established platform with a developed community of some sort. However based on my observation, it is reasonable to assume that more platforms will move towards this form of the platform which will make such a model more relevant.

These ideas are summarized in the figure below. This only represents an idea of how to conduct future studies, and the model itself has not been validated. However, since the concept of platform boundary is in itself young, I think it is worth to propose future evolutions of the model established by Ghazawneh and Henfridsson (2013) to make applicable tools in the future.

![Figure P: The platform open platform boundary resource model](image-url)
8. CONCLUSIONS

To return to the purpose of this thesis and harken back to the introduction, I will now give some general guidelines of how open data can evolve in Sweden. From the study of Trafiklab and open data in the public transport sector, it is clear that the next step in ensuring greater implementation and impact of open data is to expand the notion of what open data. This would be done by more clearly defining open data to mean both accessibility and transparency: an open and transparent access to information regarding the continuous accessibility of the data.

Perhaps giving developers more transparency will make them feel safe about investing their own time into utilizing the data. Because when data becomes all the more open and accessible, when all data becomes “open”, developers will naturally gravitate towards developing an application using the data that provide the best value for them and away from those that are unstable and hard to work with. Because, in my opinion, to be successful in open data, it is not enough to provide access, it needs to is a collaborative experience with third-party developers valued as an integral part of the process. If this is done, the possibilities of open data are truly beyond our imagination. This is not just a question for developers, but since most open data comes from the government and is used by the general public, the better open data provided to developers, the more value provided to end users like you and me since it helps to create better application for everyone to use to improve their daily life.

In this, organizations like Trafiklab can serve as an intermediary between developers and data holders that build trust to both sides and offers greater transparency of itself and the actors back its chain.

8.1 Trafiklabs future

In summary, this thesis recommends Trafiklab to work on improvements in the following areas for the purpose of help creating more value for third-party developers using Trafiklab.

In the short term, Trafiklab should focus on making it easier to play around with APIs, to hopefully help develop stronger initial interests. This can be done offering more data to try out before committing to creating a full membership. As important to catch these first users is to guide them to that easily accessed information on the website and work from the start to build an interest in what is possible with Trafiklab. This can also be done by evolving the documentation also to include examples of what the APIs can be used for and coding examples, things that will make developers interested and make it easy to start to try out ideas for themselves.

Trafiklab should also work on providing even better communication with third-party developers, mostly to clear out the areas of uncertainty that has been described in the
data section. That is that third-party developer always happier when they know what’s going on. One way of doing this would be to find a person that can be more responsible for communication with the third-party developers.

In the longer term, Trafiklab should primarily be more conscious about what have been discussed in this paper, for example, that they cater towards both so-called API and – data developers. More important they should make to provide continuity and stability in their communicate, which can take the form of both documentation and that direct announcement of most of the necessary information. They should also work towards provider more transparency towards third-party developers and take their opinions to the next level. With future development of new APS or updates, they should consider the greater involvement of third-party developers as a useful resource. How exactly such collaboration would look depends on the particular development needed, but in general, it is always beneficial with an early involvement.

One idea that might become clear from the discussion between Trafiklab and Samtrafiken is that perhaps Trafiklab should be a separate organization than Samtrafiken. This would help to elevate some of the confusion, but as argued through the analysis, one of the greatest strengths of Trafiklab is relationship back the chain and its central position in the public transport sector. It has this strength just because of its close connection to Trafiklab, without it Trafiklab risk becoming an organization that talks a big game, but has not powered to affect other actors. With Trafiklab as a natural part of Samtrafiken, it becomes an actor that is harder to ignore. Remember WebFoundation survey, what Sweden lack is not lacking in readiness, it’s lacking in implementation and impact. It is time to stop talking about open data and start implement it so it can have a real impact.

Moreover, to do this cooperation and trust is necessary. To reuse the concept of the platform boundary resource, to achieve the resourcing open the public transport sector opening up for more cooperation with Trafiklab, securing is necessary which takes the form of the experience and good will of the Samtrafiken name, an actor most of them own a part of.

8.2 Future research

The natural next step of this project would be to bring the suggestions of this thesis to the platform sponsors, the owners of Trafiklab and ultimately the actors with the final say when it comes to the future evolution of Trafiklab. Do the results and recommendations presented in this study match their idea of Trafiklabs purpose and future functionality? Another study by someone else could serve as a good “mirror” with a focus on the largest interests that exists in the background of this study and what goals they have. To measure this was outside of the scope of this thesis, but is an area worth further research. It is, however, a good note to end up, with saying that these
results are now stated and is now in the hands of Trafikslabs platforms sponsors because ultimately it is up to them to decide what happens next.
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Preliminär titel: Relationen mellan plattformen Trafiklab och dess medverkande tredje-partsutvecklare

Kontakt:
Telefon: X
Email: X

Projektbeskrivning

Denna studie har som syfte att studera relationen mellan Trafiklab och dess tredje-partsutvecklare i syfte att komma med förslag på hur de kan förbättras. Detta kommer mer konkret ske genom att undersöka det värde Trafiklab skapar för tredje-partsutvecklare. För att genomföra detta önskar jag att få en bättre bild hur det är att använda sig av Trafiklabs tjänster och hur relationen med Trafiklab fungerar.

Studien utförs i formen av ett sista års projekt på civilingenjörsutbildningen System i teknik och Samhälle vid Uppsala Universitet, ett så kallat examensarbete och pågår under våren 2016.

Intervjun kommer att pågå 30-60 minuter, antingen via telefon eller face-to-face. Under intervjun så känns dig fri att svara så mycket eller så lite du vill. Du har möjligheten att inte svara på frågor och att avbryta intervjun när du vill.

Intervjun kommer, med din tillåtelse, att spelas in. Detta inspelade material kommer endast användas som ett komplement till nedskrivna anteckningar och minnet. Det inspelade materialet kommer att tas bort inom tre månader av avslutat arbete och ses som helt konfidentiellt, vilket innebär att det inte kommer att behandlas av annan person än av examensarbetaren.

Fördelar

Genom att medverka i denna studie har du en möjlighet att påverka hur Trafiklab ser på sin relation med tredjepartsutvecklare och vad de erbjuder för tjänster. Din medverkan i detta kommer förhoppningsvis att förbättra Trafiklab för dig själv men också för andra.

Konfidentialitet

Den information du anger kommer tillsammans med andra intervjuer och källor att användas som empiri i detta examenarbetes slutrapport. I slutrapporten kommer ditt namn inte att anges, dock kommer hänvisningar göras till den aktuella intervjun. Du har dock
möjlighet att anonymisera enskilda uttalanden, detta anges då antingen vid intervjun eller inom 14 dagar efter intervjun.

Är du intresserad att läsa examensarbetet efter avslutat arbete så behöver du enbart ange detta intresse så kommer du få examensarbetet skickat till dig inom en månad efter att projektrapporten slutförts.

Överenskommelse

Genom att du genomför en intervju med Anton Söderman samtycker du med det i ovan ställda ramarna. Du accepterar att all erhållen information kan användas i syfte att göra studien så bra som möjligt.

Jag ser fram emot att träffa dig och ha ett givande samtal.

Med vänliga hälsningar,

X
Appendix B: Interview questions third-party developers (Swedish)

Intervju frågor till tredjepartsutvecklare

Allmänt

Bakgrund inom mjukvareutveckling

Hur hamnade du inom området Trafikinformation?

Trafiklab

Hur upptäckte du Trafiklab?

Vad vet du om Trafiklab?

Har du någon kontakt med Trafiklab?

Hur sköter du den kontakten?

Vad tyckte du generalt om Trafiklab?

Hur använder du dig av Trafiklab?

Vilka resursers som Trafiklab tillhandahåller använder du dig av?

Vad motiverar dig att använda dig av Trafiklabs tjänster?

Hur expanderar Trafiklab dina möjligheter att arbete?

Vilket funktionalitet tillhandahåller Trafiklab dig idag?

Finns det några särskilt smarta lösningar som Trafiklab på ett direkt eller indirekt sätt hjälper dig skapa?

Trafiklab som ett plattform

Hur definierar du ett plattform?

Vad kan ett plattform tillföra dig som en utvecklare?

Är du engagerad i något typ av utvecklar Community?

Använder du dig av något annat typ av plattform med teknisk funktionalitet, likande Trafiklab?

Använder du dig av något särskilt plattform som kompletterar Trafiklab?

Vad anser du om öppna data? Vilka fördelar kan de ge dig?
Vad anser du är den viktigaste egenskapen hos en öppen datakälla?

Anser du att Trafiklab tillhandhåller öppen data

Trafiklab kallar själv för ett ”Community”, vad anser du om den beskrivningen?

**Funktionalitet**

Vad motiverar dig att använda dig av Trafiklabs tjänster?

Hur enkelt är det att få tillgång till Trafiklabs vertyg?

Hur enkelt är det att förstå Trafiklabs verktyg?

Hur enkelt är det att använda Trafiklabs verktyg med andra utvecklings verktyg du använder dig av?

När du implementerar någon av Trafiklabs verktyg, hur krävande är då underhållet av funktionalitet till Trafiklab för dig?

Hur beroende är du av underhåll ifrån Trafiklabs sida?

Hur ökat Trafiklab ditt intresse och möjlighet att använda sig av deras verktyg?

Vad skulle de kunna göra för att öka ditt intresse?

Finns det andra aktörer som påverkar hur du använder Trafiklabs tjänster?

Finns det tjänster som du använder för att komplementera den informationen Trafiklab ger dig.

**Förbättringar**

Hur skulle du vilja se att Trafiklab utvecklas och förbättras?

På en mindre, rent tekniska nivå?

På en större, mer general nivå?

Hur skulle du vilja se expandera sin funktionalitet?

Är det någon särskilt datamängd du skulle vilja hade tillgång till?

Vilka andra aktörer skulle du vilja se att Trafiklab kopplade ihop dig med?

**Begränsningar**

Hur begränsar Trafiklab dig i ditt arbete?

Vilka mekanistiska begränsningar finns det?
Finns det hinder/svårigheter att jobba med Trafiklab

Har det funnits fall där Trafiklabs funktionalitet varit begränsad och du därför har tvingats finna en egen lösning på problemet?

Inofficiella APIs?

Finns det tjänster som du använder för att komplementera den informationen Trafiklab ger dig.

Har det funnits andra aktörer som då har kunnat hjälpa dig?

Finns det funktionalitet på Trafiklab som du inte kan få på något annat sätt?
Appendix C: Interview question Person 2 & 3 (Swedish)

Introduktion av vem jag är, vad mitt projekt handlar om och lite info om intervjun.

Vad är din egen bakgrund?

Vad är dina arbetsuppgifter här på Samtrafiken?

Du som är marknadschef, vilken marknad jobbar Samtrafiken emot?

Samtrafiken

Kan du berätta mer om vad Samtrafiken är för något?

Vad är Samtrafikens viktigaste uppgift, enligt dig själv?

Vilka är era viktigaste samarbets partner?

Vilka är de största aktörerna ni samarbetar med?

Hur fungerar de relationerna?

Vad är några andra aktörer ni interagerar med?

Finns det några aktörer specifika aktörer ni inte interagerar så mycket med?

Ni åter er att när ni samlar in data ifrån kollektivtrafikföretag att: "behandlar Kollektivtrafikföretag icke-diskriminerande och konkurrensneutralt.". Hur påverkar detta eran verksamhet?

Ni jobbar just nu med två större tjänster: ResRobot och ResPlus, skulle du kunna berätta mer om hur dessa två tjänster passar i Samtrafiken i stort?

Hur tänker ni vid utveckladel av ett gemensamt biljetsystem?

Kan ett gemensamt biljetsystem leda till att det blir möjligt att genomföra sin betalning via tredjepartsutvecklade applikationer?

Ser ni er själva som erbjuda tjänster direkt till slutresenär? Alltså är det tänkt att era tjänster direkt eller indirekt ska användas av slutkund?

I så fall, hur interagerar ni med dom?

Trafiklab

Kan du berätta vad Trafiklab är för något?

Vad det du om hur de bildades?

Vad särskiljer Samtrafiken och Trafiklab? Går det ens att dra någon gräns mellan de två?
Vad gör Samtrafiken och vad gör Trafiklab?

Hur anser du att Trafiklab ligger i Samtrafikens större organisation?

Hur stor del av Samtrafikens verksamhet skulle du säga består av Trafiklab?

Trafiklab ser sig själv som ”Community för öppen Trafikdata”, hur ser du Trafiklabs roll som ett Community?

Hur definierar du ordet Community?

Vad gör er till ett Community?
Introduktion av vem jag är, vad mitt projekt handlar om och lite info om intervjun.

Vad är din egna bakgrund?

Vad är dina arbetsuppgifter här på Samtrafiken?

Din titel här är leveranschef, vad för leverans är det som då åsyftas?

Samtrafiken

Kan du berätta mer om vad Samtrafiken är för något?

Vad är Samtrafikens viktigaste uppgift, enligt dig själv?

Vilka är er viktigaste samarbets partner?

Vilka är de största aktörerna ni samarbetar med?

Hur fungerar de relationerna?

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Hur tänker ni vid utveckladet av ett gemensamt biljetsystem?

Kan ett gemensamt biljetsystem leda till att det blir möjligt att genomföra sin betalning via tredjepartsutvecklade applikationer?

Ser ni er själva som erbjuda tjänster direkt till slutresenär? Alltså är det tänkt att era tjänster direkt eller indirekt ska användas av slutkund?

I så fall, hur interagerar ni med dom?

Tekniskt

Kan du berätta mer om GTI?
Kan du förklara mer om vad Transportformatet är för något och hur det uppkom?

Kan du förklara mer vad ResRobot är för något?

Vad för funktion fyller ResRobot?

Hur använder ni er av ResRobot? Man hör er nämligen ofta prata om det.

Ser ni ResRobot som något som ni direkt erbjuder resenärer eller är det mer en bonus?

Trafiklab

Kan du berätta vad Trafiklab är för något?

Vad särskiljer Samtrafiken och Trafiklab? Går det ens att dra någon gräns mellan de två?

Vad gör Samtrafiken och vad gör Trafiklab?

Kan du ange vilka olika sätt man få ut Trafikinformation ifrån er, både som utvecklare och resenär?

ResRobot

GTFS-feed

APIer

Kan man få tag på den informationen ni erbjuder, eller delar av den informationen ni erbjudet på något annat sätt?
Som en utvecklare, hur gör man för att få tillgång till er Data?

Kan du förklara steget man måste gå igenom för att använda sig för att få tillgång till eran data och APIer?

Varför utformades steget som de gjorde?

När man ska börja jobba med ett projekt på Trafiklab så måste man skapa ett projekt, där man anger vilka APIer man tänker använda? Varför måste man göra detta?

Hur fungerar de ”nycklar” ni delar ut?

Trafiklab ser sig själv som ”Community för öppen Trafikdata”, hur ser du Trafiklabs roll som ett Community?

Hur definierar du ordet Community?

Vad gör er till ett Community?