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Digital Solution for Grannsamverkan

Investigating the Requirements in order to Enhance the
Administrative Process and Concept Use on behalf
of the Swedish Police Authority

Master's thesis in Computer science and engineering

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MASTER'S THESIS 2023

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Abstract

The concept of Neighbourhood Watch is widespread internationally and acts as a crime preventing method, focusing on neighbours collaborating with law enforcement in order to reduce crimes. The equivalent in Sweden is known as Grannsamverkan and according to Brottsförebyggande rådet (Brå), the use of the concept reduces the risk of crimes in residential areas by 36%. The concept is supported and managed by several actors, one of them being the Swedish Police Authority. They play a crucial part in the seriousness of the concept since they represent law and order. In addition to this, a common job duty for the police officers is administration of Grannsamverkan, which is perceived as insufficient to some extent by personnel within the authority. The thesis project has consisted of a pilot study and have been conducted at the Swedish Police Authority. The aim has been to seek out the appropriate requirements needed by police officers in order to increase and improve the current administration of Grannsamverkan. A thorough data gathering process have been conducted where police officers all over Sweden have participated. Some of the key findings from the data gathering process was a feeling of not having enough time, a lack of structure, and the significant importance of having a municipal counterpart. This have resulted in a requirements specification for a digital tool, presented in four portfolio epics which captures the functionality of the digital tool. The end-users are police officers working with Grannsamverkan, and therefore the digital tool is set to be an integrated digital tool consisting of several key activities all revolving around the administration of Grannsamverkan.

Keywords: Interaction Design, Requirements Engineering, Grannsamverkan, the Swedish Police Authority.

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REBECKA BERG, Gothenburg, 2023-05-29

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Glossary

Compound Neighboring households who make up a Grannsamverkan group.

Delegate A representative of a Grannsamverkan group.

Acronyms

Brå Brottsförebygganderådet.

NOA Nationella Operativa Avdelningen.

SAMBO Samverkan mot Brott.

SSF Stölskyddsföreningen.

TCA Thematic Content Analysis.

UC Utvecklingscentrum.

UX User Experience.

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1

Introduction

Crime prevention has become an increasingly important topic in modern society. The negative impacts of crime on individuals, families, communities, and society as a whole are well-documented. Criminal activities not only cause physical and emotional harm to the victims, but also erode social trust and cohesion, increase the cost of public services, and undermine economic development. Therefore, preventing and reducing crime is a critical goal for any society. An approach to prevent criminal activities within residential areas is neighborhood watch, the equivalent in Sweden is known as *Grannsamverkan*. It acts as a method and a concept, and is the collective name for actions, where people living in a neighboring area collaborate to achieve a crime prevention network. Over the past few decades, the concept has gained significant popularity in Sweden, as many neighborhoods across the country have adopted this practice to enhance community safety and security. The approach involves creating a network of neighbors who collaborate to monitor their community and report any suspicious activity to the police. The primary goal of the initiative is to prevent crime before it occurs and to increase the overall sense of security within the neighborhood.



Figure 1.1: Logo of Grannsamverkan by SAMBO [1].

The concept is managed by SAMBO (Samverkan mot brott), which is a non-profit organization consisting of various actors such as; SSF (Stölskyddsföreningen), the Swedish Police Authority, Folksam, Länsförsäkringar, If, Trygg Hansa, Moderna Försäkringar, ICA Försäkring, Brå (Brottsförebyggande rådet), SKL (Sveriges Kommuner och Landsting), Hyresgästföreningen, Riksbyggen, Dina Försäkringar, Villaägarna and Brottsofferjouren [2]. Grannsamverkan is financed by the actors of SAMBO together with the municipalities of Sweden, making it possible for individuals to start a Grannsamverkan compound without having to finance it themselves.

1.1 Aim

The objective of this project is to enhance the administrative process of the Swedish Police Authority with regards to Grannsamverkan. This project aims to streamline the process and make it more efficient, thereby improving the overall functioning and collaboration between the parties involved. In order to achieve this, an important aspect of the thesis is to gain a comprehensive understanding of both the concept of Grannsamverkan and how the Swedish Police Authority utilize it.

The focus of this thesis will be to create a requirements specification, which will serve as a comprehensive guide for the development of a digital solution for the Authority. The requirements specification will be the result of thorough research and analysis of the current administrative process and will take into account the needs and requirements of the Authority as well as SAMBO and other stakeholders with interest in Grannsamverkan.

The requirements specification will act as a blueprint for future work which involve the development of a digital solution that will help automate and digitize the administrative process. In other words, the strive of this thesis is to do a thorough pilot study with the goal to produce requirements for a digital solution that will address the challenges faced by the Authority in its current process and improve overall productivity.

1.2 Research Area

The research area of this project lies in the two fields of Interaction Design and Requirements Engineering, which will be used in order to develop a user-centered requirement specification to meet the needs and expectations of the intended end-users, police officers administering Grannsamverkan.

Requirements engineering will be used to elicit and analyse the needs and requirements of both the stakeholders and end-users, while interaction design methodology will be used in order to ensure a clear and intuitive user experience. By combining the two fields, the project seeks out to deliver a requirement specification that is not only intuitive but also meets the needs of its users in terms of functionality and performance.

1.3 Project Process and Research Question

The process of the thesis revolves around a comprehensive understanding of the current administrative process and the requirements of the Swedish Police Authority with regards to Grannsamverkan. This involves conducting a literature review on similar projects such as existing digital solutions used for facilitating collaboration and administration in similar contexts. The research would also involve gathering requirements from relevant stakeholders, such as the Swedish Police Authority, SAMBO and the community members involved in Grannsamverkan, to determine their needs and preferences for a digital solution. However, the primary stakeholder for the thesis will be the Swedish Police Authority. Having that said, the research question of the thesis is:

What requirements are suggested, in terms of a digital solution, in order for an authority, such as the Swedish Police Authority, to facilitate the administration of a concept, such as Grannsamverkan, to increase and improve the use of the concept?

2

Background

In this chapter, the background and context of the problem are explored. The background chapter provides context for the research being conducted and lays the foundation for understanding the problem being addressed. The purpose of this chapter is to provide a comprehensive overview of the ascendance of neighborhood watch as well as the problem area and related work.

2.1 The Ascendance of Neighborhood Watch

In 1964, Kitty Genovese was raped and murdered outside of her apartment in Queens, New York. Shortly after her murder The New York Times reported that 38 people witnessed the rape, either by hearing or sight [3]. Only one called for help, but then it was too late. After the murder of Genovese the social psychological theory, *the bystander effect* or *Genovese syndrome*, was introduced [4]. Other researchers claims that there does not exist valid evidence which shows that there were 38 witnesses whom heard or saw the murder, nor did anything to call for help [5]. However, regardless of the credibility of the evidence, the murder of Genovese has indeed left an imprint in the American history. It has increased the awareness of the bystander effect and has played a crucial part regarding the demand and need for a crime prevention initiative.

According to USAonWatch, they formed the first neighborhood watch compound in 1972 [6]. This due to an increase of crimes in the late 1960s, which culminated the need for a crime prevention initiative. As a result of this, the National Neighborhood Watch Program was created. The fundamental idea behind the program was to heighten the involvement of the citizen, to inform the citizen about the burglaries occurring in their neighbouring area and to minimize the bystander effect. However, there are records which states that the first organized neighborhood collaboration started in Portland, Oregon, USA already in 1966 [7]. That initiative was a collaboration between the Police Department and a crime prevention committee which were created by the residents. Nevertheless, the one created by USAonWatch in 1972 is often seen as the first compound due to it being documented in detail, unlike the one in Portland. Further examples of early established neighborhood watch compounds are Home Watch which was created in the United Kingdom in 1982,

In 1985, neighbourhood watch came to Sweden when the municipality of Linköping adapted the concept [8]. Since then, Grannsamverkan has spread across the country

and today many Grannsamverkan compounds exists in municipals all across Sweden.

2.2 The Swedish Police Authority

As mentioned, the Swedish Police Authority is one of many actors behind Grannsamverkan and a part of SAMBO. In order to deter burglars from break-ins, the involvement of law enforcement is of utter importance. In addition to this, one of the Swedish Police Authority's prime responsibilities and ambition is working for crime prevention and they have several methods to achieve this, Grannsamverkan being one of them [9].

Grannsamverkan is nationwide, but despite that it is being utilized in many different ways. Except it being a crime prevention method for the authority, no restrictions regarding usage exists. However, there are some guidelines on how it should be utilized from the perspectives of the authority. These guidelines include (1) carrying out training about crime prevention to the representatives from each residential area, (2) order materials, such as signs and stickers, to all active compounds, (3) keep a current list of contact information for each representative from each residential area, (4) providing local crime statistics and inform the representatives of any increase in local crime activities, (5) gather representatives once a year in collaboration with the municipality to discuss the collaboration as well as inform about burglary prevention, and (6) provide the opportunity for residents to tag their belongings and ensure the resident representatives receive this information for relaying to residents [10].

When a compound is founded the residents within that compound are offered a start-up meeting which is held by the Swedish Police Authority. The purpose of the meeting is to present the meaning of Grannsamverkan, how the residents can protect their home and establish a contact with the representatives of the compound [2].

2.3 The Problem

In order to have a functioning Grannsamverkan it is of high importance that all parties involved actively work towards the same goal; crime prevention. In order for this to be achieved, all parties must have the proper prerequisite. One component which needs to be considered is the commitment of the local residents within each compound. In a report by Ove Svensson, he describes the success and work effort behind the implementation of two separate Grannsamverkan compounds in multifamily buildings in two different areas in Halland [11]. The report emphasizes, among other things, the strong commitment of the locals in the Sörse area and their efforts to foster community solidarity. However, residents who were interviewed said that after a while, when the job had become more routine, both the Swedish Police Authority and the municipality discontinued their support. One might contemplate why this is the case.

Another component which needs to be considered in order for Grannsamverkan

to be properly functioning is the Swedish Police Authority. Firstly, it needs to be studied what they need in order to carry out their responsibilities towards the compounds. One aspect of this is whether they have the right tools to support them in their work, for example, digital tools. If the Swedish Police Authority find themselves not having the the right prerequisite, it could affect Grannsamverkan and its compounds in a way which could discontinue their support towards the concept. As a matter of fact, the Swedish Police Authority have expressed that as of today the administrative process is being insufficient and an essential part of the thesis project is to investigate in what way. The Swedish Police Authority have expressed a wish to revise and strengthen the administration in some way, but as of now it is uncertain how. There have been discussions within the Authority about introducing a portal which would digitize the administration process and also be used nationally, meaning that all of the municipalities of Sweden would work alike.

Today, there exists various digital platforms which both supports the Swedish Police Authority in their work and the representatives of the compounds and their neighbours. However, they are not developed for the Swedish Police Authority in particular but mainly for the residents and representatives in the various compounds. Thus, the situation today is that it does not exists one solution which fits all. Additionally, there is no digital platform that has been created with the authorities and its administrative procedure in mind. Each municipality in Sweden has a unique method for organizing and carrying out the responsibilities related to Grannsamverkan. Some use already-existing platforms, some have partially digitized the process using tools like Microsoft Excel, and some are still using paper and pen. The issue arises when the number of compounds increases and the manual and semi-manual methods become unworkable. The process of managing all of the different parts which are included in the guidelines for the Swedish Police Authority regarding Grannsamverkan, listed in Section 2.2, becomes overwhelming for the authority.

The Swedish Police Authority agrees with what Ove Svensson mentioned in his report. After some time the support from the Swedish Police Authority could be discontinued due to the problematic circumstances with a non-existing digital platform. Anneli Svensson, a police officer in the municipality of Falkenberg who actively work with Grannsamverkan, expresses how her work is heavily affected negatively by the administrative process being so insufficient [12]. She admits that her duties toward the compounds are not carried out correctly, for example the yearly meetings with the representatives are not always held. Neither are providing the compounds with information regarding, for example, local crime activities. This is clearly seen as problematic due to Grannsamverkan being one of the strategies which the Swedish Police Authority uses in their crime prevention work.

2.4 Related Work

There are currently two applications available that serve as tools for law enforcement and residents to prevent crime in Sweden. CoSafe Technology AB created CoYards after consulting with the Swedish Police Authority, neighborhood watch

compounds, anti-crime organizations, security professionals, insurance companies, and local governments [13]. CoYards was designed to provide a forum for residents to interact with both law enforcement and one another. The technology, which is based on a mobile application, intends to strengthen neighborhood cooperation by boosting security and using more effective approaches. Ellen Berglund Molin and Clara Nilsson wrote a thesis in the field of criminology in 2019, the subject of the thesis was to find out if Grannsamverkan was made more efficient with the help of digital tools [14]. The thesis focused entirely on the CoYards application and to what extent it has impacted the work regarding Grannsamverkan in the municipality of Staffanstorp. The thesis shows that interacting with Grannsamverkan compounds has been streamlined and made simpler by using Coyards, mainly because the communication has become more efficient. However, CoYards is owned and managed by a profit making company, making it difficult for authorities to utilize the application as their main tool for their work with Grannsamverkan. This due to the financial interest of the company behind CoYards. Therefore, there have been discussions within the Authority how right or wrong it is to use such an application. Police officers are not encouraged to use the CoYards application, however, the ones which have already implemented it into their work routine can continue utilize it.

On behalf of SAMBO, SSF has created the application “SSF Grannsamverkan” which serves the same purpose and have similar functionality as CoYards. In contrast to CoYards, police officers are encouraged to use this application in their work with Grannsamverkan. Although this application is developed by one of the actors involved in SAMBO one might expect it to be utilized nationwide. Despite that, this is not the case. According to SSF themselves, the application does not meet the standards of today and they do not have the resources to finance the application in a desired way [15]. Additionally, Lina Nilsson, the chairperson of Grannsamverkan, discusses how this is the application’s bottleneck and why it has not received the distribution it was intended to. Furthermore, since the application can not be maintained it has been discussed within SSF and SAMBO to liquidate the application.

In addition to this, there exists standalone applications which serve as communication tools for neighboring areas. One example is Safeland which is created by the company with the same name and has developed their application mainly for their costumers [16]. Safeland focuses on home alarm and the application serve as a complement to the their alarm systems. However, one can use the application even though one is not a customer to Safeland. Safeland have therefore created their own neighborhood watch concept and advocates that crime prevention is best done by the neighbors and not by law enforcement or any other security services. The fundamental idea of the application is that police officers and guards will never be able to be there to prevent a break-in. However, neighbors can counter it much more effectively. Unlike CoYards, the Safeland application do not have an active cooperation with law enforcement and therefore they are not relevant for this thesis more than acting as inspiration for new ones.

3

Theory

This chapter aims to present and describe the theoretical aspects of the thesis. It covers theory regarding the neighbourhood watch, collaboration between authorities, the Swedish police authority's goals for 2024, the new law "Municipalities against crime", digitization and social media within authorities. Additionally, it will cover the two fields Requirements engineering and Interaction design.

3.1 Effects of Neighborhood Watch

Trevor Bennett, Katy Holloway and David P. Farrington writes in their paper *Does neighborhood watch reduce crime? A systematic review and meta-analysis* about their findings on the effects of using neighborhood watch as a crime prevention tool [17]. The findings differed, but a conclusion could be drawn, neighborhood watch reduces the number of crimes in residential areas. However, there is a need for more high-quality research in order to untangle why the findings differ depending on the scheme and study.

According to SAMBO there is a significant decrease of break-ins and other crimes in residential areas when using the concept of Grannsamverkan [8]. More specifically, when using the concept, the risk of crimes in neighbourhoods is 36% lower than if the concept is not used. Furthermore, Brå states that crimes are reduced by 16% to 26%, depending on the method being used for the measurement, when the concept of Grannsamverkan is being used [18]. Furthermore, 19 out of 20 thieves say that they prefer to avoid areas with Grannsamverkan. These statistics prove that the concept of Grannsamverkan has a significant impact in terms of crime prevention. Therefore, it is of high importance that every part of Grannsamverkan is both reliable and functioning.

According to a report written on behalf of Brå, crime involving housing fell by 8% 24 months after a Grannsamverkan-compound was formed compared to 24 months prior to the start of the compound [19]. Furthermore, it is mentioned that the risk of burglary within a compound increases heavily during a short period of time after a burglary in the local area has recently occurred. The importance of each actors responsibility regarding crime prevention is brought up. From the perspective of the Swedish Police Authority, the communication with the compounds plays an important part in this. If they can inform their compounds about the recent crime-related events the neighbours within that area becomes more attentive regarding

unusual behavior and circumstances. When law enforcement have the right tools to keep their compounds up to date and informed about recent events, situations like this can most likely be prevented.

3.2 Collaboration for Crime Prevention

Collaboration between parties, such as authorities and nonprofit organizations, provides added value and it is likely that the effort gains a common focus and becomes more effective as a result [20]. Furthermore, the key component of a collaboration and what distinguishes collaboration from other types of work is the shared goal between the parties [21]. The parties within the collaboration can have several goals, and may not share all of them, although it is usually necessary that they share at least one goal in order for the collaboration to be successful. Regarding this instance, the various parties of SAMBO have their own interests and goals of the collaboration, though the shared goal is to prevent crime.

Early examples of collaboration between authorities date back to the 1970s [22]. Then, it was mostly social services and healthcare working together. Today, the collaboration phenomena has evolved, meaning that a collaboration most often consists of several parties and is found in various business areas. Mikael Löfström lists the three main motivations for the use of collaboration, which have been found in several investigations; (1) to achieve a more efficient use of resources, (2) that the authorities must respond better to the needs of groups at risk, and (3) to increase the influence of citizens as well as local actors [22]. All of the incentives can be used to demonstrate the value of the thesis work. The meager resources available to the Swedish Police Authority, along with the resources from the various actors of SAMBO, can be used to their fullest potential with the collaboration that SAMBO provides. Additionally, it takes into account the requirements of groups at risk as well as ways to strengthen the impact of local actors and citizens. As an illustration, Brottsofferjouren, a nonprofit organization, is the newest member of SAMBO and aims to improve the lives of crime victims, witnesses, and their families. When it comes to the requirements of groups at risk, they bear a heavy burden in the work done by SAMBO.

A report created on behalf of BRÅ in 2013 evaluates an agreement between the Swedish Police Authority and the municipalities of Sweden regarding collaboration [23]. In 2008 collaboration agreements between the Swedish Police Authority and the municipalities of Sweden were presented, where a few years later *almost* all of the municipalities had signed the agreements. The objective of the agreement was to provide a framework for the actors in order to work together on local crime prevention. For example, it specifies which criminal issues to collaborate on and what different prevention measures each actor should carry out.

3.3 Crime Prevention

The ambition and goal of the Swedish Police Authority is to decrease criminality and maintain a secure society [9]. In order to achieve this, they have decided on three main duties and obligation; crime prevention, investigation and prosecution, and service [24]. Crime prevention, which is one of the three, includes several methods and actions in order to carry out this duty and obligation. One important aspect of the crime prevention work is to be seen and to be present out in the public. Attending football games, be seen in public places, and be out in the traffic are a few examples of such actions. However, police officers can not be everywhere at every time, since they have limited resources and limited manpower. Therefore, initiatives like Grannsamverkan has been introduced, where volunteers support the Swedish Police Authority in their work for crime prevention. Furthermore, four main strategies exists within crime prevention and Tim Hope account for one of them - community prevention [25]. Community prevention refers to the crime prevention related to residential areas and it aims to change the social conditions within these areas which sustains the crimes. As stated several times, neighborhood watch is crucial for the success of the crime prevention work. Hope exemplifies this by saying that members of a neighborhood watch compound are more likely than nonmembers to report a crime to the police. In light of this, it is crucial that community prevention remains and all parts related to crime prevention is maintained, in this case the concept of Grannsamverkan.

3.4 July 2023 - Municipalities against Crime

On the 28 of November 2019 the Swedish government decided that the crime prevention responsibility of the municipalities in Sweden were to be investigated [26]. The mission of the investigation was to examine and evaluate the various activities that municipalities in Sweden could undertake to aid in the work to prevent crime. The outcome of the investigation was the suggestion of a new law which implies that the municipalities in Sweden should contribute to society's work to prevent crime by performing certain tasks and to take certain responsibility for the coordination of local crime prevention work.

The proposition submitted by the government to the Swedish parliament stated that crime needs to be countered with effective crime fighting as well as preventive measures [27]. Further declaring that the municipalities have a particularly important role in society's overall crime prevention work. Wanting to ensure that municipalities work with said issues in both an efficient and knowledge-based way, and therefore proposed that the municipalities responsibility for crime prevention should be regulated by law.

According to the new law, municipalities will need to develop a situational picture of crime and based on it decide on the need for measures as well as an appropriate action plan. Further, local crime prevention efforts must be coordinated by the municipalities, who should establish a coordinating function as well as assume

responsibility for its implementation.

3.5 Strategy 2024 - Goals and Initiatives

The Swedish Police Authority, together with other authorities within and outside of the judicial system, are constantly working to reduce crime and improve public safety[28]. As a way to clarify a transition to a new phase the Swedish Police Authority developed what they call, “Strategy 2024”, back in 2020 [29]. The strategy describes the authority’s vision, goals, mission statement and strategic initiatives for the year 2024. Strategy 2024 is to be adapted nationally as well as locally. Therefore, regions and police departments in Sweden have developed their own local strategic orientations in order to contribute to the goals set by the strategy. The following three objectives outlines the overall goals for the Swedish police authority,

- Successful law enforcement and investigation
- Strong local presence
- Attractive workplace and partner

Further, the authority have five national strategic initiatives to lay the foundation for the success and increase the strategic and operational capabilities. The initiatives are,

- Attract and keep employees
- Digitize
- Streamline and collaboration
- Improve and future-proof
- Expand the citizens’ meeting

Focusing on the Digitize initiative, the authority elaborates on adapting to new technology to increase its effectiveness and refers to information technology allowing a modern and resource-efficient interaction between citizens and the police. Further, using automation to simplify and streamline processes for both the public and police staff is essential in order to achieve the goals of the authority. In addition the Police Authority highlights collaboration with municipalities, other authorities, business world as well as the not-for-profit sector should be based on both clarity and with respect to the varied roles of the actors. They add that the polices meeting with citizens should be characterized by openness and a high accessibility where the police also must strive for internal efficiency through digitization.

3.6 Digitization and Social Media within Authorities

The rapid technology development in recent years and the large-scale digitization of our society has affected and affects public authorities all over the world [30]. Adapting to the current state of technology takes both time and effort, and comes with various new challenges. An Australian policing strategy called Project Eyewatch has been described as an online version of Neighbourhood Watch as it utilises Facebook to encourage communities participation in raising awareness regarding neighbourhood crimes [31]. Having Facebook as the primary communication platform, the need of having in person meetings reduces since the community can interact with the police directly via Facebook. The strategy was first introduced in New South Wales, Australia, in 2011 due to constant criticism towards Neighbourhood Watch for failing to reduce crimes and having minimum interactions with the communities. The authors Andrew Kelly and Amalie Finlayson conducted a study, *Can Facebook save Neighbourhood Watch?*, in order to evaluate the efficacy of the strategy [31]. They found that Project Eyewatch has the potential to conquer the problems surrounding Neighbourhood Watch, and requires active community participation and police interactivity. However, in practice the strategy has failed to deliver according to the authors. This is partly due to the climate of social media, limiting the engagement of the police as well as the problems arising regarding sharing personal information on the internet.

Moreover, Kevin Walby and Courtney Joshua describes in their article *Community crime prevention and crime watch groups as online private policing* their study on 35 online community crime prevention groups in Canada [32]. They gathered data from Facebook, amongst others, and analysed the content posted in the groups to search for types and trends communicated within the groups. Their findings were that even though the groups contributed in bringing the community closer in their aim to reduce crimes, the focus had shifted from crime prevention to a focus on fear as well as intense reporting. By focusing on fear the authors reported that the groups encourage discriminatory practices as well as vigilantism.

3.7 Requirements Engineering

Instead of focusing on *how* something is designed, Requirements Engineering focuses on *what* needs to be designed [33].

The paper *An Insight into Requirements Engineering Processes*, by Mohd Sadiq and S. K. Jain describes the meaning of Requirements Engineering to be; defining the goals, requirements, that a system should achieve [34]. Users' and stakeholders needs are researched and translated into requirements and then specified in a requirements specification, which is a document that outlines the functionalities a system must have. This can be specified in different styles, such as; diagrams, tables, or in text format. The specification is delivered to the developers to implement the requirements in a system. Furthermore, a specification can be updated and changed during

the development of a system, which is called requirement maintenance.

There exists multiple different types of requirements, Soren Lausen describes many of them in his book *Software Requirements Styles and Techniques*, where the two main categories are Functional Requirements (FR) and Non-functional Requirements (NFR) [35]. NFR specify the *quality* of a system while FR specify the *functionality* of a system. For example, a Map application may have the following NFR, “the system should be efficient enough to load the map within 2 seconds”. Further, some examples of FR could be, “The user can search for streets”, “The application has a search-bar” and “the user can tap on a place on the map to receive the address”. Further, Lausen mentions that Functional requirements work as a way to specify what data should do in a system and continues to describe a system’s user interface as a significant part of visualizing different types of data.

One dimension of FR are Business goals which are defined in the early phase of a project, usually in collaboration with the stakeholders [35]. It works as a form of success criteria and its by the creation of requirements these business goals can be achieved, one example could be “Provide a system to increase the interest towards cars”.

3.8 Interaction Design

In 2004 Jonas Löwgren referred to Interaction Design in his book *Thoughtful Interaction Design: A Design Perspective on Information Technology* as “...the process that is arranged within existing resource constraints to create, shape, and decide all use-oriented qualities of a digital artefact for one or many clients” [36]. Since 2004 technology has come a long way, however, a lot of the principles of interaction design have remained similar. In 2021 Interaction Design Foundation described Interaction Design to be an essential factor under the broad heading of user experience (UX) design and further explained Interaction design as “.. the design of the interaction between users and products” [37].

Alan Cooper discusses the concept of Interaction design thorough in his book *About Face: The Essentials of Interaction Design* and states that interaction design is “the practice of designing interactive digital products, environments, systems and services” [38]. He further elaborates that Interaction design, unlike other traditional design disciplines, puts emphasis on “the design of behaviour”. The world is continuously becoming more and more complex, and so are the objects surrounding us. Cooper means that these objects are complex objects and they have given rise to the newly disciplined Interaction design. Further, Cooper describes that Interaction design borrows techniques and theory from other more traditional design disciplines as well as engineering disciplines. But he also emphasises the inclusion of unique techniques and procedures within Interaction design such as Goal-Directed Design. The method is based on focusing on the user’s goals, expectations, and attitudes, in other words, the motives behind a person’s initial use of a product.

4

Methodology

In this chapter, the methods which will be used in the thesis will be presented and motivated. Additionally, it combines techniques from the fields of interaction design and software engineering, with the majority of the techniques coming from interaction design. The first method presented in this chapter will act as framework for the project, meanwhile the following sections will describe what type of methods will be used in the various phases.

4.1 The Double Diamond

The Double Diamond design model was introduced by the Design Council of the United Kingdom in 2005 and acts as visual representation of the design process [39]. It is used as a guideline for the whole process and can be used regardless of what design tools and methods is used during the process. As can be seen in Figure 4.1, the design model consist of two diamonds which itself is made up of four phases.

Discover is the beginning of the first diamond and is the phase where the scope of the project will be broadened. This is necessary in order to gather information and understand, rather than assume, what the problem is. This can be done in various ways, including speaking to people concerned and affected by the problem. Overall, the Discover Phase serves as a critical starting point for any project, providing the necessary foundation for success by broadening the scope of the project and ensuring a deep understanding of the problem at hand.

Define is when the first diamond closes and is where the scope will be narrowed based on the findings and insights from the Discovery Phase. The challenges in the project can be defined in a more distinct manner than before. In addition to defining the project scope and objectives, the Define Phase may also involve conducting further research or analysis to identify potential solutions to the problem at hand.

Develop is the beginning of the second diamond and is where the scope of the project once again will be broaden, this time in order to create and evaluate solutions or concepts. One is encouraged to give different answers to the problem in this phase. This could involve challenging assumptions and exploring new perspectives that may lead to breakthrough solutions. Iterating on solutions is vital, as it allows the team to refine and improve ideas based on stakeholder feedback and testing results, ensuring a well-designed, effective, and goal-aligned final solution.

Deliver is when the second diamond closes and the project is finalized, produced and delivered. This is a critical stage that involves rigorous testing and quality assurance to ensure that the final product meets the project's goals and objectives. One important aspect of the Deliver Phase is the ability to test solutions at a small scale, allowing for identifying any issues or shortcomings before a full-scale launch. This helps to minimize risks and ensure that the final product meets the needs of the target audience. During this phase, it's important to be open to feedback and to reject any solutions that do not meet the project's requirements. This can be a difficult decision, but it's crucial to maintain a focus on the overall project goals and to ensure that the final product is of the highest quality. By focusing on quality and stakeholder feedback, it can be ensured that the final product is successful and delivers value to the stakeholders.

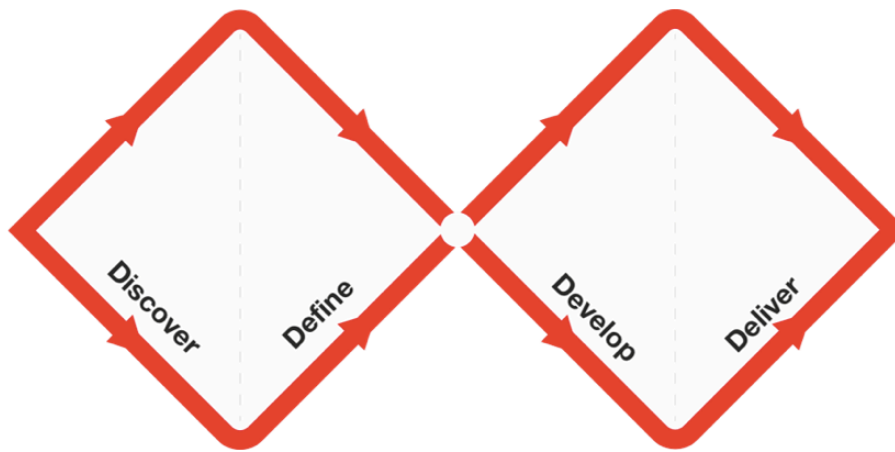


Figure 4.1: The Double Diamond Design Model.

4.2 Brainstorming

In order to have a successful brainstorming session, Soren Lausen states in his book *Software requirements: Styles and Techniques* the importance of creating a stimulating setting where ideas can flow freely without the risk of being criticized or degraded [35]. After the session, discussion regarding the ideas occurs as well as a prioritization of the ideas.

The first chapter of the book *Brainstorming and Beyond, A User-Centered Design Method*, by Chauncey Wilson, goes a bit more in depth regarding brainstorming and discusses the more complex aspect of the method [40]. Wilson brings up the same steps for brainstorming as Lausen, but further highlights the importance of wild and crazy ideas. Further, he emphasizes the use of brainstorming when there is a desire to generate ideas, find solutions to problems and as a method to come up with requirements. Brainstorming sessions can, with advantage, be used multiple times throughout a project as a creative method to move forward in a project.

4.3 Stakeholder Analysis

In her article *Stakeholder Analysis Guidelines*, Kammi Schmeer describes a stakeholder analysis as a thorough process for gathering and analyzing qualitative data to determine which individuals' interests should be taken into consideration when developing programs and systems [41]. Furthermore, she points to the success rate of projects being increased when a stakeholder analysis has been used to guide the implementation and progress.

Lausen describes the process of conducting a stakeholder analysis as essential for every project or organization in order to succeed [35]. It is done in order to identify who the stakeholders are, understand their needs and to prioritize them. A stakeholder is any individual or group that has an interest or is affected by an organization's activities, decisions, or outcomes. These stakeholders can be both internal or external to the organization and can include employees, customers, suppliers, shareholders, government agencies, and local communities.

According to Lausen, when conducting a stakeholder analysis one should try to find and specify the answers to the following questions:

- Who are the stakeholders?
- What goals do they see for the system?
- Why would they like to contribute?
- What risks and costs do they see?
- What kind of solutions and suppliers do they see?

In order to gather this information, Lausen discusses the concept of constructing focus groups with the stakeholders where their needs and priority issues can be discussed and established. If necessary, one can also construct individual interviews with the stakeholders to receive the information.

4.4 Data Collection

In order to understand the needs of the users it is essential to gather data and is a crucial part of any project. Various methods exist in the categories; quantitative data collection and qualitative data collection. Below, the chosen methods is presented and elaborated.

4.4.1 Survey

A way of collecting quantitative data is to conduct a survey. In order to conduct a survey, one can make use of questionnaires. Lausen describes two paths the aim of a questionnaire can take, where one direction is to receive statistical support for a hypothesis and the other to gather thoughts and perspectives from participants [35].

Tomoko Nemoto and David Beglar discusses guidelines for developing substantial questionnaires in their article *Developing Likert-Scale Questionnaires* where they highlight likert scales and their use in questionnaires [42]. They point out the usefulness of evaluating effective variables, such as motivation and attitudes, using likert scale questionnaires. They further elaborate on the importance of not only relying on likert questionnaires but instead combining it with other data gathering methods in order to achieve a well rounded outcome.

4.4.2 Interviews

Interviews can be organised in various ways, Sharp outlines the differences between structured-, unstructured- and semi-structured interviews [43]. The distinction of the types are based on how much the interviewer steer the conversation. In structured interviews, the interviewer directs the dialogue significantly, whereas in unstructured interviews, the conversation can flow more naturally. Semi-structured interviews are a mix between the two, where some parts of an interview can be more structured and other less structured.

Chapter six in *A Handbook of Research Methods for Clinical and Health Psychology*, by Fiona Fylan, describes semi-structured interviews as a conversation where the interviewer has a clear goal of what he or she want to find out, having a focus on covering topics rather than having a list of questions [44]. This allows the interview to have a more natural flow and gives the interviewee room to express his- or herself as well as further resulting in the possibility of conversations looking different from interview to interview. However, semi-structured interviews can vary a lot and be more or less structured. Fylan points out the need of reflecting on the future analysis method before deciding on the interview format. For example, if searching for coding frames is part of the analysis, such as in thematic content analysis, the semi-structured interview should have more structure in order to make the analysis smoother.

Another author who brings up the use of codes, or themes, when analysing semi-structured interviews is William C. Adams in chapter nineteen of the book *Handbook of Practical Program Evaluation*, called *Conducting Semi-structured Interviews* [45]. He further showcases semi-structured interviews as a good compliment to questionnaires with close-ended questions, meaning that open-ended questions are well suited for semi-structured interviews.

Fylan describes some frameworks for when constructing semi-structured interviews, where she begins by stating to “keep it brief” and advises to have around five broad questions for the interview [44]. This to be able to easily keep track of what topics have been covered. She states that semi-structured interviews tries to find out “why” and that questions and topics should be aimed at what the participants think and feel regarding said topic. She advise to having prepared prompts noted down as a useful tool if a participant have a difficulty in expressing themselves, need encouraging or to steer the interview.

Both Fylan and Adams mentions the task of identifying and finding the right target

audience and participants for the interviews. Having participants with different opinions, backgrounds and experiences, ensures different perspectives to the questions asked. This is especially important since, as mentioned by Fylan, semi-structured interviews want to find out *why* and therefore broad range of different perspectives is preferred.

4.4.3 Focus Groups

Focus groups, according to Lausen, are similar to brainstorming sessions but with more structure [35]. Usually, it consists of several stakeholders within the project and the group is conducted early in the process to establish relevant grounds.

Sharp also point to the benefits of having focus groups consisting of stakeholders, she however further elaborates of the perks of using focus groups in a data gathering phase [43]. Indicating that a focus group works as a form of group interview. It typically consists of three to ten participants, each of whom represents a different viewpoint from the target demographic. By having a set agenda but enough flexibility to allow for discussions, unexpected issues and challenges faced by the participants can be noted and furthered examined.

Sue Wilkingson describes in her article *Focus group methodology: a review* that the flexibility of the focus group method is one of its primary strengths since it allows for a wide range of potential applications and can be used in different frameworks [46]. She further discusses that the use of a focus group is a good method when wanting to gather peoples opinions, views and perspective. However, some disadvantages to the method is that it can limit reliability and validity, due to different biases.

4.4.4 Interview Documentation

Common types of recording tactics for interviews are; notes, audio recordings and video recordings. Authors Blandford, Furniss and Makri of *Qualitative HCI Research Going Behind the Scenes*, highlights audio recordings as the most suitable for both focus groups and interviews [47]. This because it allows the interviewer to concentrate more on the interviewee rather than having to scribble down notes and instead be able to focus on the interviewee.

Further, recording interviews allows for more precise transcription which is crucial for a later analysing phase [47]. Depending on the quality of the data, the lengths of the silences, and the transcriber's typing speed, transcription of audio data often takes 4 to 6 times longer than the recording if one does it manually. Transcriptions can be done in different levels of detail, for example only when relevant themes and topics are discussed, or word by word.

4.4.5 Usability Inspection

Robert A Virzi describes in chapter 27, Usability Inspection methods, in the book *Handbook of Human-Computer Interaction*, a number of different usability inspection methods of interfaces [48]. He states that instead of relying on empirical methods,

such as collecting data or observing users interacting with a system, usability inspection methods focus on having judges with competence inspect and foresee potential issues and problems with a product. He continues to explain that the methods in practice have proven to be both dependable and cost efficient when evaluating usability.

One example of an Usability Inspection method is the Expert Review, where a person, who can be considered an expert in usability, is asked to judge and to find usability problems regarding an interface [48]. The method is motivated by the assumption that the expert, or experts, can spot potential problems with an interface due to having prior expertise in working with both users and the technology at hand. One thing that distinctives this technique from others is that the expert, or experts, are asked to work alone to search for usability problems with an interface.

Robert L. Mack and Jakob Nielsen mentions other methods of Usability Inspections such as the Feature Inspection, where the focus lies in the functionality provided by a software system [49]. For example whether a feature is developed to satisfy the requirements of the intended end-users. A function's design may also be examined as part of Feature Inspections, in addition to its evaluation.

An experiment conducted by Rolf Molich and Joseph S.Dumas had the aim of comparing the two usability evaluations Expert Review and Usability testing [50]. The authors had 17 professional teams evaluate the website for the Hotel Pennsylvania, were eight of the teams conducted Expert Reviews and nine of the teams did usability testing. Their findings revealed that out of the total 340 reported usability problems concerning the website, only nine were reported by more than 50% of the teams, meaning that even though there were only two different methods, the outcome varied even between the teams using the same technique. The study conclude that there was no real distinction between the teams doing usability testing and the teams doing expert reviews for the problems identified.

4.5 Data Analysis

The last step towards specifying the requirements is data analysis. This is when the findings of the gathered data will be discovered in more detail. There exist several techniques and methods to do data analysing and below it is presented what techniques and methods has been chosen for the thesis.

4.5.1 Thematic Content Analysis

Thematic Content Analysis (TCA) is a commonly used method in qualitative research for analyzing textual data such as transcripts of interviews or focus groups [51]. According to Braun and Clarke, TCA is a systematic and flexible method that involves identifying patterns or themes that emerge from the data [52]. This can then be used to draw conclusions about the research question or objective. TCA involves a rigorous process of coding and categorizing data, which requires a keen eye for detail and a systematic approach to data analysis. By identifying common

themes and patterns in the data, TCA provides a structured way of making sense of complex qualitative data and helps to uncover the underlying meaning and interpretation of the data. Overall, TCA is a valuable tool for researchers looking to gain deeper insights into their research questions.

4.5.2 Personas

Alan Cooper introduces the concept of a user persona in his book *The Inmates Are Running The Asylum* from 1999 [53]. He describes it as a fictional character, or as he calls them *hypothetical archetypes*, which are shaped and based on their goals. The personas represents the users throughout the design process. Furthermore, Helen Sharp elaborates on the content of a persona, she adds that it includes the user's activities, attitudes, behavior and environment [43]. She goes on to say that a good persona is one that can respond to any queries that begin with “who”, “what”, “when”, “where”, and “how”.

Cooper also discusses the importance of making software which will bend, stretch and adapt to the user, and not the other way around [53]. He points out that oftentimes the user becomes an *elastic user*, which refers to them being the ones whom will bend, stretch and adapt to the software. From the perspective of the developer, it truly is a comfortable situation since the developer can design and code as they prefer. To avoid this, personas are used instead and a developer can no longer refer to “the user” but has to consider a “very specific individual”. Therefore, it is crucial to make the persona as specific as one can in the matter of aspects which is important for the development of the system. Including information about the users which is out of the scope of the system could instead imply a great risk in terms of violation of personal integrity. With this in mind, the design tool will be more effective if it is more specific. Cooper suggests that each persona is given a name and a picture. Consequently, the persona becomes more realistic in the minds of the developers.

4.6 Requirements Specification

In software development, specifying the requirements of a system can be done through themes, epics, user stories and tasks [54]. These four elements, provide a unique perspective on the functionality and features needed for a software system to meet the needs of its users.

The highest level of work of the four elements is a theme, under which all related epics, user stories, and tasks are subsumed [54], this is illustrated in Figure 4.2. A theme functions as a useful tool to indicate that a set of associated epics share a unifying characteristic, such as pertaining to the same functional domain. Epics are high-level statements that define a broad area of functionality that the system must fulfill. They break down the project into manageable pieces, which allows one to focus on specific areas of development. Furthermore, an epic refers to a vast narrative which exceeds the scope of a single sprint, thus making it impossible to deliver all at once [55]. To tackle such an enormous task, the epic is divided

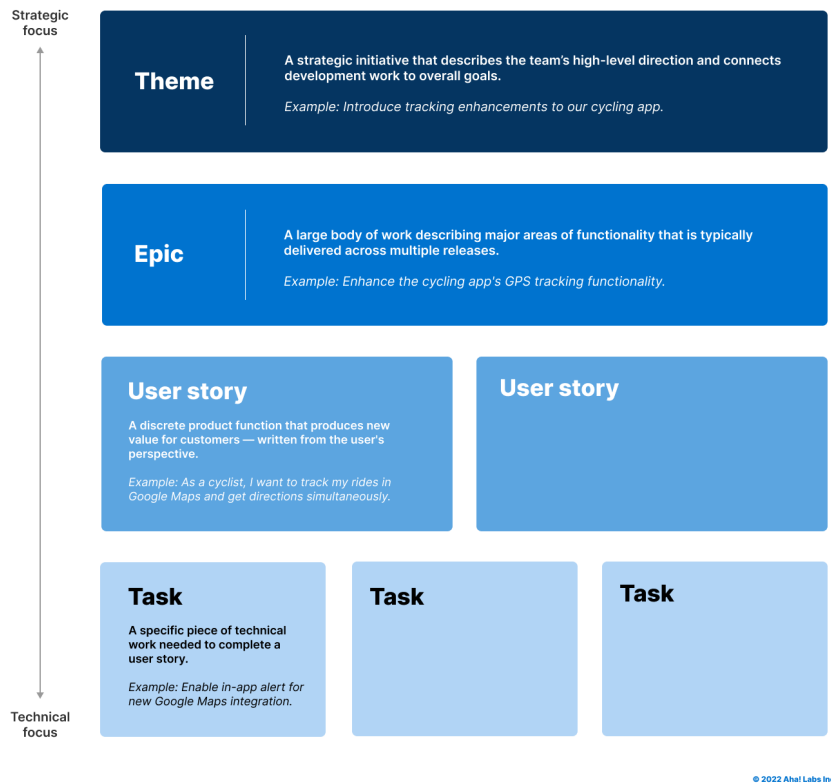


Figure 4.2: The Framework for Specifying Requirements by “Aha!” [54].

into smaller, manageable units of work known as user stories. User stories are more granular than epics and are used to define specific requirements from the perspective of the user. A user story follows a simple template that describes the user, the functionality they need, and the rationale for it. User stories provide context for the tasks required to implement them and help capture the needs of the system’s users. They can be developed and delivered within a single sprint as a production-ready product [56]. Tasks are the most granular of the four elements and define the specific actions required to implement the functionality described in the user stories [54]. They can be broken down into smaller pieces and assigned to individual team members. Together, themes, epics, user stories, and tasks provide a comprehensive framework for specifying the requirements for a software system. By breaking down the project into manageable pieces and focusing on the specific needs of the system’s users, these elements ensure that the system meets the needs of its intended audience and is developed efficiently.

5

Planning

The purpose of this chapter is to outline the overall project plan and provide details on the specific goals and objectives of each step in the process. The project consists of four phases; the Discover Phase, the Define Phase, the Develop Phase, and the Deliver Phase. Each phase will focus on a specific set of tasks, including data gathering, data analysis, developing, and evaluating. These tasks will be carried out in a continuous fashion, with each phase building upon the previous one to ensure a well-rounded and comprehensive final product. Additionally, it will be explained how the methodology, tools and techniques will be used in the various steps.

The chosen framework for this thesis is the Double Diamond design process. Due to the project being a pilot study, the Double Diamond was chosen over an iterative process since it provides a clear framework for structuring the various steps into distinct phases.

5.1 Discover Phase

As any other project, it is crucial to include planning in order to reduce uncertainty of the project and heighten the possibility for project success [57]. Therefore, a planning stage will be included in the Discover Phase which will consist of a literature review and a stakeholder analysis. Furthermore, in order to broaden the scope of the project, it is necessary to both do thorough research and engage in various information-gathering activities. One effective method is to involve individuals who are directly impacted by the problem, as they can provide valuable insights and perspectives. This will be done in terms of a survey and using a focus group.

5.1.1 Literature Review

A literature review is an important aspect of any research project and it will serve several purposes in this thesis. Firstly, the literature review will help to provide a comprehensive understanding of the research topic as well as its historical and current context. It will also help to identify gaps in the existing knowledge which then could result in a research question which address these gaps. Additionally, the literature review will help to establish the theoretical framework and research methodology for the thesis. Therefore, a comprehensive literature review will be done before going any further in the project.

5.1.2 Stakeholder Analysis

After conducting a literature review, the next step will be to identify the stakeholders of the project. In order to do so, a stakeholder analysis, which follows the format by Lausen, presented in 4.3, is planned to be performed. Since the Swedish Police Authority is in fact a Swedish authority, several potential stakeholders can be excluded before entering the stakeholder analysis. The Swedish government is responsible for what the authorities do and they direct the authorities on what type of work they should operate [58]. In addition to this, the authorities are funded by the government which in turn is funded by taxes. Therefore, there is a great public interest in how the resources are spent within the authority. Due to this, the Swedish Police Authority has internal guidelines which state that they should act impartially, and therefore it could be considered unethical to publicly support products created by for-profit companies [59]. The above factors implies that the Swedish Police Authority not only acts as employee in the project but also customer, supplier, shareholder, and government agency.

Since the project have several parties involved already, referring to SAMBO and the Swedish Police Authority, the aim of the stakeholder analysis is to understand the various parties involvements, roles, interests and goals. Each actor within SAMBO will be contacted and questioned about their role and what responsibilities they have towards SAMBO and Grannsamverkan.

5.1.3 Survey

As a first step to collect data it is planned to conduct a survey in terms of a questionnaire. Following the recommendation from Lausen, as presented in Section 5.1.3, the aim of the survey will be to gather information and perspectives from the target audience. The participants of this survey will be police officers all over Sweden working with Grannsamverkan. This in order to get more insight into their procedures, needs and to understand the problem at hand. Collecting quantitative data will be important since the outcome of the thesis aims to be one solution for all, regardless of location and work procedure. Since the project has a time constraint and a limited manpower it is not feasible to interview every police officer working with Grannsamverkan, which is estimated by the authority to be around 150 people. Hence, a survey would be a great approach to get more stakeholders involved in the project.

As mentioned, the questionnaire will be sent out to police officers working all over the country. It will be made with an internal survey tool that is commonly used within the authority. Taking inspiration from Fiona Fylan's book *A Handbook of Research Methods for Clinical and Health Psychology* regarding design and shape interviews, the questionnaire is, beside demographics, planned to focus on three topics [44]. They are: their duties regarding Grannsamverkan, tools utilized to execute these duties, and their attitude towards the administrative process regarding Grannsamverkan.

5.1.4 Focus Group

The focus group for the thesis project consists of three people working in different fields within the Swedish Police Authority, all with a connection to Grannsamverkan. Anneli Svensson works as a municipal police officer, with one of her many commitments being Grannsamverkan meaning that she is responsible for all of the administrative work regarding Grannsamverkan. She is also responsible for conducting crime prevention and safety work with a strategic perspective. One of her main tasks is to ensure the existence of a collaborative agreement with the local municipality and to drive the process from a shared situational assessment to activity plans and citizen commitments. Damir Celebic is a police officer working as an organizational developer at NOA/UC SYD which . He is involved with SAMBO and is the represented spokesperson on behalf of UC SYD as stated on the SAMBO website. Robert Möörk holds the job title of RIFA VL, Regional Implementation Responsible Management (Regionalt införandansvarig verksamhetsledning). Among his responsibilities, he has been involved in creating the new strategy for citizen meetings called the Citizen Meeting Strategy, see Section 3.5, where focus have been on communication and the involvement of citizens in crime prevention. He previously worked as a municipal police officer, where he was responsible for the administration of Grannsamverkan.

The group were selected to take part in the focus group due to being the projects initiators and their opinions and feedback will be important in order for the project to succeed. Two meetings will be held with the group throughout the thesis. This in order to receive feedback, discuss possible problems and, as Wilkinson mentions in Section 4.4.3; to obtain different perspectives moving forward.

During the Discover Phase, a presentation regarding the results of the questionnaire will be held, paired with upcoming questions and discussion topics for the group. The outcome of the meeting will hopefully be helpful feedback in terms of advice and inputs regarding the direction of the thesis and what can and can not be done in terms of internal guidelines within the Swedish Police Authority.

5.1.5 First set of Interviews

So called “Kommunpolis” (municipal police officers) and “Områdespolis” (area police officers) from all over Sweden will be amongst the interviewees. This since they usually are the ones responsible for the activities related to Grannsamverkan in their municipal. As mentioned in Section 5.1.3, a questionnaire will be sent out to the personnel actively working with Grannsamverkan within the Authority. The questionnaire will include a question at the end asking if the participants want to participate in an upcoming interview. Further meaning that the sample of participants will depend on the interest and time of the police officers. Since the participants will be located all over the country, the interviews will be held online using the in-house communication software that provides instant messages, voice chats and video calls.

The interview format will be semi-structured interviews and will consist of three main topics, following Fylan’s guidelines regarding the structure presented in Section

4.4.2. The topics is as follows; the interviewees thoughts and opinions regarding the concept of Grannsamverkan, a reflection of their job duties and a reflection of the aids they use to administer Grannsamverkan. The aim of the interviews is to get an overview of the routines of the police officers and their opinions regarding their work and aids. The interviews will further end with an open-ended question were the interviewees will be asked to think freely and bring up their own thoughts and opinions of the subject of a digital tool for Grannsamverkan. The choice of using semi-structured interviews is due to its compatibility with the analysis method thematic content analysis. The aim of the analysis will be to find and search for problems with the administration of Grannsamverkan, but also what it is that works with the current administration.

Before conducting the actual research interviews, a pilot interview will be held with one of the police officers who took part in the survey. The primary purpose of the pilot interview is to identify and address any issues with the interview questions, such as ambiguous or confusing phrasing, and improve the overall quality of the study design. Through the pilot interview, the clarity and relevance of the interview questions, and the reliability and validity of the collected data can be ensured.

In order to transcribe, and further analyse, the interviews need to be recorded. An internal tool video-editing tool with a recording feature, commonly used within the Swedish Police Authority, will be used to do this. In order to get an overall picture of the interview, and to be able to read possible non verbal cues, both video and audio will be recorded during the interviews.

Furthermore, the interviewees will be asked to give their consent to having their interview recorded for future transcription. If interviewees do not wish to be recorded their interview will be noted by pen and paper. In such cases key points of the interview will be compiled and put together after the interview.

5.2 Define Phase

The second phase, the Define Phase, aims to analyse the collected qualitative data from the previous phase. The result of the analysis will be used to create personas which will later be used to create requirements.

5.2.1 Thematic Content Analysis

In order to extract relevant and valuable information from the interviews, the data will be analyzed with the TCA approach. This will allow for finding themes, codes and patterns within the answers. The transcribed interviews will one by one be thoroughly read and recurrent themes and patterns will be highlighted and documented. Further, codes within the themes will be searched for and analysed. In addition to this, the outcome of the TCA will be used to look for correlation between and among the data.

5.2.2 Personas

Once the data has been analyzed, the next step is to create personas, which will represent the different types of users which has been encountered in the project. The personas will be based on the data collected during the Discover Phase and they will provide a way to visualize and empathize with the needs and behaviors of the target audience. The personas which will be created in the Define Phase are an essential tool for developing requirements in the next phase of the project. By understanding the needs and goals of each persona, it can be ensured that the system meets the needs of the end-users.

5.3 Develop Phase

The project will once again be broadened in the third phase, the Develop Phase. To fill in the gaps that may have arose during the previous phase, the Define Phase, qualitative data will be collected through another set of interviews. Additionally, the Develop Phase will include its most distinct segment: developing requirements.

5.3.1 Second set of Interviews

A second set of interviews, with new participants, is planned to be held after the data from the first set of interviews has been analyzed. This in order to answer any questions which may not have been answered during the first set of interviews. The interviews are planned to have the same structure and setup as the first set of interviews - semi-structured, held via the internal video-communication tool, recorded and transcribed. No subjects or question are planned in advance since the purpose of the interviews is to answer question which may arise during the project.

5.3.2 Developing Requirements

As stated in 4.6, the requirements specification of the system will be produced in terms of epics, user stories and tasks. As already mentioned, this is a common approach within software engineering and there is no difference at the Swedish Police Authority. The UX-designers and developers at the authority uses the same methodology in their projects, but with a minimal difference - “Theme” is replaced with “Portfolio Epic”. Since this thesis will be conducted at the authority, the intended deliverables will be adapted to align with their work practices. Therefore, their alternative framework, which can be seen in Figure 5.1, will be used. The structure of the framework is as follows: a **Portfolio Epic** will contain X **Epics**. Each of the X **Epics** will consist of Y **User Stories**, which in turn will consist of Z **Tasks**. In addition to this, the framework will follow the same structure which was presented in Section 4.6.

A project is typically broken down into several portfolio epics to make a complex project manageable. The following instructions will act as a guideline when formulating the various requirements into Portfolio Epics. A portfolio epic is a collection of work which should be implemented over a four-month period and eight sprints.

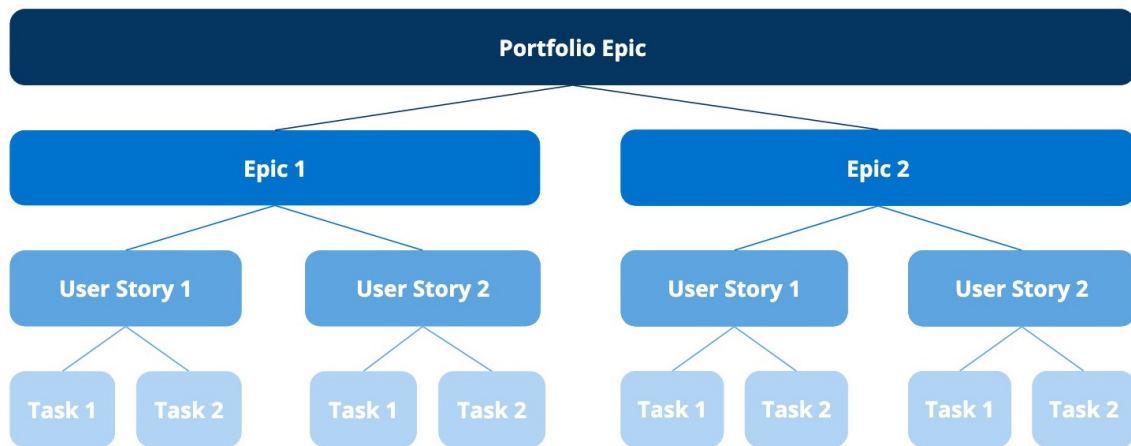


Figure 5.1: The Framework for Specifying Requirements used at the Swedish Police Authority.

An epic should be implemented within four sprints, which represents a two-month period. Lastly, a user story and its associated tasks should be implemented during one sprint, which spans over two weeks.

The requirements will be produced based on the findings from the Define Phase and the findings from the Develop Phase. Furthermore, brainstorming sessions will be carried out and several meetings will be held with a UX-designer at the authority to discuss ideas and possible solutions.

5.4 Deliver Phase

The Deliver Phase is the final phase of the Double Diamond and is where the project is narrowed down a final time. This is when the deliverables of the project will be presented, evaluated, refined and delivered. This includes an Usability Inspection and a Focus Group meeting.

5.4.1 Usability Inspection

As a way to test and validate the requirement specification which was established in the previous phase, a combination of the Usability Inspection methods - Expert Review and Feature Analysis - will be held. The aim of the Usability Inspection is to make sure that the requirements produced holds value and is considered relevant for the police officers administrating Grannsamverkan. It also provides an opportunity to make sure no important functionality has been left out of the specification.

The Usability Inspection will, as in an Expert Review, consist of an expert, in this case the expert is within the field of Grannsamverkan. The expert in question is stated as the contact person on the website of SAMBO, on behalf of the Swedish Police Authority. Further, she is responsible for the Grannsamverkan administration within her municipality. She has been selected to take part in the study due to her knowledge and involvement with Grannsamverkan. In difference to an Expert

Review, the chosen expert will not be presented with an interface or do the review on her own. Instead the focus will lie in the functionality and features of the system, as in a Feature Inspection. By conducting a presentation consisting of all the functionality within the system, the expert will offer feedback and comments which will be analysed and work as a base to update the system to increase its usability. The Usability Inspection will held online due to geographical differences between the interviewers and interviewee. Furthermore, the Usability Inspection will be recorded and later analyzed.

5.4.2 Focus Group

In order to conclude the project in a similar manner as it started, a Focus Group meeting is planned to be conducted. The purpose of the Focus Group meeting is to present the outcomes of the project in terms of the requirement specification. The meeting will offer a way for the system to be evaluated by the initiators of the project. As all of the previous interviews and meetings, the focus group meeting will be recorded and later analyzed in order to capture the insights and feedback provided by the participants.

5.4.3 Deliverables

As already stated, the deliverables of the thesis will be a set of requirements which will be formulated in several Portfolio Epics. The Portfolio Epics will be presented in tables in the Results chapter and an example of such table can be seen in Table 5.1. The Portfolio Epics and Epics will be descriptive titles and the user stories will have the following structure: “As a <user role> I want to <perform some task> so that I can <reach some goal>.” Every user story will contain some tasks which will vary in their technical debt; some will be very specific, while others will be more general. Having stated that, the tasks will not have a predetermined template.

Portfolio Epic							
Epic 1				Epic 2			
User Story 1		User Story 2		User Story 1		User Story 2	
Task 1	Task 2	Task 1	Task 2	Task 1	Task 2	Task 1	Task 2

Table 5.1: The Template for the Deliverables of the Thesis.

6

Execution

The previous chapters have established and elaborated on the foundation of the thesis in terms of theory, methodology and planning. The purpose of this chapter is to go further into detail on how those theories, methodologies and planning have been applied during the execution of the project. The project consisted of four phases starting with the Discover Phase and ending with the Deliver Phase.

6.1 Discover Phase

The first phase, the Discover Phase, consisted of a comprehensive literature review, a stakeholder analysis, a survey, data analysis of said survey, a focus group meeting and a first set of interviews. The literature review and stakeholder analysis provided a solid foundation for the subsequent research, allowing to develop a clear understanding of the research context, identify research gaps, and engage relevant stakeholders in the research process. In order to gather information and insights from potential users, three data collection actions was performed. They were; a survey in the form of a questionnaire, a focus group meeting with the initiator of the project, and interviews with police officers working with Grannsamverkan. These methods provided a wealth of valuable feedback, which have been analyzed in order to produce the requirements specification of the system.

6.1.1 Literature Review

In order to better understand the research area, a comprehensive review of existing literature was conducted. The literature review included areas such as; crime prevention within the authority, neighbourhood watch worldwide, digital tools for crime prevention, upcoming changes and strategies within the authority, and collaboration between authorities and non-profit organizations. Furthermore, a review of literature within the areas of requirements engineering and interaction design was also conducted in order to find the methodology most appropriate for the thesis.

6.1.2 Stakeholder Analysis

Since the thesis is being conducted at the Swedish Police Authority and the deliverables of the thesis include a requirement specification for a digital tool which will be utilized by police officers, it is implicit that the authority is a stakeholder in

this project. However, it was necessary to identify further potential stakeholders of the project, and this was done by conducting a stakeholder analysis. As has been stated in 4.3, the focus during the stakeholder analysis was on SAMBO. All of the various actors involved in SAMBO were contacted for a brief phone interview using a semi-structured approach. Everyone was reached except ICA Försäkring, who did not respond to either phone calls or emails. A presentation of the project were given to the potential stakeholders and the questioning revolved around one topic, their role within SAMBO. Follow-up questions were formulated and asked depending on the answers from the interviewee.

Out of 15 actors, two were found to be potential stakeholders of the project, in addition to the Swedish Police Authority: SSF, and Brottsofferjouren. Among these, SSF was the only actor within SAMBO, aside from the Swedish Police Authority, found to have administrative responsibility for Grannsamverkan. SSF is the principal actor responsible for maintaining anything related to SAMBO and Grannsamverkan, including the distribution of materials such as the familiar Grannsamverkan signs, which can be seen in Figure 1.1, social media management (including a website and a mobile application), budgeting, and financing. Furthermore, Brottsofferjouren was also identified as a potential stakeholder for the project. Brottsofferjourens ambition is that every civilian who has been exposed to crime, regardless of their involvement in Grannsamverkan, should be offered the right help and support. In order to succeed with this, it is essential that every civilian can find the information and support provided by Brottsofferjouren. With that being said, a future user interface, developed for the delegates in Grannsamverkan, should be provided with information regarding the kind of help and support Brottsofferjouren offers and how to get in contact with them. However, the scope of the project is limited to the development of the user interface for the Swedish Police Authority's digital tool. As such, some stakeholders who may have a peripheral interest in the project are not directly relevant to the project's goals and objectives at this scale. While it is important to identify and engage with all potential stakeholders at the outset of any project, it is also important to recognize that not all stakeholders will have the same level of relevance or impact on the project. In this case, stakeholders who are not directly involved in the development of the user interface may not have a significant role to play in shaping the project's outcomes. Nonetheless, these stakeholders will play an important role in the forthcoming development of the system.

6.1.3 Survey

To gain a better understanding of the problem and the work context at hand, the first step was to collect quantitative data through a survey, in the form of a questionnaire. Due to the internal guidelines regarding safety and security, the questionnaire had to be made using the internal tool. Moreover, due to a lack of access to the system, it had to be constructed together with personnel at the authority. This led to some consequences, including being dependent on others throughout the process of creating, distributing, collecting and analysing the survey. The purpose of the questionnaire was to get a better understanding on what the general perception of the administrative process was like according to the officers working with

Grannsamverkan. The topics covered were:

- Demographics such as gender, position and location
- Number of compounds
- Duties
- Tools and how they are utilized
- Perception of their work regarding the administrative process
- Whether there is a need of a digital tool or not

The questionnaire was distributed via email to approximately 150 personnel within the authority who are actively working with Grannsamverkan all across the country, however, around 10 delivery failures occurred. Due to the fact that the digital tool is supposed to suit all of the police officers, regardless of location, it was of high importance to collect information of their location. This allowed for knowing whether the respondents were from all over the country and not just within some areas. The distribution of the respondents location can be seen in Figure 6.1.

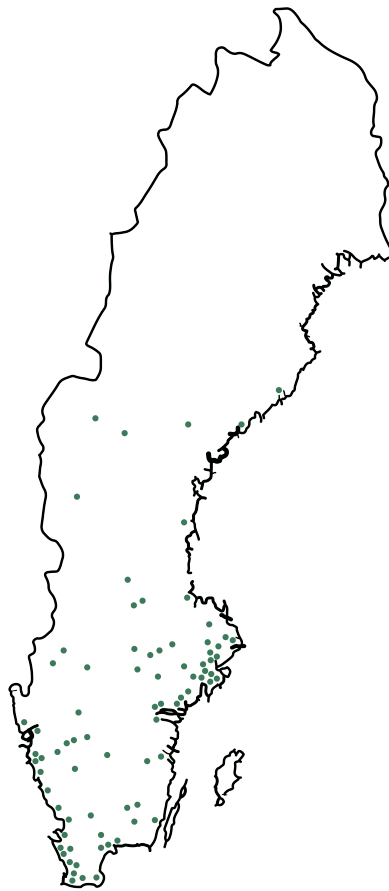


Figure 6.1: Map of Sweden showing the Distribution of the Respondents Locations.

79 people responded to the questionnaire. 47 identified as men, 32 identified as women, and 0 identified as neither. 59 out of the 79 respondents had the position of a “municipal police officer” (kommunpolis). 10 respondents had the position of a “area police officer” (områdespolis) and the remaining 10 respondents either had the position of a coordinator, administrator, facilitator or crime prevention officer. The most common duty was to arrange start-up meetings with the compounds, followed by ordering materials for the compounds. The distribution of duties among the respondents can be seen in Figure 6.2. Furthermore, the most utilized tool were the internal tools followed by the external tool Excel. The majority of the respondents stated that the internal tools were used to follow crime trends in the different areas and to see various statistics. Also, several stated that they used the internal tools since they include a map service which can give them a better understanding where the crimes occur and where they do not. The distribution of the tools is shown in Figure 6.3. The most common number of compounds per police officer was 100-499 compounds followed by 0-49 compounds. In Figure 6.4, the distribution of number of compounds per police officer is shown in a pie chart.

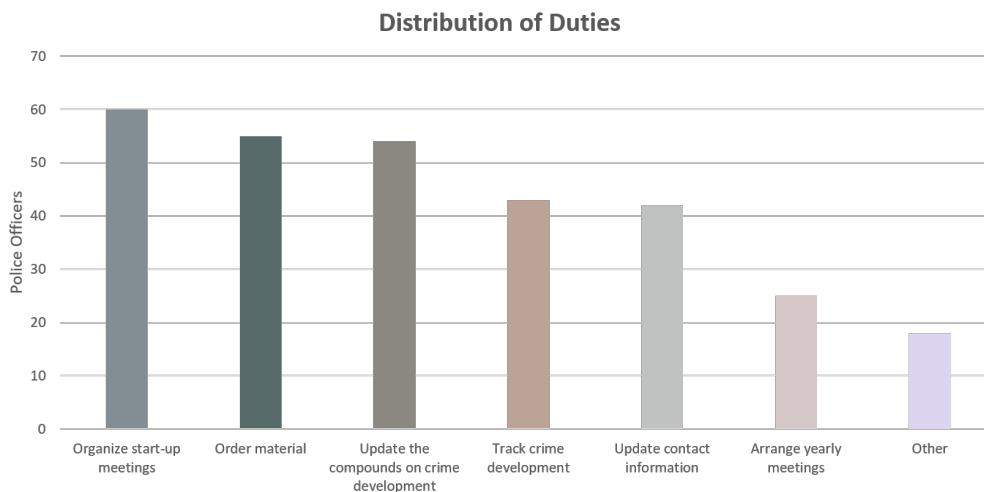


Figure 6.2: The Distribution of Duties among the Police Officers.

The respondents were asked to grade their experience regarding the administrative process on a three-point likert scale consisting of “It works well”, “Room for improvement” and, “It works poorly”. In addition to this, a fourth option was included “No opinion” in order to not limit the respondent in their answer. The questionnaire showed that there is a significant need for an improvement of the administrative work, with a majority of 66% answering “Room for improvement”. An additional 16% even answered “It works poorly”. Only 13% answered “It works well”, meanwhile 5% answered “No opinion”. Furthermore, it showed that the general opinion among the police officers is that there is a substantial need for a digital tool to facilitate the administrative work. Specifically, when asked whether there is a need for a digital tool, 66% stated that they “Totally agree” and 29% answered that they “Partially agree”. Only 5% answered “Do not agree”.

Furthermore, the respondents were given the free choice to share their thoughts in

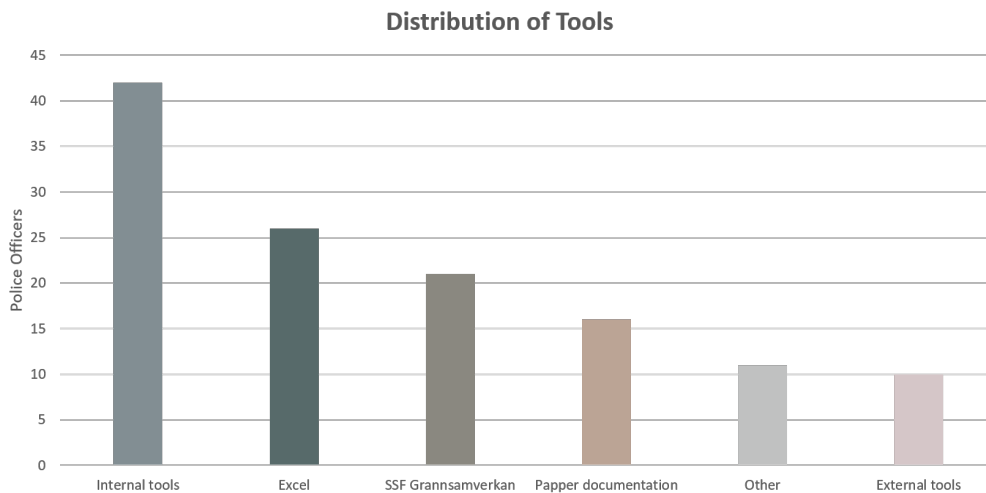


Figure 6.3: The Distribution of Tools among the Police Officers.

an optional text box with the question “Is there anything else you want to add regarding the administrative work with Grannsamverkan that you think we need to know?” Due to this, several interesting findings emerged. One of them, which had not been discovered prior to the survey, was the significant role played by the local municipalities in the context of Grannsamverkan. 12 of the respondents stated in the optional text box that they have counterparts in the local municipalities, with whom they either share the administrative workload with, or have delegated the administrative responsibilities to entirely. In addition to this, 2 respondents expressed their desire to have an active municipal counterpart in the context of Grannsamverkan. One respondent stated the following regarding the importance of having a municipal counterpart: “As a municipal police officer, there are a hundred things going on and it is difficult to devote excessively much time to GSV (Grannsamverkan) combined with all other tasks. Therefore, it is also good to be able to ‘share the burden’ with the municipality, which also has legal requirements regarding community protection this year.” Another respondent said: “It is important to be able to handle the administration together with a municipal counterpart.” A third respondent said: “I wish for a clearer role for the municipality in the work towards Grannsamverkan.” Another respondent even thought that the responsibility for the administrative work should lay on the local municipalities entirely, they stated: “The police should not administer Grannsamverkan at all. The municipality should be responsible for this as it involves coordinating civil society, it is not the police’s task.”

Another finding that emerged from the survey was the differences among police officers in the form of how they operate in the context of Grannsamverkan. Several respondents mentioned in the optional text box that their perception is that personnel within the authority operate differently across the country. Some further stated that they disliked this and would prefer some kind of “national template” for administrating Grannsamverkan. One respondent said that: “My feeling is that there are differences in how this is handled from local police office to local police office, and it would be good to have a common, national, and internal website for

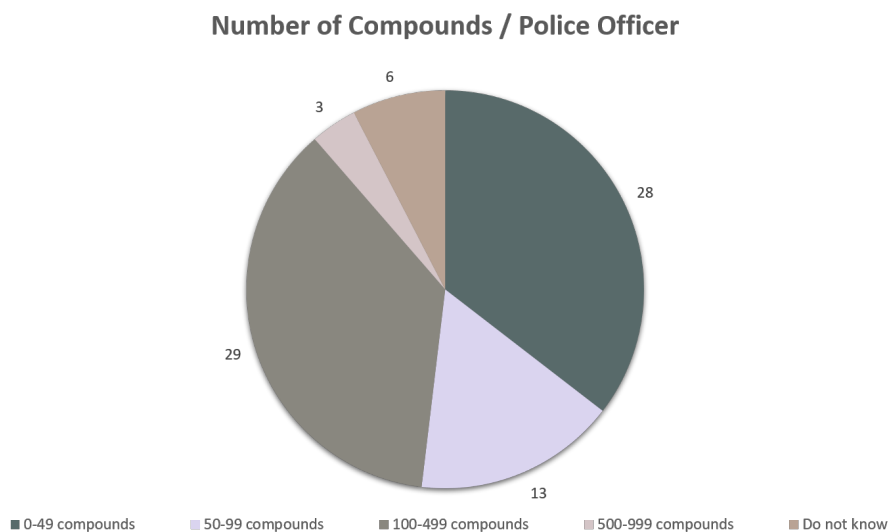


Figure 6.4: The Distribution of Number of Compounds per Police Officers.

us police officers who work with this so that we do not have to reinvent the wheel again and again.” Meanwhile, another respondent stated that: “Since there is a lack of a comprehensive approach within the police regarding the administrative work surrounding Grannsamverkan, we have had to come up with our own solutions over the years (which, admittedly, work somewhat effectively but are far from optimal).” Another respondent said: “My perception is that all local police areas work slightly differently with the method and have found ‘their way’ of working with it. There is likely also a significant difference in what they do and what level of service they provide to the Grannsamverkan compounds.” That same respondent continued with: “A unified way of working with the method and digital tools would definitely be desirable. Perhaps a national platform with good information that we can share with the regions so that one does not have to develop everything themselves at the local police office. There is certainly an opportunity to streamline here.” Two other respondents spoke on the subject, one respondent said: “It would be good if we had a national letter with current information that we could then supplement with local information.” The other respondent said: “Clearer guidelines on how the work should/must be carried out.”

Lastly, several respondents brought up the need for a digital tool in the optional text box and shared some personal insights and reflections regarding it. One respondent said: “It would be good if there was a digital system that connects everything and that representatives (referring to the delegates) can have some access to. That you can post material and information there. Now you have to do a lot of things manually and updates of lists on email, etc. There, changes could also be made by representatives for their compounds.” Another one said: “There needs to be a system where you can easily register the different Grannsamverkan compounds.”

At the end of the questionnaire the respondents were given the opportunity to include their email address for the purpose to later be contacted for an interview, 33

respondents did so.

6.1.4 Focus Group

The purpose of the first focus group meeting was to present and discuss the analyzed data collected from the survey, as well as to receive answers to a few questions that had surfaced during the project so far. The meeting was held online and during the meeting a presentation was held which included visualizations of the survey data in the form of bar charts and pie charts. Besides the presentation, the meeting was similar to an unstructured interview in order to not limit the field of inquiry [60], where the focus group, having different perspectives, experiences and expertise's, could discuss among themselves and ask questions regarding the project.

One of the topics discussed with the group was in regards to the questionnaire results, regarding the responsibility and involvement of municipalities. Where an increased involvement of the municipalities was viewed as a positive initiative by the survey respondents. The focus group agreed to this, but noted that some internal systems related to the Grannsamverkan administration can only be accessed by the Swedish Police Authority, which limits the ability of municipal employees to take over *all* of the administrative work. For example, following local crime trends cannot be managed by municipal employees since it requires the usage of internal systems owned by the authority. Moreover, the focus group believes that a joint administration of Grannsamverkan between the local municipalities and the local police to be advantageous in the future. The focus group brought up the fact that a new law, "Municipalities against crime", covered in Section 3.4, is scheduled this summer. Due to Grannsamverkan being one of few evidence-based methods for crime prevention, it serves as a convenient tool for municipalities to meet their obligations when the new law is enforced. Furthermore, it provides a solid foundation for enhancing collaboration between the parties.

During the project, a question regarding the feasibility of including a communication tool within the system arose. As stated in Section 2.4, there already exist applications on the market, developed by for-profit companies, where communication is one of the key functionality of the applications. Some of these applications have become very popular and the importance of communicating with one another has been praised in the media [61]. Therefore, this idea was consulted with the focus group. After discussing the topic with the focus group, it was found that there are several policies in place regulating how the authority should handle all incoming data, including interactions with civilians on digital platforms. If civilians were able to communicate directly with the authority, it would need to be closely monitored and administered by the authority.

6.1.5 First Set of Interviews

To test the validity and effectiveness of the research instruments, a pilot interview was conducted with a participant selected from the pool of respondents who had completed the questionnaire, as described in Section 5.1.5. This was an important

aspect since the outcome of the pilot interview needed to reflect the interviews which later would be held. Furthermore, the pilot interview gave an indication on the time that would be required. The feedback received was positive and the participant seemed to perceive the questions to be clear and relevant. Nonetheless, slight modifications were made to the phrasing of certain questions to enhance clarity in the upcoming interviews.

As mentioned prior, there was an interest among the municipal police officers to participate in the upcoming interviews shown by their answers from the questionnaire. Ten police officers were chosen for the first set of interviews and in order to achieve diversity the participants were chosen based on gender, age, location, number of compounds and position within the authority. The ten interviews were conducted during the span of two weeks and held online using the internal video communication tool. The interviews all ranged from 30 to 50 minutes, with the majority of the interviews being 30 minutes.

All participants agreed to being recorded for their interview. The availability of conference rooms at the office varied, and therefore different conference rooms were used during the interview process. Due to this, the audio from the interviews were of mixed quality since the conference rooms was equipped with different setups for video meetings. Another factor affecting the quality of the recordings were the setup of the interviewees, they had different microphones and surroundings.

Further, the recording program used only picked up audio from the computer microphone instead of the online meeting itself, resulting in a dip in audio quality. Lastly, it was planned to record both audio and video in order to pick up non verbal cues. However, this was not possible due to the choice of using a conference room for all of the interviews, aiming for a professional set up which included a conference microphone, professional camera and a large screen. The set up in the conference room only offered an external device which was connected to the large screen, meaning that it was not possible to screen record the interviewees locally. Although the loss of video recordings of the interviewees was regrettable, it was deemed acceptable considering the professional setting that was achieved.

The interviews were transcribed continuously alongside the execution of the interviews, where important parts and sections of the interviews were highlighted in preparation for the upcoming TCA to be performed. The audio quality of some interviews lead to a few possible misunderstandings in terms of wording in the transcription phase. These sections were marked in the transcriptions and not further analysed due to the risk of misinterpretation.

6.2 Define Phase

The Define Phase aimed to analyse the qualitative data collected from the previous phase through a TCA. The TCA enabled the identification of recurring themes and patterns in the data, which helped with understanding the needs and expectations of the end-users of the digital tool. Once the TCA was completed, the next step was to create personas based on the findings and insights gained from the analysis

but also from the findings and insights from the previous phase. In addition to the TCA and creating personas, the Define Phase also included defining the scope of the digital tool based on the findings.

6.2.1 Thematic Content Analysis

In order to make sense of the complex data collected in the previous phase, a thorough TCA was performed. As a result of the analysis, several themes and patterns were discovered where the most prominent ones were:

- Experience of Grannsamverkan
- Citizen dialogue
- A communication tool
- Inadequate accounting of compounds including Excel and email
- A map feature
- Involvement of a municipal counterpart
- Heavy workload
- Light workload
- Own thoughts and ideas

Without being asked to do so nine out of the ten participants expressed a positive attitude towards the concept of Grannsamverkan and thought of it as a great method in their work for crime prevention. One participant said: “It’s an evidence-based approach, it has been researched, it works, it reduces the risk of burglary by 36%. In the areas that have active Grannsamverkan compounds, other types of crime such as vandalism and general mischief also decreases.” Several of the other participants spoke on Grannsamverkan in a similar manner. Another participant said “I see it positively, because there is a scientific basis for it, it has been evaluated and it works. However, it also depends on taking action. I don’t want the brand to be watered down. It should be handled properly.”

One of the discovered themes was the significance of **citizen dialogue**. Eight out of the ten participants stated, without being asked on the subject, that it is important for the local police to establish closer connections with the citizens. All eight participants expressed a willingness and desire to connect with their citizens and stated that Grannsamverkan is an effective tool to achieve that goal. One participant expressed a significantly stronger and more distinct desire to engage with the citizens compared to the remaining participants. They repeatedly mentioned the importance of establishing personal connections with citizens and emphasized the need to “break down barriers”. According to the participant, Grannsamverkan is an effective method to achieve that goal. Furthermore, they expressed a concern when discussing a potential digital tool, stating that it may not align with their goal and that it could result in the police becoming more anonymous to the citizens. They once again emphasized the significance of face-to-face interaction, highlighting

the importance of the police's physical presence and active communication with the citizens. All things considered, they feared that digitization of Grannsamverkan may create more barriers between the Swedish Police Authority and the citizens. Moreover, other participants expressed a feeling of failure on the subject of citizen dialogue. One participant expressed that the police have been inadequate in listening to what the citizens want from their police force. Meanwhile another participant stated that their understanding is that the Swedish Police Authority in fact have failed to establish closer relations with the citizens.

Another discovered theme were regarding the use of a **communication tool**, where the opinions among the participants were divided. Although no questions were asked on the subject, several participants mentioned the need for such a tool, while others expressed resistance or hesitation towards it. One participant emphasized the importance of neighbors communicating with each other for Grannsamverkan to be effective. Another participant highlighted the importance of neighbors working together, and this by using some kind of communication tool. A third participant suggested that a chat function would be beneficial, and that they wanted communication to be possible both between the police and the delegates, and between the delegates and their neighbors. Additionally, three participants expressed a desire for a communication tool where they could communicate just with the delegates. Two of them also stated that they do not care about *how* the neighbors communicate with each other, while one of them expressed that the delegates also should be able to communicate with their neighbors within a system. Meanwhile, two participants mentioned the risk of introducing a false sense of security if some kind of chat function existed, that citizens might believe that the police monitor the chat round-the-clock. Whereas another participant points out the risk of misuse with a chat function, referring to the climate on social media which also is brought up in the Theory chapter, specifically 3.6.

All of the participants with an administrative responsibility reported on having **inadequate accounting** of their delegates contact information. Eight of those participants stated that one reason for inadequate accounting is that the delegates do not contact them when they quit, move or change their email address. Only one participant stated that delegates are good at informing the police when a new delegate is needed. One participant stated that the delegates are usually elderly, and sometimes they pass away. When that happens, it can take a while before the information gets through that the person is no longer a delegate. As a result, the compound may become inactive. According to some participants, updating delegate information can be a cumbersome process that involves multiple steps, such as modifying records in email and Excel spreadsheets. This complexity poses the risk of errors, and some participants mentioned that keeping track of changes requires constant effort to ensure that the records are up-to-date. Failure to do so could lead to a backlog of unprocessed changes and cause the situation to escalate rapidly. One participant stated that they fear that their successor will not be able to execute the duties towards Grannsamverkan and that the situation could escalate and in the worst case even collapse.

All respondents, except for two, reported that they use Excel to manage dele-

gate information. One of the two who did not report any usage of Excel, explained that since they are not responsible for any administrative work related to Grannsamverkan, they are not in need for such documentation. Instead, the local municipality has that type of documentation. The other participant of the two mentioned that they use an email list in Outlook instead, but also pointed out a problem with this approach: they do not know which email address that belongs to which person or area.

Furthermore, all participants stated that they use email and that most communication in the context of Grannsamverkan occurs via email, such as ordering materials, sharing tips, changing of delegates, asking questions, and starting new compounds. All of them also reported that their email lists are not up-to-date. Four participants reported another problem with the accounting of email addresses - they first need to retrieve the desired email addresses from an Excel file, copy them, and then paste them into Outlook in order to send an email. Moreover, it is mentioned that a common issue is that there are many “delivery failures” when emailing the delegates. One participant mentioned that when they email the 170 delegates, they receive 30 “delivery failures”. Another participant mentioned that it could occur as much as 70 “delivery failures” at a time.

An interesting finding that emerged was the desire of a **map service**. Without asking any questions on the subject, five of the participants expressed a desire for a map service. The feedback received from those participants included to be able to mark an area on a map and get all the delegate’s contact information within the circled area. Further, one should also be able to visualize all of the active compounds on the map and several of the participants expressed that such a service would allow for easily identifying where no active compounds exist. In that way they will easily know where to campaign for Grannsamverkan and encourage the neighbours to start a compound, they said. Furthermore, several of the participants stated that the map should work in a similar manner as a commonly used internal system, and that it is important that the map is connected with already existing internal system for crime statistics. In that way, the police officers can both see where the crimes occur and where the active compounds exist.

Through the analysis, a correlation between workload and the presence of an active **municipal counterpart** was found. Participants who reported a **heavy workload** tended not to have an active municipal counterpart, while those who stated that they did have an active municipal counterpart never expressed a feeling of heavy workload but rather expressed a feeling of **light workload**. Some of the participants who had stated to have an active municipal counterpart went so far as to suggest that the success of Grannsamverkan was dependent on the shared responsibility with the municipality. Furthermore, it was also found that those who did not have a municipal counterpart experienced more problems with their work regarding Grannsamverkan. For example, one participant mentioned several times during the interview that “there is not enough time”, referring to not having enough time to execute all of the various duties related to Grannsamverkan.

The last discovered theme of the TCA was **thoughts and ideas** of the participants.

In the last question of the interview the participants were asked if there was anything that had not already been discussed, something that they might feel that they wanted to share, could be any personal thoughts, ideas, or similar. Below is some of the ideas of the participants listed:

- Be able to spread information regarding crime prevention.
- Be able to add new addresses within a specific compound easy and accurately.
- The system should be easy to navigate.
- The system must be easy to use.
- It is important to have updated lists with contact information to the delegates.
- Citizens should be able to participate and contribute when there is an exchange of contact persons.
- Be able to send emails based on geographical area.
- Be able to receive a notification when changes have been made.
- The compounds could have their own portal where they could find information and news.
- The delegates should be able to enter their contact information in to the system.
- The delegates should be able to start a new compound through “Mina Sidor” at “www.polisen.se” where the delegates can log in with “Bank ID”.

6.2.2 Personas

Based on the data from both the survey and first set of interviews, two personas, Ewa Persson and Lars Lindgren, see Figure 6.5 and 6.6, was created as a way to visually represent characteristics of the intended end-users. Further, the personas will be used as a tool to better understand the needs and perspectives of the target audience of the project.

The decision to have the personas be 45 respectively 55 years old was influenced by the fact that the age ranges "35-49 years old" and "50-65 years old" was by far the most represented in the survey, and thus the personas were tailored to appeal to this demographic. With 59.5% identifying as male, 40.5% identifying as female and 0% identifying as other, it was decided to have one female persona, Ewa, and one male persona, Lars. Furthermore, the data collected showed indications that men exhibited slightly more skepticism than women toward a new digital tool, with a higher percentage of men expressing some reservations about its effectiveness, a trend that is reflected in the personas. Although the personas are responsible for administering Grannsamverkan, they also have other job duties. This is because the majority of the interview participants were municipal police officers who had additional responsibilities beyond Grannsamverkan.



Polisen

Ewa Persson

Age: 55 years

Profession: Police officer

Compounds: 100-499

Job duties Organize startup meetings, order materials, update contact information, follow and update the compounds on crime trends.

Aids used Excel, pen and paper, internal tools to follow and observe crime trends.

- Believes an IT-solution is necessary. Finds Excel to be a poor tool for managing compounds.
- Does not know how many compounds she has due to a lack of overview.
- Have other job duties in addition to Grannsamverkan activities. Shares the administration responsibilities with a municipal counterpart.

Figure 6.5: Persona of Ewa.



Polisen

Lars Lindgren

Age: 45 years

Profession: Police officer

Compounds: 0-49

Job duties Organize startup meetings, hold continuous meetings, order materials, follow and update the compounds on crime trends.

Aids used Excel, SSF Grannsamverkan, internal tools to follow and observe crime trends.

- Believes that Excel is a suitable tool for managing his relatively small number of compounds.
- Slightly skeptical of a new IT-solution, but thinks that the administration can be improved.
- Have other job duties in addition to Grannsamverkan activities. Have no municipality counterpart.

Figure 6.6: Persona of Lars.

The choice to create one persona which has 0-49 compounds and another who has 100-499, was based on the need to accommodate police officers with different amounts of compounds. By letting the personas respectively having both few and multiple amounts of compounds, the digital tool can effectively meet the needs of police officers with varying amounts of compounds. Both the personas' job duties and aids used were derived from the most recurring survey and interview responses and are quite similar with some minor differences.

The decision to give a municipal counterpart with some administrative responsibilities to the persona Ewa, but not to Lars, was based on the findings in the interviews. The approach is useful in representing the variety of administrative structures that exist within the different municipalities. Furthermore, the personas attitudes regarding managing compounds using Excel varies, Ewa finds it to be poor and experience a lack of overview of her compounds. Whilst Lars, who has fewer compounds to manage, finds the usage of Excel to manage compounds quite suitable.

6.2.3 Defining the Scope of the Digital Tool

Before the project went any further, it was necessary to make a few decisions regarding some of the findings in both the Discover Phase and the Define Phase. Specifically, the inclusion of local municipalities, the importance of citizen dialogue, the decision whether or not to include a communication tool within the system, and the desire of the new system to interact with already existing internal systems used by the police officers.

One of the findings, which was discovered due to the survey, was that the local municipalities played an important role for several of the respondents. This finding brought forth the question of whether the current digital tool catered to the needs of these municipalities as well. Several questions arose, such as: "Could the system

allow for both personnel within the authority and within the municipalities to utilize it?”, “How common is it that a municipal counterpart exist in the context of Grannsamverkan?”, and “What type of administrative work does the counterparts perform?”. Before answering any of those questions, one primal decision had to be made - whether the system should be internal or not.

After consulting with key stakeholders within the authority, it was decided that the system should be internal. This decision resulted in an exclusion of the local municipalities as users at this stage since an internal system only can be utilized by authorised personnel within the authority. At the Swedish Police Authority, the regulations are even stricter. A personnel must have valid reason to access a specific system, even though one is a police officer that does not automatically guarantee access to a system. Every personnel within the authority has to go through the same process, regardless of where one are in the hierarchy. Therefore, it was decided that including another user interface, specifically designed for use by the municipalities, would be beneficial. This would allow the municipalities to have a dedicated platform for managing their administrative tasks related to Grannsamverkan, which would streamline the overall process and improve communication between the municipalities and the police authority. Furthermore, the system should not limit how one works with Grannsamverkan. If the local municipalities share the responsibilities, the system should “bend and stretch” to meet that need as Alan Cooper says [53]. Similarly, if the local municipality does not share any responsibility, and the responsibility is entirely on the police officer, then the system should work for that too. However, as stated before, due to the time constraint of the project, the scope of the project is limited to the development of the user interface for the Swedish Police Authority. Although, deciding on another user interface for future reference could enhance the usability as well as the future development of the system.

As mentioned in Section 6.2.1, one of the themes which were discovered during the TCA was the importance of citizen dialogue. This finding brought the understanding that there exist both a desire and willingness of the police officers to cherish the relations with the citizens but also a fear of new barriers being created due to digitization. In order to cater to these findings, a decision was made that the system should only ease the burden which takes up unnecessary time for the police officer, referring to administrative work. In other means, they should be able to continue to execute their duties in *their* way and should not have to “bend and stretch” to the system.

Another of the discovered themes were both the desire and the resistance of a communication tool. Since several of the participants brought up the subject without any questions asked regarding it, it had to be looked in to. And as mentioned in Section 6.1.4, the subject had already been raised during the focus group meeting and implementing such tool would most likely lead to a higher administrative workload and impose a greater burden for the authority. Such a decision would be in conflict with the goal of the thesis, which aims to streamline the administrative process rather than making it more cumbersome. Therefore, the decision was made not to include a communication tool within the system.

As mentioned prior, according to the survey, 'internal tools' were the most commonly selected tools used for administering Grannsamverkan, and especially two internal systems was mentioned multiple times during the interviews as the go-to tools for following and analyzing current crime trends to inform the delegates. With this in mind, it was clear that introducing a digital tool integrated with the two mentioned internal systems would be the best approach to gather Grannsamverkan activities into a single system.

6.3 Develop Phase

The Develop Phase aimed to establish suitable functionality and requirements, which was based on the findings and insights from previous phases, that would meet the expectations of the intended end-users. Before creating those requirements, a second set of interviews was held to address questions which had arisen during the project.

6.3.1 Second Set of Interviews

As mentioned in Section 5.3.1, the second round of interviews was initially planned to be in a semi-structured format. However, since performing the TCA for the first round of interviews which took a significant amount of time, it was decided to switch to a structured format for the subsequent interviews. Structured interviews, as mentioned in Section 4.4.2, allows the interviewer to steer the interview more which allows for more control. Further leading to more concise and to the point answers, resulting in a smoother and quicker analysis phase. The aim of the interviews was to investigate and explore certain topics and themes that had become prevalent during the prior TCA. Especially wanting to further explore the themes, "Inadequate accounting of compounds", "Email", "Map" and "Involvement of a municipal counterpart". As mentioned in 6.2.3, the choice was made to not involve municipalities due to it being out of scope for the project and as the main focus lies on the perspective of the Swedish Police Authority. However, it was deemed necessary to receive more data on the subject. This since it is important to understand how the administration of Grannsamverkan is handled in different municipalities and to ensure that the needs of all officers can be addressed. Furthermore, in contrast to the first set of interviews, this set focused on exploring possible solutions rather than solely understanding the problem.

The interviews consisted of 12 questions and was estimated to take around 30 minutes to carry through. Topics covered in the interviews were: possible municipal counterpart and viewpoints on an increased responsibility on behalf of the municipality, most frequent job duties, questions regarding administration of compounds, email and communication, process of ordering of materials and opinions regarding the implementation of a map service. The final question asked the interviewee to describe specific functions and features they would like to see included in a future digital tool for administering Grannsamverkan. This question was designed to allow the interviewee to speak freely and share their insights without being steered in any particular direction. In contrast to the final question of the first round of interviews,

this question had a specific focus on functionality.

Five police officers were recruited to take part in the interviews, all of whom had participated in the prior survey and expressed interest in taking part in the project. Wanting to once again achieve diversity among the participants, they were chosen based on age, location, number of compounds and position within the authority. All five interviews were conducted online, and all participants provided consent for the interviews to be recorded in order to later be manually transcribed. Similar to the first set of interviews, a pilot interview was conducted with a police officer as a way to examine the flow and structure of the interview. As a means of ensuring clarity, it was decided to write out the interview questions in the form of a presentation, allowing the participants to both hear and read the questions. Based on the pilot interview some minor grammatical changes were made to the questions and the presentation format was kept for all of the interviews.

Of the five participants, two mentioned having an involved municipal counterpart, where one mentioned that the municipal has full administrative responsibility and the other participant said that their municipal has no administrative responsibility. The participant with no administrative responsibility stated that their duties revolves around compiling and sending out crime statistics to the delegates. The remaining three interviewees reported not having a municipal counterpart, but they all recognized the benefits and possibilities of such arrangement. This is consistent with the findings from the first round of interviews, where officers with full responsibility for Grannsamverkan expressed a desire for a more involved municipal counterpart.

The most frequently mentioned occurring job duties by the participants were email administration and creating crime prevention letters. Three of the interviewees reported on using pre-made email groups to send out the letters to the delegates. Moreover, all participants reported experiencing “delivery failures” when sending out emails, which could be argued to be partly linked to the fact that all participants also mentioned having inactive compounds, meaning that crime prevention information is not reaching these compounds. However, all of the interviewees were unsure of the exact number or which compounds were affected, but expressed a desire to have more information on this matter. Where one participant brought up that in order to be able to measure the effects of Grannsamverkan, in regards to crimes, it is essential to know which ones are active or inactive.

The participants all showed a highly positive attitude towards a potential map service in the digital tool, which reflected the opinions of those who had brought up a potential map service in the first round of interviews. The possibility of integrating a potential map with existing tools within the authority, such the two internal systems for tracking crimes, was brought up. Additionally, the possibility of sending out emails based on the location of compounds, and having an overall overview, among other features was voiced. Moreover, the current process of ordering materials from SSF was viewed as both smooth and positive by all participants except one, who specifically mentioned using the SSF Grannsamverkan application to place orders, instead of using the SAMBO website. The participant elaborated and expressed frustration over having to repeatedly fill in the same information every time they

place an order. They further stated that certain information needed to be provided may be difficult to know.

As in the first round of interviews, the participants expressed a desire to be able to have all functionality concerning Grannsamverkan integrated into a single system, minimizing “having to jump between systems” as one participant put it. Increasing the responsibility for, and involving the delegates more in terms of administering their own and their compounds information, was brought up. Moreover, a feature allowing delegates to chat with one another was brought up twice with the motivation of being able to update each other in regards to potential crimes or similar. Further, the possibility of some kind of communication between police officers and delegates within the tool was voiced where one participant leaned towards a chat function as means of communication whereas another officer explicitly turned down the implementation of a chat function. However, as already discussed, a decision was made earlier in the project to not include such a feature.

Lastly, after the second set of interviews some characteristics and traits were added to the personas regarding inactive compounds, email management and attitudes towards municipal counterparts. Where all participants discussed having inactive compounds but not knowing exactly which ones or how many. Further, all interviewees expressed frustrations regarding email management where “deliver failure” responses was a highly common response when emailing delegates. Finally, due to participants expressing a desire for a municipal counterpart, as they believed it would be beneficial for their Grannsamverkan activities, it is represented in the persona Lars.

Lars Lindgren:

- Wish the municipality took more responsibility in regards to Grannsamverkan.
- Have a few inactive compounds.
- Each time he emails the delegates he receives some Delivery Failure

Ewa Persson:

- Does not know how many inactive compounds she has.
- Have three different email groups she uses when emailing her delegates.
- Experiences multiple Delivery Failure when she emails the delegates.

6.3.2 Creating Requirements

During the course of this project, several complications related to the administration of Grannsamverkan have been identified, evaluated and analysed. The purpose of the requirement specification is to both address these issues and to provide a modern, streamlined approach to the administration of Grannsamverkan. Furthermore, keeping in mind the importance and the need of citizen dialogue, as stated by the police officers, it is of high importance that the digital tool enables this and not increases the time it takes to administrate, but rather decrease it. Below are

6. Execution

the primary aspects that the digital tool aims to address in order to simplify the administration and to centralize all activities in the same system.

- Structured compound administration
- Updated email management
- Ordering materials
- Inclusion of a map
- Integration of the two internal systems
- Provide information to the police officers working with Grannsamverkan

Moreover, the focus of this project is, as mentioned before, on the functionality of the product rather than its design. Therefore, the process did not involve the creation of detailed design solutions. Instead, rough sketches were made in order to visualize and test out different ideas, ensuring that they were feasible options for the product's functionality. In order to generate ideas and rough sketches, multiple brainstorming sessions were held. Some of the sketches made during the brainstorming sessions can be seen in Figures 6.7, 6.8, 6.9 and 6.10.

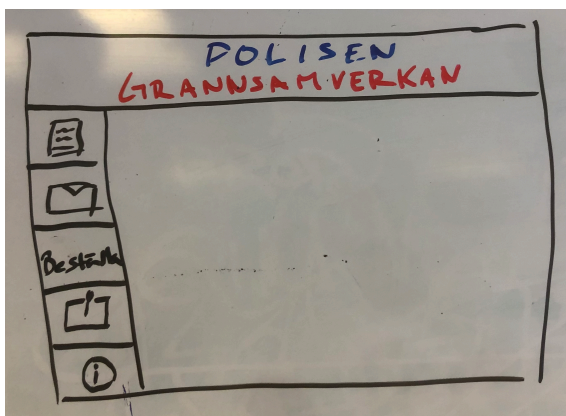


Figure 6.7: Sketch of Home Page.

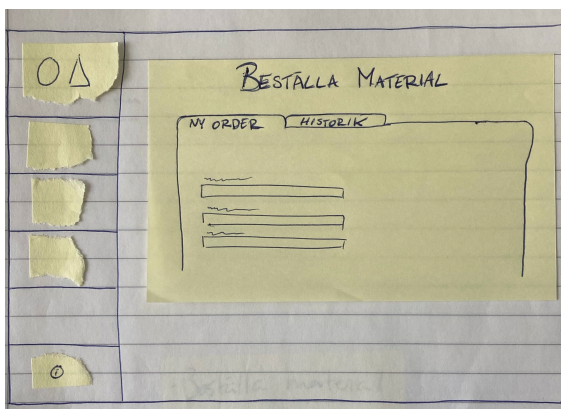


Figure 6.8: Sketch of Material Page.

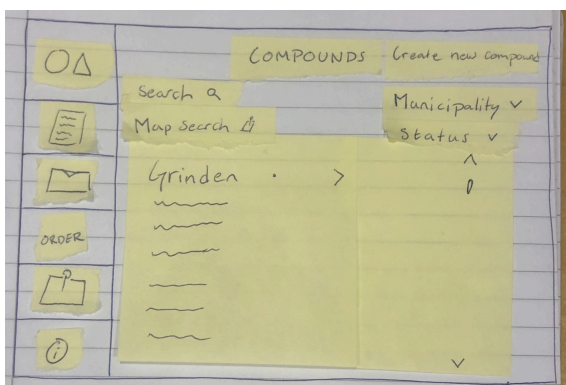


Figure 6.9: Sketch of Compound Page.

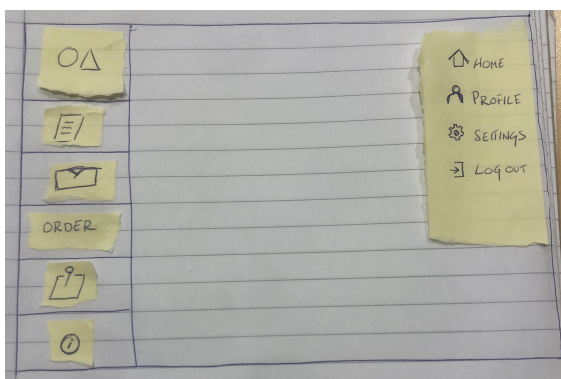


Figure 6.10: Sketch of Hamburger Menu.

Meetings were conducted with one of the UX-designers working at the authority, who also serves as a supervisor for this project, to discuss potential functionalities as well as the UX-design process at the authority. Furthermore, the meetings served as a way to reassure that the functionality discussed and created were of relevance in terms of following the internal guidelines at the authority as well as being feasible in terms of the internal development routines.

Based on the analyzed data, personas, sketches, brainstorming sessions, and feedback from the supervisor, the intended functionality of the digital tool was formed. To achieve an organised compound administration, the digital tool will include a dedicated page for this subject, which will provide an overview of all the compounds along with different filtering options. Further, addressing the frustration felt regarding having to update delegate information in multiple places, as discovered in the TCA. Each compound will have their own page allowing for editing both the compound information and delegate information, see Figure 6.9. Further, a feature allowing for specifying whether a given compound is active or inactive is included, partly as a means of providing an overview regarding the statuses of the compounds. It also helps to keep the concept alive by allowing officers to easily identify and reach out to inactive compounds. To ensure that email lists remains up-to-date, the email addresses of the delegates will be stored in a dedicated page in the digital tool specifically designed for email management. This page will have the functionality of creating different email groups, always being updated thanks to them being dynamic and connected with the delegate information, and lastly to easily export the emails to Outlook.

Moreover, the inclusion of a page allowing for ordering of materials from SFF, will help to contribute to a more integrated system. As discovered in the second round of interviews, the current process of ordering materials is one of very few positive aspects regarding the Grannsamverkan administration. Having taken that into account, it was decided to keep most of the structure of the current version on the SAMBO website. However, before that decision could be made, SSF, which is one of the stakeholders, needed to be contacted and the proposal of transferring the procedure to the internal system. The proposal was well received by SSF and a decision could then be made to include the procedure in the system. As already mentioned, the current process of ordering materials is seen as positive by the police officers and therefore it will look and work in a similar manner as it does on www.samverkanmotbrott.se. Nonetheless, there will be two new features which will improve the process - storage of personal information and order history. Where the opportunity to have personal information saved have been one of very few improvements mentioned by the interview participants. Further, the possibility of viewing previously placed orders will provide the users an clear overview their order history. Regarding a map service, it has by far been the most popular and prominent functionality mentioned by the police officers in prior interviews. Elaborating on that, the inclusion of a map will provide the police officers with the option to, among other, visually see where their compounds are located, further it will allow for retrieving email addresses based on geographical location. Additionally, by integrating map functionalities from two other internal systems owned by the authority, it will

be possible to follow crimes committed relative to the location of compounds and relevant statistics, providing a valuable tool for analysing crime trends.

A need that was highlighted in both the survey and the first set of interviews was the lack of information provided to the officers. To address this, the inclusion of an informational page will act as a way for the authority to publish and spread information regarding Grannsamverkan. With the motive to provide officers the same information and to ease the learning process for new administrators of Grannsamverkan.

Lastly, other implementations to the digital tool will be a profile page and a settings page allowing officers to change some of the default settings within the digital tool. The settings will act as a way of not limiting the users by the functionality in the digital tool. For example, letting the user be able to decide whether check boxes concerning their compounds' statuses should be activated and used in the tool or not.

Based on the functionality at hand, the requirement specification started to take form with the following structure:

- Log In Page
- Home Page
- Administrating of Compounds and Delegates
- Dynamic Email Lists
- Ordering of Materials
- Map Feature
- Information Page
- Hamburger Menu where on can navigate to:
 - Home
 - Profile
 - Settings
 - Log Out

Following the internal structure and frameworks of the authority regarding portfolio epics, epics, user stories and tasks, four portfolio epics were identified; Home Page, Manage Compounds, Email and Order Material, and lastly Map. Moreover, the portfolio epics consists of several epics which in turn consist of detailed user stories and tasks. This was done in order to break down the functionality into smaller pieces, capturing the end-users' needs and goals and ensuring that important aspects of the system are covered.

6.4 Deliver Phase

The final phase of the project, the Deliver Phase, aimed to evaluate the content of the requirement specification by conducting both an Usability Inspection and a final Focus Group meeting. The two evaluation methods resulted in valuable feedback regarding the functionality of the digital tool, as well as identifying areas where the requirements specification needed to be upgraded in order to meet the needs of the end-users.

6.4.1 Usability Inspection

As previously mentioned in Section 5.4.1, the Usability Inspection was a mixture of an Expert Review, which evaluates a system's usability from an expert's perspective, and a Feature Inspection, which examines a system's features and functionality. The expert in the Usability Inspection was Anna Schelin, a police officer working with Grannsamverkan, among other things, in Huddinge Municipality. Anna has several years of experience of working with Grannsamverkan and is seen as a prominent person in the work the Swedish Police Authority does with Grannsamverkan. Several independent persons has mentioned her throughout this project and therefore she caught our attention. In addition to this, she is declared as the representative of the Swedish Police Authority on the website of SAMBO.

The inspection was held online and consisted of a presentation which provided details on the structure of the inspection itself, the projects aim and background, and detailed explanation of the functionality regarding the digital tool.

The functionality was divided into five main sections, including: Compound page, Email page, Order Materials page, Map, and Information page, as well as a "Profile and Settings" section. Each section was presented and discussed and analysed with the expert. The ambition of the inspection was to receive feedback regarding whether the expert found the functionality presented to be both relevant and useful in terms of administering Grannsamverkan. Furthermore, it aimed to investigate if the expert desired any extended functionality regarding the digital tool.

The comments and feedback from the expert consisted of clarifying some specific aspects of the functionality, such as specifying that if a new individual becomes a delegate of an already existing compound, the delegate needs to go through training in order for the compound to stay active. Which led to some minor changes related to the functionality on the compound page. Furthermore, it was suggested by the expert to incorporate the concept of "police municipal districts" which are districts used exclusively by the police, as a possible filter option within the digital tool. This was information not previously known and lead to the decision to include the filter option in the digital tool. A discussion evaluating the utility of a feature included in the digital tool that allows for Swedish to English translation were held. The expert argued that for a first release within the Swedish Police Authority, the feature seemed unnecessary, given that all police officers in Sweden are expected to be fluent in Swedish. As a result of the expert's feedback, it was decided to completely remove the translation feature from the digital tool.

Lastly, discussions were held regarding the functionality of future releases, with a particular focus on potential informational features for the Information page. Additionally, topics were discussed related to the future delegates' interface, where the expert suggested the possibility of publishing informational dispatches directly to the delegates page as a means of ensuring the information reaches the intended recipients.

6.4.2 Focus Group - Final Meeting

Having updated parts of the functionality based on the feedback and discussions from the Usability Inspection, it was time for the final meeting with the focus group. It took place online and a presentation covering a summary of the outcome of the two prior interview rounds, together with the functionality of the digital tool was held. The aim of the meeting was to provide an update on the project's progress, to then receive feedback, and seek approval from the focus group on the functionalities of the digital tool. Similar to the first meeting, besides the presentation, the meeting had similarities with an unstructured interview, where the group were encouraged to share their thoughts and ideas about the features of the digital tool and discuss amongst themselves. Due to commitments outside of this project, the members of the focus group had limited time to spend in the meeting, and therefore some aspects of the presentation needed to be sped up whilst others were completely removed.

Many of the discussions held were concerning topics beyond the immediate scope of the project, such as the concept of Grannsamverkan itself and ideas for features to be implemented in future releases, partly revolving around a delegate user-interface. Moreover, technical discussions regarding the implementation of the map service took place, since the map is to be integrated with already existing internal systems within the authority. While the possibility of having access to the map showcasing the compounds and delegates in neighboring municipalities was mentioned by one of the members. This to be able to warn compounds about a potential crime wave or other security concerns, it was decided that the idea will not be implemented in the current version of the digital tool. This due to collaboration between police officers in different municipalities is to be left to the officers themselves, and not something to be introduced by the digital tool. However, it is something that should be further evaluated and considered for inclusion in future releases of the tool as a means to enhance collaboration among officers managing Grannsamverkan.

Each section of the developed functionality was presented to the focus group in order to discuss the outcome of the project and to receive feedback. Overall, some questions arose in regards to upcoming releases and, as mentioned, topics beyond the immediate scope of the project. However, the overall impression of the focus group and the absolute majority of their feedback was that the functionalities presented was of both high relevance and met their needs and wishes. Where the map service, which has been a reoccurring theme during the project, was a favorite among the focus group members.

7

Results

In this chapter the results of the thesis will be presented. The results consists of a requirements specification for a system, or digital tool as it has been referred to during the thesis report, which is to be utilized by police officers working with Grannsamverkan. The proposed name for the digital tool is “GAS – Grannsamverkans Administrativa Stöd”. It is decided to be an internal system and implemented as a web application where only authorized personnel within the Swedish Police Authority will have access to it. In Figure 7.1 an overview of the system can be seen where the core functionality of the system is displayed. It includes the compound management (1), a dynamic email page (2), ordering of materials (3), a map service (4), and an information page (5). Theses functionalities are formulated in four portfolio epics and will be demonstrated in their own section down below. Further, the portfolio epics will be presented in tables and due to their extent each portfolio epic will consist of multiple tables. The first table of every section will be an overview of each portfolio epic with its subsumed epics. The tables will also include the user stories and tasks of that specific portfolio epic, these will be shown with a unique identifier, US_n for the various user stories and T_n for the various tasks.

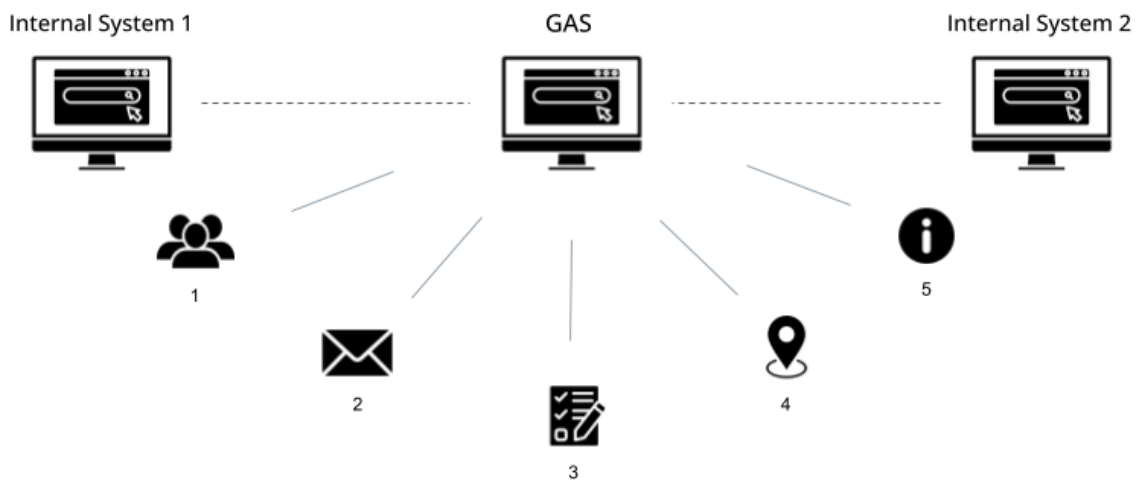


Figure 7.1: Overview of the digital tool.

7.1 Portfolio Epic 1

The first portfolio epic aims to capture the initial stages of the system, specifically the login and home page. The home page is crucial as it gives the users an idea of what to expect when they enter the system. On the home page, the user will access five pages – compound management, dynamic email lists, ordering of materials, a map, and an information page. Additionally, a hamburger menu is to be included in order to allow the users to access certain features from any page. These functionalities are divided into four epics – Log In, Home Page, Profile, and Settings, and are further presented in Tables 7.2, 7.3, 7.4, 7.5, and 7.6. Also, in Table 7.1, an overview of the first portfolio epic can be seen.

Log In and Home Page																																					
Log In						Home Page									Profile					Settings																	
US1			US2			US3			US1						US2			US3			US1			US2		US1			US2								
T1	T2	T3	T1	T2	T3	T1	T2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T1	T2	T3	T1	T2	T3	T1	T2	T3	T4	T5

Table 7.1: Overview of Portfolio Epic 1.

Log In and Home Page							
Log In							
As a police officer, I want it to be clear which system I have opened when entering the log in page so that I can be confident that I have opened the desired system.			As a police officer, I want to be able to log in to my admin account so that I can manage and administrate Grannsamverkan.			As a police officer, I want to be able to reset my password (log in page) so that I can access my account if I have forgotten my current password.	
Add the logo of the Swedish Police Authority.	Add the logo of Grannsamverkan.	Add the name of the system: "GAS — Grannsamverkans Administrativa Stöd" in text format.	Add two text fields where the user can fill in their u-number and password.	Add a button "Log In".	When clicking on the "Log In" button the user should enter the home page.	Add a button "Reset Password".	When clicking on the "Reset Password" button, the user should be directed to a new page where he or she is able to reset their password.

Table 7.2: Portfolio Epic 1 - Epic 1

Log In and Home Page								
Home Page								
As a police officer, I want to enter a home page when I have logged in to my account so I can navigate to various pages.								
Add a header including the logo of the Swedish Police Authority and the logo of Grannsamverkan.	Add a text field where it shows either the name, username or u-number of the logged in user.	Add an AOD (always on display) menu.	Include a "Compounds" button in the AOD menu.	Include a "Order Material" button in the AOD menu.	Include a "Map" button in the AOD menu.	Include an "Email" button in the AOD menu.	Include an "Information" button in the AOD menu.	Add a search field.

Table 7.3: Portfolio Epic 1 - Epic 2 - User Story 1

Log In and Home Page					
Home Page and Navigation					
As a police officer, I want to be able to find valuable information regarding Grannsamverkan on the home page so that I always will be up to date when entering the system.		As a police officer, I want to be able to navigate to the home page, profile page, settings page and be able to log out at any time, so that I can access the pages or log out, no matter my location in the system.			
TBD by the organization.	Include a hamburger menu.	Add a "Home" button in the hamburger menu.	Add a "Profile" button in the hamburger menu.	Add a "Settings" button in the hamburger menu.	Add a "Log Out" button in the hamburger menu.

Table 7.4: Portfolio Epic 1 - Epic 2 - User Story 2 & 3

Log In and Home Page				
Profile				
As a police officer, I want to be able to change my personal information on my profile page so that the information can be accurate.			As a police officer, I want to be able to change my password on the settings page so that I can ...	
Add a text field with the header "Name".	Add a text field with the header "Email".	Add a button "Edit" below the text fields so that the user can edit their personal information.	When clicking on the "Edit" button, a button "Save" should appear.	Add a button "Change Password" so that the user can change its password.

Table 7.5: Portfolio Epic 1 - Epic 3

Log In and Home Page						
Settings						
As a police officer, I want to be able to select on the settings page which municipality/municipalities to appear on my page so that I can manage the municipality/municipalities which I am responsible for.			As a police officer, I want to be able to decide if the check boxes on the compounds pages should act as a way of determining whether or not the compound is active or inactive, on the settings page so that I am not limited by the functionalities of the system.			
Add a text field "Municipality" as a header to the feature.	Add a text field with a drop down which includes all of the municipalities in Sweden.	The user should be able to select one, several or all of the municipalities.	Add a text field "Compounds Page" as a header to the feature.	Add a checkbox "Show 'Training Completed'" which should by default be filled in.	When deselecting the checkbox, the "Training Completed" checkbox on the compounds pages should be removed.	Add a checkbox "Show 'Received Material'" which should by default be filled in.
						When deselecting the checkbox, the Received Material checkbox on the compounds pages should be removed.

Table 7.6: Portfolio Epic 1 - Epic 4

7.2 Portfolio Epic 2

The second portfolio epic aims to capture the functionality of the compound management feature which includes three epics – Overview of Compounds, Create New Compounds, and Compound Page. These epics are all related to the administration of the various compounds and delegates. The feature includes an overview of every compound in the form of a list, the user will be able to easily navigate in the list and search for the desired compound. Furthermore, every compound will have their own "compound page" where information about the compound and the delegate/s of the compound can be found. Lastly, the compound management includes a feature which allows the user to create a new compound. All of the three epics are

7. Results

presented in Tables 7.8, 7.9, 7.10, and 7.11. In Table 7.7 an overview of the second portfolio epic can be seen.

Compound Management																									
Overview of Compounds						Create New Compound						Compound Page													
US1						US2						US1						US2							
T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T1	T2	T3	T4

Table 7.7: Overview of Portfolio Epic 2.

Compound Management									
Overview of Compounds									
As a police officer, I want to navigate in a list, with an alphabetical order, with all of the compounds so that I can easily scroll among them.					As a police officer, I want to be able to search so that I can easily find the compound I am looking for.				
On the first page, add a list with all of the compounds which has an arrow on the right to indicate that the user can click on the compound.	Between the name of the compound and the arrow, add a point (either green or red) which will indicate if the compound is active (green) or inactive (red).	Add a drop-down bar called "Status" which holds "Active", "Inactive" and "Both" as alternatives.	Add a drop-down menu called "Municipality" which holds a list of all of the municipalities and an alternative "Show All".	Add a button "Create New Compound".	When clicking on the "Create New Compound" button, the user is directed to a new page (Epic 2 - Create New Compound).	Include a search bar which includes searching for a name of a specific compound, location or name of a delegate.	Include a button "Map Search". Where the user can navigate on a map and pinpoint where the desired compound is located.	When clicking on the "Map Search" button, a pop-up window should appear with the map.	

Table 7.8: Portfolio Epic 2 - Epic 1.

Compound Management							
Create New Compound							
As a police officer, I want to be able to create a new compound so that I can have them documented in the system.						As a police officer, I want to be able to send a template to a compound where the delegate can fill in the template with the necessary information so that I can add the information to the system.	
Add the following text fields: name of compound, municipality, area within the municipality, delegate/s and contact information to them, number of households and addresses.	Add a checkbox "Training Completed".	Add a checkbox "Received Material".	Add a radio button which states whether the compound is active or inactive.	Add a feature which allows the user to mark the compound on an area.	Add a "Create Compound" button which creates the compound.	Add a feature which lets the user download the template. The template should include the following: name of the compound, delegate/s and their name, surname, address, email and phone number. Municipality and what area within the municipality. Total number of households within the compound and the addresses to the households.	Add a feature which lets the user upload an already filled in template.

Table 7.9: Portfolio Epic 2 - Epic 2.

Compound Management									
Compound Page									
As a police officer, I want to be able to navigate on a "Compound Page" so that I can find specific information about the compound.									
Include contact information about the delegate on the compound page including; name, address, phone number and email.	Include the number of households in the compound and a list of addresses to the household.	Add a button "Order Materials" which will redirect the user to the order materials page.	When redirected to the order materials page, the information regarding the specific compound should be auto filled.	Add a status feature which indicates whether the compound is active or inactive.	Add a terminate feature which allows the user to terminate the compound.	Add a feature which allows the user to see where the compound is located on a map. A marked area should be shown, indicating where the compound is located.	Add a checkbox "Training Completed" which will let the user keep track of whether the delegate/s of the compound has completed mandatory training.	Add an "Edit" button which will allow the user to edit all of the information on the compound page.	When clicking on the "Edit" button, a "Save" button should appear.

Table 7.10: Portfolio Epic 2 - Epic 3 - User Story 1.

Compound Management			
Compound Page			
As a police officer, I want to be able to email the specific compound which I am currently managing so that I do not have to exit the compound page and navigate to the email page.			
Add a button “Email” on the compound page.	When clicking on the email button, a pop-up window should appear.	The pop-up window should have the email of the delegate/s of the specific compound filled in automatically.	The user should be able to add several recipient to the email.

Table 7.11: Portfolio Epic 2 - Epic 3 - User Story 2.

7.3 Portfolio Epic 3

The third portfolio epic aims to capture the functionality of email management and ordering of materials. The first refers to updated and dynamic email lists, and will include a feature which makes it easy to access the desired email address and later export them to outlook. The latter refers to ordering of materials related to Grannsamverkan, which is made to SSF. The portfolio epic consist of two subsumed epics – Dynamic Email Lists and Order Materials – and these are presented in Tables 7.13, 7.14, 7.15, and 7.5. In Table 7.12 an overview of the third portfolio epic can be seen.

Email and Order Materials																			
Dynamic Email Lists												Order Materials							
US1						US2						US1		US2				US3	
T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T1	T2	T1	T2	T3	T4	T1	T2

Table 7.12: Overview of Portfolio Epic 3.

7. Results

Email and Order Materials					
Dynamic Email Lists					
As a police officer, I want to be able to have maintainable lists with all of the email addresses to the various delegates, so that I can get an overview and easily manage and navigate among them.					
The email addresses should be derived from their respective compound page.	The user should be provided with a list of all of the delegates email addresses within their area of responsibility.	The user should be provided with N default email groups consisting of all the delegates within the same municipality.	The user should be able to create new email groups.	The user should be able to maintain already existing email groups, in terms of adding and removing addresses.	Add a search field so that the user can navigate among the groups, lists and email addresses.

Table 7.13: Portfolio Epic 3 - Epic 1 - User Story 1.

Email and Order Materials					
Dynamic Email Lists					
As a police officer, I want to be able to retrieve email addresses from the updated lists and export them to Outlook so that I can avoid delivery failures when emailing my contact agents.					
Add a button which allows the user to begin retrieving email addresses.	The user should have the option to retrieve all of the email addresses.	The user should have the option to retrieve one or several email groups.	The user should have the option to search for specific email addresses.	The user should have the option to retrieve email addresses by marking the desired area on a map.	When the user has chosen the desired email addresses, it should be possible to have them exported to Outlook.

Table 7.14: Portfolio Epic 3 - Epic 1 - User Story 2.

Email and Order Materials							
Order Materials							
As a police officer, I want to be able to order materials to the compounds from SSF so that all of my duties related to Gransamverkan is gathered in the same system.		As a police officer, I want to have all of my personal information saved so that I do not have to fill them in every time I make a new order.			As a police officer, I want to be able to see my order history so that I can have them stored and view them at any time.		
Use the current structure for ordering materials existing on "samverkan-motbrott.se".	Add a drop-down bar so that the user can select which compound the order is for.	The user should be able to have region, name, surname, delivery address, CIP code, city, phone number and email saved, so he or she do not have to fill them in every time they make a new order.	Add a drop-down for the option "Municipality". When the chosen municipality has been made, the text field below (which is total number of compounds in the municipality) should be auto filled.	Add a button "Edit" where the user can edit their personal information.	When clicking on the edit button, a button "Save" should appear so that the user can save its changes.	Add a list where the user can view the order history in a chronological order.	Add a filter function, so the user can filter the order history depending on compound, location or date.

Table 7.15: Portfolio Epic 3 - Epic 2.

7.4 Portfolio Epic 4

The fourth and last portfolio epic aims to capture the desired map service of the system. The purpose of the map is for the users to easily get a geographically overview of their compounds, where they can navigate and search for specific compounds or delegates. The portfolio epic consist of two subsumed epics - Implementation of Map and Filter Functions – and are presented in Tables 7.17, 7.18, and 7.19. In Table 7.16 an overview of the fourth and last portfolio epic can be seen.

Map																	
Implementation of Map								Filter Functions									
US1		US2		US2				US1									
T1	T1	T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10

Table 7.16: Overview of Portfolio Epic 4.

Map							
Implementation of Map							
As a police officer, I want to be able to navigate on a map so that I can geographically see my compounds.	As a police officer, I want to be able to have the system integrated with internal system 1 and internal system 2, so that I can access data seamlessly between the systems.	As a police officer, I want to be able to mark an area on the map so that I can get information about the marked area.					
Implement a map.	Integrate the system with internal system 1 and internal system 2	Add a button "Marker".	When clicking on the "Marker" button the user will be able to mark on the map.	Display the compounds within the marked area in terms of a dotted line/-s around the compound/-s.	When the user hovers over a dotted line area surrounding a compound, an information box should be displayed consisting of the compound name and the delegate. As well as a feature allowing the user to be directed to the specific Compound Page.	Information about the compounds within the marked area should be displayed consisting of the name of the compounds together with information about the compound agents.	Add a feature allowing the user to send out an email to the compounds within the marked area.

Table 7.17: Portfolio Epic 4 - Epic 1

Map				
Filter Functions				
As a police officer, I want to be able to visualize the compounds based on various properties so that I can see the locations of the compounds within the chosen properties.				
Add a dropdown "Compounds" which holds all of the compounds as well as the option to "Show all" (as the first option).	The user can select any number of compounds within the dropdown to have the locations visualized on map.	When the option "Show all" is selected all the compounds locations are visualized on the map.	Add a dropdown "Municipalities" consisting of the different municipalities managed, as well as the option to "Show all" (as the first option).	When a municipality is selected, all the compounds locations within that municipality are visualized on the map. Multiple municipalities can be selected.

Table 7.18: Portfolio Epic 4 - Epic 2 - User Story 1 - Tasks 1-5

7. Results

Map				
Filter Functions				
As a police officer, I want to be able to visualize the compounds based on various properties so that I can see the locations of the compounds within the chosen properties.				
Add a dropdown “Status” consisting of the two options “Active compounds” and “Inactive compounds” as well as the option “Show all” (as the first option).	When “Active compounds” is selected, all locations of the active compounds are visualized on the map.	When “Inactive compounds” is selected, all locations of the inactive compounds are visualized on the map.	When “Show all” is selected, all of the compounds, regardless of status, are visualized on the map.	When the user hovers over one of the compounds, an information box should be displayed consisting of the compound name and the delegate. As well as a feature allowing the user to be directed to the specific Compound Page.

Table 7.19: Portfolio Epic 4 - Epic 2 - User Story 1 - Tasks 6-10

8

Discussion

This chapter aims to discuss various aspects, choices and outcomes of the project. Specifically, both a theoretical discussion and a methodology discussion is included in order to reflect upon the chosen methods and what the theory have contributed with. Furthermore, the results will be discussed in terms of validity, impact and generalizability. Also, the ethical considerations of the project will be discussed as it is a crucial part of any project. Lastly, the limitations and the future work of the project will be emphasized and discussed.

8.1 Theoretical Discussion

The purpose of the theoretical discussion is to bring light to the relevance and contribution of the chosen theory for the thesis. This include discussion of the Grannsamverkan literature, communication aspects between police officers and citizens, and the choice of combining theories and methodology from interaction design and requirements engineering.

8.1.1 Literature Regarding Grannsamverkan

The research that needed to be conducted for the literature review regarding Grannsamverkan was diverse in terms of the level of research that has been produced previously. A large amount of bachelor and master theses was found among the articles researched, containing research mostly on a local municipal level. Research articles regarding the Neighbourhood Watch worldwide was more widespread, covering various attempts of improvement and investments made. Therefore, a lot of information regarding Grannsamverkan in Sweden was found on the SAMBO website. However, regarding the police officers' duties, which is presented in the Background chapter in Section 2.2, it only contains a small bullet list of responsibilities.

Moreover, since it does not exist specific national guidelines on how the local police officers should administrate Grannsamverkan. This has instead allowed for the different local municipalities and police officers to come up with administrate solutions themselves, in terms of responsibilities and duties among them. This has, as been discovered in this project, led to a number of dissatisfied police officers feeling a lack of structure and support from the municipal in their work.

8.1.2 Communication Aspects

A recurring theme throughout the progress of this project has been regarding the consideration to include a communication or chat feature in the digital tool. This topic has been brought up in both the survey and the interviews, eliciting varying levels of enthusiasm from the participants. While some participants view it as a modern and effective means of communicating, others have raised some concerns and expressed caution regarding such a feature. However, early on in the project process the Swedish Police Authority made it clear that they do not support a chat function between the police and citizens due to the extensive documentation and coverage it would entail.

An alternative way of facilitating direct communication between police officers and citizens regarding Grannsamverkan, besides the current email communication, is through social media platforms. The possibility of utilizing platforms like Facebook, or similar platforms, for establishing Grannsamverkan is a practical and cost-effective opportunity. Unlike developing new software or tools, leveraging existing social media platforms would require minimal resources. A handful of participants even brought up in the survey that they already have incorporated it in their work with Grannsamverkan. Moreover, given the popularity of Facebook and its widespread usage among Swedes, it presents a viable option. However, as mentioned in Theory chapter 3.6, previous attempts, such as Project Eyewatch, to bring the Neighbourhood Watch concept to platforms like Facebook have in practice failed to deliver and have faced significant challenges due to the climate of social media. Moreover, there was evidence that Neighbourhood Watch Facebook groups contributed to bring the communities closer in the goal to reduce crimes, it became apparent that the focus had shifted from crime prevention to a focus on fear as well as intense reporting leading to vigilantism and discriminatory practices.

Regarding a concept like Grannsamverkan, one consideration is the significance of preventing the public distribution of false information, racist slurs, and defamatory remarks. Therefore, it is preferable to have a controlled environment where citizens can interact with law enforcement in a safe manner. Rather than an environment where knowledge may be swiftly exchanged and disseminated to the general public, like Facebook or Twitter. This project has also examined applications like Safeland, Coyards, and SSF Grannsamverkan, where greater emphasis is placed on ensuring people's security in a way that social media platforms cannot guarantee. However, it is important to note once again that the Swedish Police Authority advises against the use of for-profit platforms by police officers. While police officers have mentioned efforts to encourage delegates to use and promote such platforms to their neighborhoods, it is done mostly without direct police involvement.

Arguably, a practical approach to implementing a chat function within Grannsamverkan activities could be to have it monitored and promoted by the municipalities, as they are not bound by for-profit considerations like the Swedish Police Authority. Due to having to enhance the work for crime prevention activities, by law, this could be one of the responsibilities of the municipalities in terms of a collaboration with the Swedish Police Authority.

8.1.3 Combining Interaction Design and Requirement Engineering

Using frameworks and methodologies from both Interaction Design and Requirements Engineering has been effective for this project. As explained in the Theory chapter in Section 3.7, Requirements Engineering focuses on identifying what needs to be designed. Due to not being police officers ourselves and lacking prior experience in the routines and structures of the Swedish Police Authority, it was highly necessary to investigate the perspectives and needs of police officers to understand the problem at hand and to produce appropriate requirements to meet their needs. Further, achieving a user-centered framework and focusing on an intuitive user experience have been top priorities. To meet these goals, interaction design methodologies have been used in order to tailor to the expectations of the end-users.

Partly why it has been effective to combine the two fields have been due to the fact that they are rather similar in their methodology, for example, the usage of User stories is mentioned by both Soren Lausen in *Software Requirements Styles and Techniques* [35] and Alan Cooper in *About Face: The Essentials of Interaction Design* [38]. With a difference that Lausen calls them "Tasks" instead of "User Stories". Furthermore, the similarities between the fields is likely due to the fact, as mentioned in the Theory chapter in Section 3.8, that Interaction design borrows techniques from other fields. While there are resemblance between the two frameworks, they each offered unique approaches to the project process that benefited the project in different ways. Therefore, it was decided to incorporate the essential elements of both frameworks as means of ensuring that the results meet the needs of the end-users in terms of both functionality and usability.

8.2 Methodological Discussion

The methodology discussion aims to discuss the chosen methodology for the thesis, including the Double Diamond, the interview approach, the usability inspection, and the choice to include user stories in the project and the exclusion of scenarios.

8.2.1 Choice of the Overarching Framework

The chosen framework for the thesis, the Double Diamond design model, consisted of four phases – Discover, Define, Develop, and Deliver. The four phases offered a structure well fitted for the project. In order to uncover potential issues, challenges, and to learn more about the problem at hand, the subject matter was explored during the Discovery Phase. The phase involved extensive learning, allowing us to broaden our understanding of the project. The knowledge gained during the Discover Phase would later be utilized to narrow down the project in the subsequent phase, the Define Phase. Furthermore, narrowing down the project at an early stage was crucial and beneficial for the project as it provided the direction which the project would proceed in. Also, narrowing down the project at an early stage mitigated the risk of wasting time on aspects which were not relevant for the project. However,

narrowing it down too early could potentially lead to overlooking crucial aspects that hold significance for the project. After the project had both been broadened and narrowed, it was time to once again broaden it by exploring various ideas and solutions. Not being limited during this phase, but rather being encouraged to explore and expand one's horizons, resulted in many ideas and solutions which could be excluded one by one until we reached the desired one. Ending with the Deliver Phase, allowed for revising of the requirements specification and ensured that the outcomes of the project met the expectations of the end-users.

In the initial stage of the project it was planned to make use of the ubiquitous framework within interaction design – *the Iterative Process*. However, as this thesis has consisted of a pilot study, the structure of the Double Diamond provided a better fit for the project. Had the thesis been more focused on design, the Iterative Process would most likely been preferable as it offers a structure where each step is iterated until satisfaction is reached.

8.2.2 Interview Approach

The choice of conducting semi-structured interviews for the first round of interviews was made in order to allow for interviewees to somewhat have the opportunity to bring up aspects and topics freely and not be stirred in any particular direction. While this approach produced some interesting takes and comments regarding Grannsamverkan as a concept, it also prompted some participants to wander off topic and provide long-winded responses. This, in turn, resulted in a time-consuming documentation and analysis. In hindsight, it could be argued that more structured interviews might have been a better choice for the first round, as they would have allowed for more efficient and focused data collection and analysis. Nonetheless, the semi-structured format did yield valuable insights into topics such as the citizen meeting, which had not previously been explored. These insights were highly advantageous to gain a deeper understanding of the challenges and opportunities associated with Grannsamverkan, and provided a knowledge base for the project.

In terms of the interviewees taking part in the interviews, the participation pool for the project has been personnel administering Grannsamverkan. Having reached out 150 individuals working with Grannsamverkan, with as mentioned, 10 delivery failures, 79 responded to the survey where 33 expressed that they were interested in taking part in upcoming interviews. While this level of interest is encouraging, it does represent a relatively small pool of potential participants compared to the initial group of 150. As a result, there was a potential risk to not achieve a broad range of perspectives or opinions among the interviewees.

As mentioned prior, due to being an authority, the Swedish Police Authority has certain rules and regulations regarding data collection and data security. One aspect of the project affected by this was the recordings and transcriptions of the conducted interviews. The online communication tool used does not include either video or audio recording options, meaning that the interviews were audio recorded using another approved tool. Moreover, the recording quality also depended on the setup of the interviewees, where some provided better quality in terms of using a

microphone while others used their computer microphone or were in a more noisy surrounding. Much action was taken to end up with as good audio quality as possible in terms of using conference rooms equipped with good speakers and asking for the interviewees to be in calm surroundings. However, when transcribing the recordings a significant amount of time was required to listen carefully to the recordings to accurately transcribe the content. In many cases, the need to replay small sections of the recording multiple times in order to distinguish what was being said further added to the time and effort required for transcription.

8.2.3 Requirement Specification Format

One should always be critical to methods used and having followed the authority's way of presenting the requirements may not have been the best method to use. The choice of the requirement specification format was rooted in how the Swedish Police Authority currently present their requirements for projects. The structure of portfolio epics, epics, user stories and tasks is very similar to the structure mentioned in the Methodology chapter, in Section 4.6, with themes, epics, user stories and tasks. Due to the similarities in the structures as well as wanting to adapt ourselves to the routines within the authority, we decided to follow to their way of presenting requirements. Furthermore, we believe that by having followed their format, the possibility of the continuation of the project from the Swedish Police Authority, have increased since they do not need to change elements of the requirements structure.

8.2.4 Choice of Evaluation

The choice to use an Usability inspection instead of doing an empirical evaluation, such as user testing, as a method to test and validate the functionality and requirements was mostly made due to the project having a time limitation. Planning, coordinating, executing and analyzing user tests takes a lot of time. However, it can provide more realistic and general insights into how the users validate the system, due to having multiple perspectives.

Not being police officers ourselves, we recognized the risk of potentially overlooking important functionality. Therefore, having an expert who is a police officer currently administrating Grannsamverkan was viewed as essential to achieve a successful inspection. Furthermore, the expert has valuable insight into the concept of Grannsamverkan itself, as they are the Swedish Police Authority's representative, as stated on the SAMBO website. However, relying solely on one person's thoughts and opinions can introduce biases that undermine the validity of the evaluation. To minimize these biases, several steps were taken. Firstly, the expert was asked to be as objective as possible and to focus on factual aspects when evaluating the system. This to ensure that the evaluation was based on objective evidence rather than personal opinions or biases. Moreover, also having the focus group take part in the evaluation process allowed for more perspectives and insights from different aspects of the authority.

8.3 Results

It is essential to discuss the results of the project, considering both the validity of the results and the significant impact they are expected to bring. By examining the validity of the results, we can ensure reliability and credibility, allowing for strong and dependable conclusions to be drawn.

8.3.1 Validity of Results

Like any other project, it is important to discuss the validity of the results. Avoiding errors is almost inevitable, and discussing the validity of the results allows for examining the limitations and potential errors that might have affected the outcome of the project. Acknowledging the presence of errors and discussing the validity of the results promotes transparency, enables critical evaluation, and supports the continuous improvement in the pursuit of reliable research outcomes.

Regarding the survey and the sent out questionnaire, several errors were found afterwards. Two questions were asked where the respondents were asked to answer on a three-point likert scale with an additional option “No opinion”. However, this was only included in one of the questions meaning that in the question about whether or not the respondent see a need for a new national digital tool they were only allowed to answer either “Totally agree”, “Partially agree”, or “Do not agree”. The absence of the “No opinion” option in the question created a potential risk of biased or inaccurate responses since it limits the respondents’ ability to express their neutral stance on the matter. By not allowing for this option, there is a risk of forcing respondents to choose an answer that may not accurately reflect their true viewpoint. This can lead to skewed data and potentially misrepresent the respondents’ opinions. Moreover, 5% of the respondents answered “No opinion” in the question which did have the option included, which proves the importance of that option. However, a conclusion can most likely be drawn that only effected the outcome to some extent. Perhaps a participant who wanted to answer “No opinion” instead answered “Partially agree” or “Do not agree”, if the same amount of respondent would have answered “No opinion” in this question as in the question which had the option included, there would still be a majority answering “Totally agree”.

Another error in the questionnaire which was discovered afterwards was misleading alternatives provided in the age question. The respondents were given the several alternatives in the form of age ranges, two of them were “50-65” and “65+”. This arrangement proved to be confusing as the alternative “65” was included in both age ranges, potentially causing confusion for respondents who were precisely 65 years old. While it is worth noting that this error was not deemed to have a substantial impact on the data’s overall validity, maintaining transparency require acknowledging even minor errors.

One of the main topics in the survey was about the tools utilized by the police officers. One of the questions in the questionnaire was on this subject and the respondents were asked to state what tools they use to execute their duties in the context of Grannsamverkan. The alternatives included Excel, paper documentation,

internal tools, external tools such as Coyards and SafeLand, and the application “SSF Grannsamverkan”. However, during the first set of interviews, it came to light that certain respondents had mistakenly interpreted one of the alternatives as referring to the website and not the mobile application. Upon reflection, it became evident that the alternative “SSF Grannsamverkan” lacked clarity, resulting in respondent misinterpretation. To address this issue, special attention was given to formulating clear questions for the interviews, ensuring that the participants fully understood the intended meaning behind them.

Due to all of the participants being located all over the country, all of the interviews needed to be conducted online. As mentioned, an internal video-communication system was used and it was only possible to record the interviews through an external tool that only captured the audio. This resulted in poor sound quality, and certain parts of some of the interviews were not included as they were sometimes inaudible. Utilizing, for example Zoom’s built-in recording tool, could have potentially prevented these issues, ensuring that important points raised by the participants were not overlooked, thereby mitigating the risk of data inaccuracies. Unfortunately, we were constrained by the regulations within the authority, which limited the alternatives of recording tools.

8.3.2 Impact

It is debatable whether our work, the thesis project, is *the* solution for the problem at hand, referring to the high workload of the municipal and area police officer in Sweden. During the project, it has been discovered that the problem extends beyond administration. Several of the respondents in the questionnaire and several participants in the interviews, expressed a frustration regarding the many commitments a municipal/area police officer holds. Additionally, bringing up the fact that no national template exist for the work with Grannsamverkan and that all personnel in Sweden does things differently, adding to the already demanding and challenging work environment of the police officers. Nonetheless, the digital tool will, in all likelihood, ease the workload for the many police officers around the country. As a matter of fact, several of the respondents and participants expressed an encouragement for the release of a digital tool, stating that it would benefit them and facilitate the administrative process. However, the fact remains, the Swedish Police Authority needs to consider the workload and expectations of their personnel if they truly desire for a meaningful change.

Lastly, the potential impact and contribution of the new digital tool will heavily rely on the progress of the project. As previously mentioned, the system is designed with the aspiration to accommodate multiple user interfaces in the future. As more stakeholders and users become involved, the system’s impact will grow significantly. By providing delegates and the counter parties in the local municipalities with a user interface, they can actively contribute and further mitigate the workload of the police officers.

8.3.3 Generalizability

A common thread throughout the data gathering phase of this project has been the notion that “everyone does the administration differently” and “there are different routines among everyone”. This understanding has been a central focus since early on, aiming to accommodate the diverse working styles of police officers and to prioritize a user-centered approach. The aim has been to ensure that the digital tool adapts to the users’ needs and preferences, rather than expecting the users to conform to a rigid system. In this aspect the project can be perceived as general, all police officers within the different municipalities in Sweden should be able to use the digital tool when administering Grannsamverkan, no matter where they are located. Moreover, aiming for a national solution with the police officers in mind.

Furthermore, looking at the Swedish Police Authority itself, administration aspects and duties can be found in different departments within the authority. Once again mentioning the authority’s aim of becoming more digitized, Strategy 2024, we believe that our contribution in the digitization of the Grannsamverkan administration can be generalized and applied to other undigitized administration activities within the authority. By improving the administration process in terms of digitization of other concepts within the authority, we believe that the enhancement and concept use will have a positive outcome.

If we were to adapt our the outcomes of this thesis project to a context outside the Swedish Police Authority and Grannsamverkan, it would be to a company where some method or concept is used and where administration is a central part of the work. This thesis has revolved around the fact that the right conditions is crucial in order for one to execute their commitments. If the right conditions are not in place, the use of the method or concept could be negatively effected, which has been proven during this thesis project.

However, when considering a broader international context it can be discussed whether the result of this project can be applied or generalized beyond the specific context of this thesis project. At its core Grannsamverkan, or more internationally, the Neighborhood Watch, revolves around neighbors looking out for each other and in some form having a collaboration with a police authority. Meaning that to a certain degree the digital tool could be applied as an administration tool, in terms of administration of compounds and delegate information. However, the inclusion of features such as allowing for placing orders for materials from SSF (Stöldskydds-föreningen) is highly specific to the ways and structure set up by the owners of the concept in Sweden, SAMBO. Furthermore, if the digital tool is to be introduced as an administration tool for the Neighbourhood Watch in other parts of the world, some adaptations will be necessary. However, in terms of managing compounds and their corresponding delegates, the tool demonstrates inherent flexibility and adaptation.

8.4 Ethical Considerations

Ethical considerations play a vital role in any research project, particularly when involving a Swedish Authority like the Swedish Police Authority. Throughout this thesis, it has been of high importance to continuously review and adhere to the authority's guidelines and possible restrictions, particularly in relation to data gathering. One specific aspect was the need to store the project's content locally instead of using cloud services external to the authority. As a result, a significant portion of the work and research was conducted at the police station to ensure proper access to the project's content.

8.4.1 Data Gathering

All businesses within the European Union must follow the GDPR (General Data Protection Regulation), which certainly applies to the Swedish Police Authority [62]. Among many things, GDPR implies that individuals have the right to know which of their personal information is stored and saved. Further, the raw data that has been collected during the thesis have been saved locally and encrypted on computers provided by the Swedish Police Authority. It acts as a safety measure and follows the routines already in place by the Authority.

In this thesis, compilations and analyses have been presented and discussed without any personal data about the participants. It is always essential to carefully consider the collection, storage, and further save data, particularly when conducting research within an authority. The Swedish Police Authority has strict rules governing data gathering processes, including the duration for which collected data can be retained. Consequently, all raw data collected, such as recordings and transcriptions, were deleted after it had been analyzed. Furthermore, participants in the questionnaire and interviews have remained anonymous in their responses, and all quotes used in this thesis have been presented without names.

The members of the focus group and the expert who took part in the expert review process are not anonymous in this report. This deliberate choice was made to provide transparency and context by presenting their identities. This decision serves as a way to motivate their roles and expertise, contributing to a deeper understanding of their contributions within the thesis. They were all asked for permission to have their names present in the reports and have all approved.

8.4.2 Inclusivity

Inclusivity should be a focus in all projects, it is important to ensure that all users, regardless of abilities or disabilities, effectively can interact with a product. One aspect of this is to, for example, create an interface suited for people with color-blindness. Another example is to provide an interface which makes it possible for people with bad vision to utilize it. This digital tool will not be for the general public but mainly for the authority itself, that said, it is still essential to create an inclusive application that meets all of its users needs.

Throughout this project, a central focus has been on promoting inclusivity in the administration of Grannsamverkan among police officers. This inclusivity encompasses accommodating to different routines and approaches employed by the officers, ensuring that the digital tool is accessible and usable regardless of their location or specific duties related to Grannsamverkan. In addition, inclusivity has been a key consideration in creating and defining the requirements for the digital tool, with a focus on incorporating clear and straightforward features. One example of such aspects is letting the user decide, in the settings page, if he or she wants to have certain aspects of the digital tool visible. This allows for a more customized experience and does not limit the police officers in how they should use the digital tool, it instead gives them the freedom to choose how they administer Grannsamverkan.

8.5 Limitations

The nature of conducting this thesis within an authority, particularly the Swedish Police Authority, introduced certain limitations that affected some aspects of the progress of the project. Specifically, some security aspects and established routines within the authority posed challenges. Accessing internal systems within the authority requires authorization from the internal central approval center, which is only granted if it is deemed necessary in order for the personnel to perform their duties. Consequently, we were unable to obtain access to the internal systems that includes maps and are used to track crime development, which are to be integrated into the digital tool. This is due to the specific crime data and statistics which is intended for police officers to use in their work. Furthermore, this led to having to rely on explanations regarding the functionalities and the reasons behind their utilization by police officers, rather than gaining firsthand experience. This dependency limited the ability to directly explore and interact with the two systems. Meaning that more comprehensive understanding of specific features and functionalities could not be derived solely from our own experience. It is worth mentioning that if we had been granted access to the systems, we would have had the opportunity to get a broader understanding of the functionality possibly leading to a more comprehensive and well-rounded digital tool.

During the data gathering phase, some limitations were encountered due to not having direct access to the internal survey tool. Having to rely on personnel to conduct and publish the survey resulted in some impact on the thesis in terms of time management due to the process taking more time than had been planned. Additionally, not having a complete email list of the police officers working with Grannsamverkan resulted in being dependent on another personnel in possession of said list, who also of course had other priorities and job duties to see to. As a result of all this, we were unable to directly access the survey data, without help from the personnel, and potential email responses that could have been concerning questions or clarification on the questionnaire.

As is often the case with projects, a longer time frame would have allowed for the inclusion of a larger number of individuals and police officers in the data gathering process. Which would have provided a broader range of perspectives and opinions,

enhancing the foundation of the project. Additionally, allocating more time for a thorough Delivery Phase would have allowed for various user testing sessions and similar activities, ensuring a more comprehensive evaluation of the requirements regarding the digital tool.

Lastly, early on there was an intention to involve both municipalities and delegates in the thesis project, this in order to get more broad perspectives with multiple stakeholders and user interfaces. However, due to the short time limit it was decided to only place focus on the Swedish Police Authority's perspective. This because it was where the project was carried out, but also since we preferred producing a complete well researched requirement specification, and did not want to risk running out of time and ending up with an unfinished specification if more parties would have been involved.

8.6 Future Work

Lastly, the future work of the project should be emphasized and discussed, as its always an important part of any project, but especially relevant for this project since its prospects have been repeatedly raised throughout the course of the project. Several findings were made during the project which were not included in the final product due to it being out of the project scope. However, as mentioned in previously in Section 8.3.2, these findings are crucial for the forthcoming of the project. Besides the technical aspects to the future work of this project revolving around implementing a user interface for the municipalities to make use of. Looking at the new municipality law coming this summer, as mentioned in the Theory chapter, in Section 3.4, an increased collaboration between the Swedish Police Authority and the municipalities of Sweden will be required.

We recommend that the next steps in this digitization process of Grannsamverkan is to organize meetings internally within the Swedish Police Authority to discuss in what way they want the local municipalities to be involved, and to have a united stance on this matter. As been discovered in this thesis project, a majority of the participants that has taken part in the data gathering have expressed a positive attitude to the involvement of municipalities regarding the administration of Grannsamverkan and we believe they should be part of said discussions. Furthermore, meetings and discussions with the organisation SKR, "Sveriges Kommuner och Regioner", (Sweden's Municipalities and Regions) is recommended to be held in order to establish a more national collaboration. SKR describes on their website that their aim is to further develop and contribute to the operations of municipals and regions in Sweden [63], and they will hopefully be a good first actor to involve on behalf of the municipals.

Our intention is as mentioned that municipalities will have access to certain parts of the digital tool via their own user interface. Where they will be able to manage compounds, use the email functionality, have access to the information page and possibly the feature that allows for ordering of materials. However, it is not up to us to decide the division of responsibilities and what access should be granted.

But we do believe that the digital tools unlocks new ways of collaboration between the parties. Furthermore, we strongly believe that an implementation of a delegate user interface where they themselves can provide information directly in the digital tool is an favorable way of trying to solve the lack of updated information of the compounds today.

9

Conclusion

This thesis project have been conducted at the Swedish Police Authority and has consisted of a pilot study, which have looked into the administrative process operated by police officers in the context of Grannsamverkan. During the thesis project, it has been discovered that the concept have been negatively affected due to the poor administrative structures. It has also been found, during the multiple data collection activities, that a new and national digital tool is needed in order to facilitate the administrative process. With that being said, the results of the thesis project aimed to answer the following research question:

What requirements are suggested, in terms of a digital solution, in order for an authority, such as the Swedish Police Authority, to facilitate the administration of a concept, such as Grannsamverkan, to increase and improve the use of the concept?

In order to answer said research question, extensive research, a literature study, one survey, two sets of interviews, one expert review, two focus group meetings, and multiple brainstorming sessions have been conducted. This have resulted in an extensive requirement specification for a digital solution, specifically a digital tool. The requirements specification is made up of four portfolio epics – Log In and Home Page, Compound Management, Email and Order Materials, and lastly Map. These four portfolio epics each consist of X subsumed epics which in turn consist of Y user stories and Z tasks. The purpose of the user stories and the tasks is to realize the needs of the end-users, which captures the desired functionality of the digital tool.

In summary, the requirements specification describes a integrated digital tool consisting of several key activities all revolving around the administration of Grannsamverkan. The digital tool will launch as an internal system which will be implemented as a web application. In a first release the digital tool will offer one user-interface, with the end-users being police officers responsible of administrating Grannsamverkan. The project thesis has intended to lay the ground work for a future inclusion of municipalities to play larger role in Grannsamverkan administration activities.

As a last act, the requirements specification was presented and evaluated by both an expert as well as a focus group within the Swedish Police Authority. Where the digital tool was recognised as an improved and valid solution to the current administrative problems of Grannsamverkan.

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