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Consulting Report - Municipality of Surco: Safety and Well-Being

**TESIS PARA OBTENER EL GRADO DE MAESTRA EN ADMINISTRACIÓN DE
EMPRESAS OTORGADO POR LA PONTIFICIA UNIVERSIDAD CATÓLICA DEL
PERÚ**

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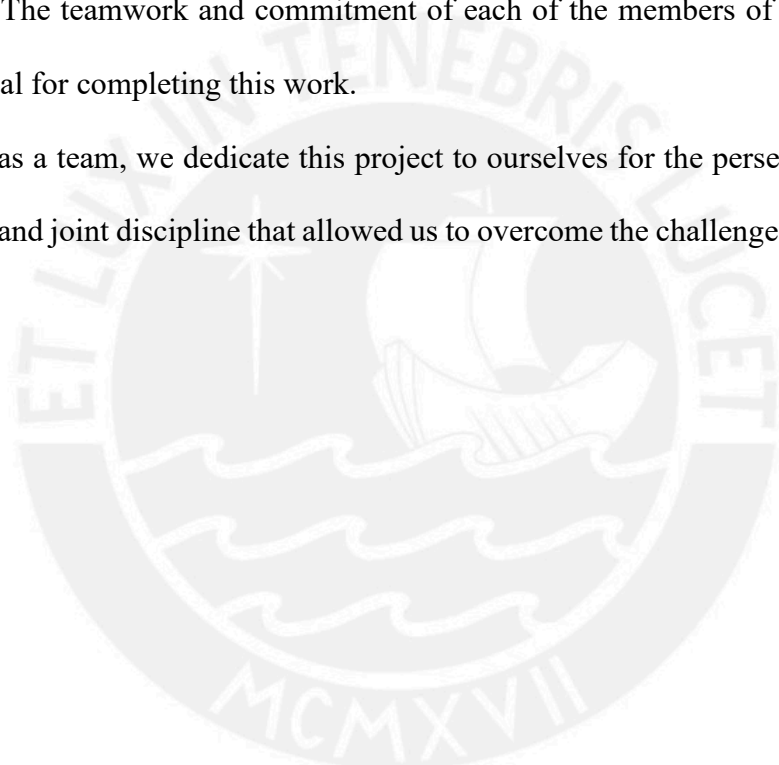
Dedication

This thesis is dedicated to all those people who have accompanied us and helped us to complete this important stage of our professional and personal development.

To our families and friends who with their unconditional support, understanding and good advice have been an invaluable source of motivation to complete this stage, their support was important to move forward with determination.

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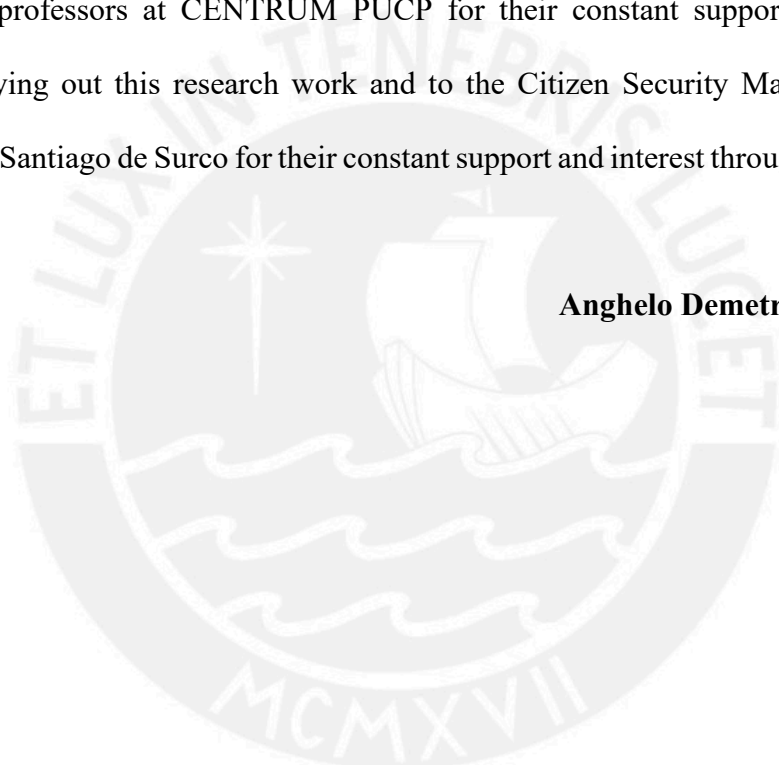
To God: For blessing me with all the valuable experiences I have lived throughout my life, accompanying me at all times, and allowing me to overcome everything.

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Executive Summary

This paper aims to address the issue of community safety in Santiago de Surco, where current security measures fail to meet the needs of the district's residents. Despite the introduction of the Alerta Surco App by the municipality, its limited adoption, functionality, and effectiveness hinder its ability to address safety concerns and foster community engagement. Key challenges include a prevalent sense of insecurity, inefficient communication between residents and authorities, and low awareness of available safety tools.

The proposed solution focuses on advancing the Alerta Surco App through the integration of more advanced features, such as chatbots, to promote community engagement in safety issues, provide real-time assistance, and streamline emergency reporting. Meanwhile, a targeted promotion and education campaign aims to increase user adoption and broader community engagement. The solution offers both immediate benefits, by improving communication and response times, and long-term social value, by fostering trust and collaboration between citizens and authorities.

The expected impact of implementing these solutions includes improved public safety, a reduction in crime rates, and enhanced community well-being. Financially, the App's advancement would be supported by advertising income and partnerships, and given its scalability, it allows for expansion without substantial additional costs, making it a sustainable solution for long-term growth. By aligning with the Sustainable Development Goals (SDGs), this solution not only addresses short-term security issues but also contributes to broader social sustainability, making the Alerta Surco App a viable, scalable solution for public safety management.

Abstract

El presente trabajo de consultoría busca proponer soluciones viables e incorporarlas en los actuales procesos existentes en la Gerencia de Seguridad Ciudadana de la Municipalidad de Santiago de Surco. Con el objetivo de mejorar los servicios de seguridad e integridad social dentro del distrito. Mediante la implementación de la herramienta tecnológica AI Chatbot en el aplicativo móvil Alerta Surco que nos permitiera hacer más eficiente y sencillo la interacción entre los usuarios y las autoridades municipales al momento de tomar las denuncias que cada uno de ellos reporte para poder brindarles la correcta intervención o asistencia inmediata que soliciten, El Chatbot nos permitirá estandarizar la información recolectada y generar reportes de seguridad mucho más consistentes cuya calidad de información se encuentra mejor clasificada.

Así mismo, buscamos implementar campañas de educación sobre la cultura de seguridad y correcto uso del aplicativo comenzando en los usuarios correspondientes a la población juvenil con el propósito de generar un cambio en la percepción de cada uno de ellos que pueda generar un cambio en el futuro. Mediante un trabajo coordinado y en colaboración con las instituciones educativas tales como: colegios y universidades.

Mediante el presente trabajo se propone incrementar la cantidad de usuarios que usen el aplicativo Alerta Surco, el cual fue creado para brindar a los usuarios las facilidades necesarias al momento de denunciar y presentar sus quejas. Sin embargo, el impacto que este ha tenido en la sociedad no es el esperado motivo por el cual se desarrollaron las soluciones planteadas con el objetivo de generar un mayor impacto en los usuarios y contribuir con el incremento de la seguridad dentro del distrito de Santiago de Surco.

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Chapter I: Context Analysis

1.1. Municipality of Santiago de Surco

The District Municipality of Santiago de Surco is one of the 43 districts of the province of Metropolitan Lima, currently under the governmental management of economist Carlos Ricardo Bruce Montes de Oca (Municipality of Santiago de Surco, 2023), who throughout the years of his governmental mandate has been gaining the acceptance of the population living within the district for the reforms and investments that have been implemented. The Municipality of Santiago de Surco has 11 departments within its organizational structure, and the Citizen Security Department is the one that will be used for this consultancy work (Municipality of Santiago de Surco, 2023). The Municipality of Santiago de Surco is characterized by its constant residential and commercial development, being one of the districts of Metropolitan Lima where throughout the day there is a general population traffic of about 3 million people due to the presence of universities, hospitals, companies and shopping centers within it (Municipalidad Distrital de Santiago de Surco, 2023). One of the main objectives of the municipality is to guarantee the well-being of its inhabitants, promoting sustainable development within the municipality and guaranteeing the safety and integrity of each of its inhabitants.

According to the District Action Plan “The district of Santiago de Surco has an estimated population of 423,985 inhabitants according to the records of the year 2023” (Municipalidad Distrital de Santiago de Surco, 2023, p. 4) where the highest percentage of the population of inhabitants of the district possess a higher academic university degree and with 69% of the population with an age range of 14 - 59 years old (Instituto Nacional de Estadística e Informática Perú, 2018, p. 24).

1.2. Description of the Problem

Within the existing managements in the Municipality of the Santiago de Surco District there is the Citizen Security Management, which in recent years has been implementing different action plans with the aim of increasing security within the district and guaranteeing the integrity of all its inhabitants. The implementation of state-of-the-art security video cameras, an increase in intelligent patrol vehicles are the measures best known by the population that the municipality has been increasing in recent years (Municipalidad Distrital de Santiago de Surco, 2024). The Municipality of Santiago de Surco since 2023 has been implementing a mobile application called Alerta Surco with the aim of providing the population with a means by which they can report all types of incidents such as emergencies, claims and complaints (Municipalidad Distrital de Santiago de Surco, 2024).

Although this application has increased the interaction and participation of the population in terms of the characterization of emergencies and support in improving response times by authorities in the face of emergencies, it is still at a stage where a large part of the population does not assimilate it and use it in the way expected by the district municipality of Santiago de Surco. The present consulting work has the objective of providing solutions and suggestions in order to attract a greater number of inhabitants of the district to use this emergency reporting application. The aim is to give the inhabitants of the district the available facilities for a simpler and more user-friendly use of the mobile application with the objective of having the largest possible number of the population use the Alerta Surco application.

Chapter II: Defining the Problem

2.1. User Definition

The residents of Santiago de Surco represent a vibrant and diverse community. As of 2023, the population is composed of 423,985 individuals and all of them are urban citizens. Women represent a slight majority, making up 52% of the population, while men account for 48%. This balance in gender shows a well-rounded community. Age-wise, the majority of residents (64.6%) are in the prime working years between 15 and 59, while 16.4% are children under 14, and 19% are 60 years or older (Ministerio de Salud, 2023). This demographic mix highlights the range of life stages and responsibilities represented in the district.

Professionally, Surco's residents are well-educated and skilled. With over 31.9% work in scientific and intellectual professions, it has a population that is driven by knowledge and expertise. Another 19.7% of residents work in service industries, such as sales, who supports the district's robust local economy. Besides, 17.3% are professional technicians, with the remaining 31.1% engaged in various other occupations (Municipality of Surco, 2023). These occupational groups show a community that is intellectually driven, service-oriented, and diverse in skill sets.

The district is divided into nine sectors (see Figure 1), each with its own composition and density. Sector two, the most populous, houses 28.4% of the residents, which makes it an important area for any public service initiatives. Following closely is sector one with 20.2%, and sector nine with 10.4%. These sectors, home to large portions of the population, are central to the everyday experiences of the district's residents. The distribution across other sectors, such as sectors three, eight, and seven, shows how people are spread throughout the district.

Figure 1*Map of the district of Santiago de Surco*

Note. Sourced from Municipality of Surco (2023)

In addition to the permanent population, Surco's people live in an environment of constant movement. The district is bordered by nine other districts, which brings in a floating population that swells to over two million people during peak hours (Municipality of Surco, 2023). This daily influx means that residents share their spaces with a large number of transient visitors, whether they are students, workers, or business visitors. The challenge of ensuring public safety, therefore, extends beyond the permanent residents to include the broader floating population that passes through daily.

2.2. User Pain

In recent years, the number of reported crime cases in Surco has fluctuated (see Figure 2). Property crimes such as robbery and theft have consistently been the most prevalent, accounting for 86.9% of total crimes in 2023. The data shows that the frequency of these crimes has decreased, while the geographical distribution of incidents has become more dispersed (Municipality of Surco, 2023), which can make it more difficult for authorities to predict and

prevent criminal activity. However, it is important to acknowledge that these statistics represent only reported crimes. Research suggests that a large percentage of crimes, particularly theft, go unreported due to a lack of confidence in the justice system (Instituto Nacional de Estadística e Informática [INEI], 2019; Pillhuamán et al., 2010). This means that the actual crime situation may be worse than official statistics reflect.

Figure 2

Statistics by the type of crime in Surco (2018-2023)

Crime Type	2018	2019	2020	2021	2022	2023
Property	5,241	5,577	2,680	3,474	4,678	3,881
Life and Health	431	198	147	234	236	187
Liberty	133	289	189	230	228	202
Public safety	144	104	139	158	233	196
Total	5,949	6,168	3,155	4,096	5,375	4,466

Note. Sourced from Municipality of Surco (2023)

From a perception standpoint, a recent survey of Surco residents reveals that 69.5% of citizens rate safety in the district as "average," with only 21.6% viewing it as "good" and 8.9% perceiving it as "poor" (Miranda & Mario, 2019). The perception of safety highlights lingering concerns among the community. Community participation in safety efforts is similarly rated, with 32.6% considering it "good," 58.3% "average," and 9.1% "poor." As Miranda and Mario (2019) argue, citizen participation in public safety efforts has been minimal in Surco, with responsibility mainly falling on the shoulders of the Serenazgo (local security patrols) and the Peruvian National Police (PNP). They argue, however, effective public safety requires more active participation from residents as it not only fosters peace but also improves the quality of coexistence in the community.

Several factors contribute to the development of citizen insecurity, including social inequality, which produces exclusion and creates a situational environment for its development; unplanned and disorganized urban growth, which generates chaos; a lack of values that disrupts

the community; and drug and alcohol consumption (Instituto de Defensa Legal del Perú, 2003). The liberal economic model has led to the adaptation of new forms of criminal behavior (Focas, 2016).

2.3. SDGs

Sustainable Development Goals (SDGs) consist of 17 objectives established by the United Nations in 2015. These goals address critical global issues such as poverty counteractions, quality education, gender equality, climate action, and sustainable economic development, with a target to achieve them by 2030 (United Nations, 2016). Companies and institutions increasingly reference the SDGs to align their operations with global priorities, showing their dedication to sustainability. By adopting these goals, they enhance their public image, meet the growing demands of stakeholders, and tap into new opportunities by tackling significant global challenges (Hill, 2020).

The study highlights the connection of the research project to four different SDGs. The four goals are not only seen as objectives, but as a ground and guideline for the entire research study. The order of the following suggested goals is according to their relevance for the social problem – the first goal being the most important one.

2.3.1. SDG 9: Industry, Innovation and Infrastructure

The SDG 9 is called Industry, Innovation and Infrastructure. To follow the vision of the goal, companies and organizations must establish initiatives, events and social metrics which advance industrial growth, encourage innovation and develop a robust infrastructure. The research of this paper prioritizes SDG 9, since it stresses the need for technological innovation to solve issues while promoting sustainability. While focusing on this goal the municipality can profit from having an advanced infrastructure which contributes to long-term development (United Nations, 2016). Each SDG has several targets that break down the goal into smaller

milestones. Target 9.5 is of particular importance for the research, since it focuses on strengthening scientific research of technological capabilities of industries with a focal point on developing countries (United Nations, n.d.). The solution which will later be proposed in chapter 4 should be aligned with SDG 9 by leveraging advanced data and innovative artificial intelligence (AI).

2.3.2. SDG 11: Sustainable Cities and Communities

SDG 11 is called "Sustainable Cities and Communities". The goal is to transform urban areas into places that are inclusive, safe, resilient, and environmentally sustainable. Relevant in that regard are providing access of essential services, and safe public spaces. This goal underscores the critical role cities play in achieving broader sustainable development objectives (United Nations, 2016). Especially target 11.7 which is about universal access to safe, inclusive and accessible (green) and public spaces is highly related to the purpose of the research (The Global Goals, n.d.).

2.3.3. SDG 16: Peace, Justice, and Strong Institutions

SDG16 is defined by the United Nations (2016) as "Peace, Justice, and Strong Institutions". This SDG promotes a society which is peaceful and inclusive with minimizing violence, establishing access to justice for all, and setting up accountable and effective institutions (United Nations, 2016). SDG 16 was chosen since it emphasizes the creation of stable environments where people can live free from fear of crimes, contributing to sustainable development and equitable growth in the district. Particularly target 16.1 is of high importance due to its focus on reducing all forms of violence (United Nations, n.d.).

2.3.4. SDG 3: Good Health and Well-Being

Lastly, "Good Health and Well-Being" is the topic of the SDG 3. The efforts of achieving this goal are related to enable healthy lives and establish well-being for people of all

ages (United Nations, 2016). In regard to the research, those people are the users defined in chapter 2.1. SDG 3 emphasizes the importance of reducing health risks from environmental factors. By achieving SDG 3, global health outcomes should be improved, and it should be ensured that everyone has the opportunity to lead a healthy life. Since the aim is solving the social problem, the solution should also foster a secure environment, economic stability, social cohesion, and a higher quality of life. Integrating SDG 3 into the project not only enhances the immediate physical safety of residents but also supports their long-term mental and emotional health, ensuring a holistic approach to community well-being.

2.4. Social Metrics

Setting multiple sustainable goals is crucial when trying to solve a social issue, however that alone is not enough. Indicators and metrics should help evaluating current situations and re-evaluating those will show developments of towards desired targets. Social metrics were chosen for each of the selected Sustainable Development Goals of the previous subchapter.

Industry, Innovation and Infrastructure (SDG 9): Since this social goal is strongly linked to the research focus on a technology-based solution, the paper suggests social metrics which give insight into the number of citizens using applications which are already available to them provided by the Municipality of Santiago de Surco. In this case, it would be the App Alerta which provides multiple features for the citizens of Surco which can be used to report accidents, make emergency calls and get information from the Municipality. Therefore, the identified metrics is similar to a social media metrics which informs about the number of subscriptions of the app and how active the subscribers actually are. To calculate the activity of subscribers is done via the Activity Ratio (AR) and measures the audience's engagement.

AR= Active members/All members

Active members = regularly using and engaging in the App

All members = all members signed in the App, also inactive members (Davis, 2017)

Other helpful indicators are ones which inform about the volume and variety of data in terms of public records or surveillance footage.

Sustainable Cities and Communities (SDG 11): Measuring the safety concern of the citizens of a community is a social metric which is strongly connected to the actual safety in an area. For example, Ardabili, B. R., et al. (2024), conducted research in Charlotte in North Carolina in which they investigated the effectiveness of existing video surveillance systems and AI-driven video surveillance technology by organizing in-person surveys with 410 participants.

Peace, Justice, and Strong Institutions (SDG 16): The paper identifies that metrics which evaluate the effectiveness of law enforcement as relevant in regard to SDG 16 and the social problem. Quantitative metrics can range from measuring response times, length of patrol shifts, reported crime rates or calls for service (Dau, Vandeviver, Dewinter, Witlox, & Beken, 2023). Regarding fluctuating crime rates, a study by Cohen and Felson (1979) found out that the main factors which influence the rates are availability of the target, the offender and the absence of capable guidance.

Good Health and Well-Being (SDG 3): Various factors contribute to the overall well-being of city residents. The Quality-of-Life Index (QLI) is an attempt to quantify the livability of a community for its average inhabitant. The index includes several sub-indexes, each representing key aspects of quality of life, such as health index, education index, peace index (Khalil, 2012).

2.5. Scalability

The scalability of the proposed solution will be crucial for enhancing well-being in Surco and beyond. Key to this is fostering collaboration between the Municipality of Surco, the PNP, and SUTRAN (Superintendencia de Transporte Terrestre de Personas, Carga y Mercancías). By integrating data from multiple sources, the solution can be tailored to Surco's needs and easily adapted to other districts (L. Miranda, personal communication, July 23, 2024). Expanding the solution to neighboring districts such as Miraflores and San Isidro will create a more cohesive safety network across the city. A unified approach that standardizes the emergency response and safety features across multiple districts can lead to a more cohesive and efficient system, reducing redundancy and enhancing the overall safety and well-being of Lima's residents (E. Espinosa, personal communication, July 22, 2024).

Technology plays a vital role in this scalability. Implementing machine learning can automate processes, saving time and resources while improving emergency response efficiency. AI can automate many processes, reducing the need for manual intervention, thereby saving time and resources. This makes the solution not only effective for Surco but also replicable in other parts of Lima.

Chapter III: User and Customer Research

This chapter aims to explain the process used to define the profile, experiences and needs of the user. This definition is highly important, since the solution should have a high social impact of a large group of individuals and positively affect those end-customers. The study uses a qualitative research method which is closely linked to ethnography. According to John Van Maan (2011), ethnography is “the study and representation of culture as used by particular people, in particular places, at particular times” (p. 155). The method suggests spending time in the environment, interacting and not altering real life to connect with the user. It involves understanding the social and cultural context in the environment which should help explaining outcomes of the research (Kwame, 2018).

3.1. User Profile

This study is driven by the aim to deal with the social issue related with the well-being of Surco’s residents. This topic is simultaneously the need of the users of this project. However, it is highly important to explore relevant information for underlying issues on that regard. To gather such data, the research involves interviews of different groups of users which are members of the municipality office, the Peruvian National Police (PNP) and residents of Surco. Those parties were interviewed during different individual sessions. An interview guideline helped as a guideline, however the sessions still allowed flexibility in an explorative environment. A summary of the first round of interviews – four interviews at the remises of the municipality and six interviews with residents of Surco are attached as Appendix A and B. Relevant information was gathered on both sides – in the interview with the citizens and with the authorities. The following paragraphs summaries the findings of the first round of interviews which were conducted to define the user profile.

The questions for the citizens aimed to find out relevant information regarding their pain points and challenges living in Santiago de Surco regarding safety and their well-being.

Furthermore, needs, expectations, community perception and feelings of the individuals were explored.

3.1.1. Citizens: Pain Points and Challenges

A recurring theme across all interviews is a sense of insecurity, particularly at night, and an increase in crime, including theft and drug-related incidents. The interviewees often mention a perceived decline in the effectiveness of security measures over the past few years, despite initial improvements (C. Román, personal communication, July 23, 2024). Factors contributing to this decline include a lack of police personnel (L. Miranda, personal communication, July 23, 2024), inadequate technological resources, such as malfunctioning or insufficient surveillance cameras, and the influence of migrants, which some believe has contributed to rising crime rates (C. Román, personal communication, July 23, 2024). Additionally, many residents are either unaware of or do not use tools like the Alerta Surco App (J. Villavicencio, Á. Aucaclla, C. Mayora and C. Román, personal communication, July 23, 2024).

3.1.2. Citizens: Needs and Expectations

Regarding their needs and expectations, the interviewees express a strong need for more consistent and visible security measures. This includes increasing the number of surveillance cameras, ensuring they are well-maintained, and enhancing nighttime security presence. There is also a call for better coordination between the municipality and other security forces (C. Román and Á. Aucaclla, personal communication, July 23, 2024), as well as for more advanced technological solutions, such as drones and artificial intelligence, to improve crime prevention and response (L. Miranda and F. Ccarhuas, personal communication, July 23, 2024). Furthermore, several interviewees emphasize the importance of strengthening the relationship between the community and security personnel, advocating for more proactive communication and collaboration. Furthermore, there is also a strong desire for a more open and proactive

relationship between security personnel and the community to rebuild trust and ensure the successful implementation of new safety measures (C. Román and Á. Aucaclla, personal communication, July 23, 2024).

3.1.3. Authority: Pain Points

Another set of interviews (Exhibit 2) were conducted at the central office of the Municipality of Surco with several stakeholder in the security system of the district. The primary issues revolve around coordination and technology integration. Despite having a robust surveillance system and relatively quick emergency response times, there are challenges in data management, particularly in the accurate recognition of repeat offenders and the sharing of critical information between different security entities like the National Police and Serenazgo. The limitations of current surveillance technologies, budget constraints, and insufficient training for personnel are also significant pain points, leading to gaps in crime prevention and response (J. Wilson, personal communication, July 22, 2024).

3.1.4. Authority: Needs and Expectations

There is a clear need for technological upgrades, including the implementation of facial recognition systems (J. Wilson, personal communication, July 22, 2024) and advanced data analytics to track criminal activities more effectively (E. Espinosa, personal communication, July 22, 2024). Interviewees emphasized the importance of continuous updates to security systems (J. Wilson, personal communication, July 22, 2024), better inter-agency coordination, and increased investment in equipment and training (R. Picardo, personal communication, July 22, 2024). Community involvement is also identified as a critical area needing improvement, as current participation levels in security initiatives are low (E. Espinosa, personal communication, July 22, 2024).

3.1.5. Meta User

The findings of each interview allowed the researchers the creation of the user profile. The user is the central point for whom the solution is developed. This customer should stand for the entire community that benefits from the proposed solution in the end (Soñta-Drączkowska, Cichosz, Klimas, & Pilewicz, 2024). The meta user for the project is a university student called Carlos Rodrigo Lopez Garmarra, 26 years old and lives in Surco Viejo. Carlos is a responsible and dedicated student with a clear focus on his academic and professional goals. He lives with his parents and younger brothers, taking on the role of the eldest son by providing support and care for his family. His social circle includes university peers, neighborhood friends, and those from the local community in Santiago de Surco. Carlos is passionate about using technology, such as artificial intelligence in his day-to-day life. Despite his busy schedule, he finds time for outdoor activities like running, gym, and football, but remains concerned about safety issues while practicing sports, especially in less commercialized and remote areas of his district. The sketch of the meta user is found as Appendix 3.

3.2. User Experience

To develop an overview of the emotions and thoughts of the meta user Carlos, as he navigates a typical scenario in his daily life, an experience map was created. The visualization of the map is shown as Appendix 4 in the Appendices Chapter. Initially, he feels stressed from exams and decides to go for a run to clear his mind. This decision is a positive step, reflecting his hope that exercise will bring relaxation and peace. However, as he prepares to run, he notices the sky darkening, which triggers caution and worry about safety. During the run, Carlos experiences calm until he witnesses a person on a motorcycle stealing from an older woman. This shocking event causes panic and insecurity, marking a significant negative moment in his experience. Despite his fear, Carlos acts by calling the security office, but this

leads to feelings of nervousness and uncertainty, as he isn't sure whether the authorities will resolve the issue effectively. Back at home, Carlos reflects with a mix of hope and lingering uncertainty, wishing for a safer community. This experience highlights the importance of the project, which aims to enhance safety and give users like Carlos greater peace of mind in their daily lives.

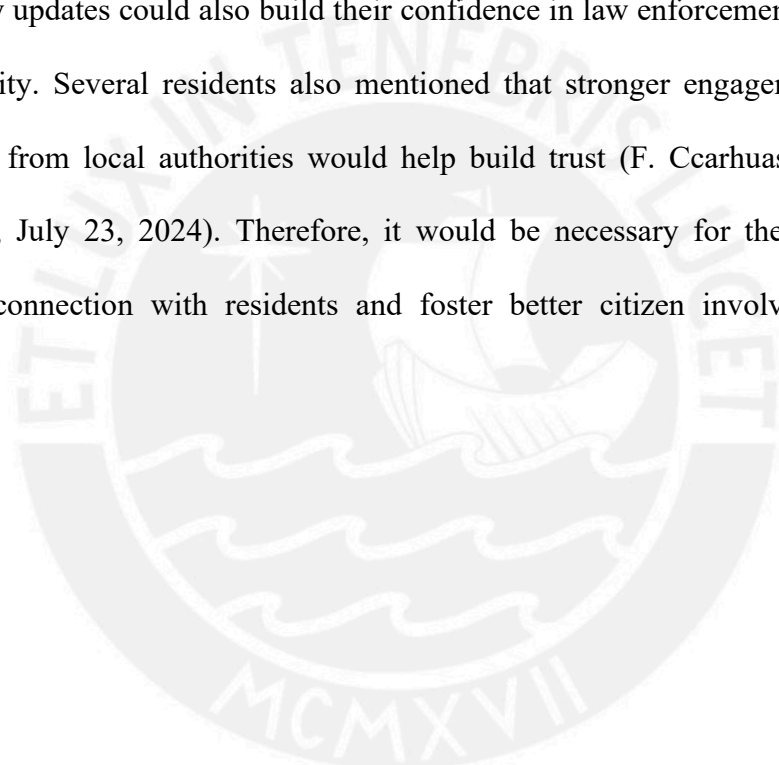
3.3. Identification of the Need to solve for the User

To better understand the needs of Santiago de Surco's residents, interviews were conducted to gather their perspectives on safety and well-being. A common theme that emerged was the need for a safe environment where they and their families could live without the constant worry of physical or mental health risks (B. Mur et al., personal communication, July 23, 2024). Given the already hectic lifestyles of many residents, they require peace of mind both at home and in public spaces, especially at night, when crime rates tend to be higher.

One key issue raised by many interviewees was the need for safe, accessible public spaces for recreation. Since outdoor activities are frequently mentioned ways for residents to unwind, they expressed frustration over the lack of adequate security measures in some public areas. Some noticed broken or missing surveillance cameras and a shortage of security personnel, which made them feel uneasy. (J. Villavicencio et al., personal communication, July 23, 2024). Thus, having a reliable system of security equipment and personnel in place is seen as important for fostering a sense of safety.

Additionally, some residents admitted they were not always aware of potential dangers or what could pose a risk, and they had limited knowledge about how to respond to different types of crime beyond simply calling the police (C. Mayora, personal communication, July 23, 2024). Thus, there is the need for better information about the risks in their surroundings and clear guidance on how to respond would empower residents to feel more prepared.

Another major concern was the availability of quick and reliable assistance when crimes do occur. Many interviewees mentioned either personal experiences or knowing someone who had been affected by crime. When incidents happen, they often do not receive timely help because police response times are usually too slow, and once the crime is reported, they rarely get satisfactory follow-ups (A. Aucaclla, personal communication, July 23, 2024). What they need is a straightforward and efficient way to contact the police, with fast response times being a top priority. Greater transparency from authorities regarding the progress of their cases and receiving timely updates could also build their confidence in law enforcement and foster trust in the community. Several residents also mentioned that stronger engagement and clearer communication from local authorities would help build trust (F. Ccarhuas et al., personal communication, July 23, 2024). Therefore, it would be necessary for the municipality to strengthen its connection with residents and foster better citizen involvement in safety initiatives.



Chapter IV: Product or Service Design – Solution

4.1. Conception of the product or service

Throughout the development of the consultancy, it was possible to identify different aspects existing within the security plans of the citizen security management, such as the lack of information to carry out a comparative analysis of the information collected by the video surveillance equipment in the streets of the district and the lack of knowledge on the part of the population regarding the existence and use of the Alerta Surco mobile application. The Alerta Surco application will allow users of the District of Santiago de Surco to report emergencies or criminal incidents in real time. This mobile application will provide four buttons to request assistance from Serenazgo, firefighters, ambulances or mechanical aid services and will be available in the 50 km of the district (Municipality of Santiago de Surco, 2023).

The solutions developed in the present consultancy work aim to improve the service of the Alerta Surco mobile application for the population, according to the needs identified as a result of the interviews conducted with the inhabitants of the district (Exhibit 1). The proposed solutions are divided into two parts that will be incorporated into the existing process of the application in the citizen security management. The first one is the improvement of the service and content that the mobile application offers to the population and the second one is the dissemination plans of the application in the population, giving a greater emphasis on the youth population that corresponds to the user profile used for the implementation of the proposed solutions alternatives as shown in (Exhibit 8). The details of these proposed solutions are as follows:

4.1.1. Implementation of Chatbot AI for user interaction

According to users need got it in the feedback it was determined as the best alternative to the implementation of the Artificial Intelligence technology tool Chatbot within the Alerta Surco application. The main objective of the Chatbot to use digital media to interact with

consumers and potential customers with service companies increasingly converse with AI conversational systems, instead of human customer service agents (Camilleri & Troise, 2022). This technological tool will facilitate more accurate and effective interactions with users. As well as to generate the reports that the management of citizen security of the municipality processes and standardize the information required from users to generate reports of emergencies and incidents, which repeatedly due to poor information intake of users these reports can not be generated properly.

We are also considering the implementation of new services within the mobile application to increase its usefulness such as (a) providing weekly information on heat maps of risk areas within the district; (b) a community within the application where relevant information is shared on events occurring within the district collected from the chatbot and (c) simplifying the current emergency reporting process that the application has through the use of the chatbot where users can interact with the application in a more friendly and efficient way through the use of microphones and cameras on their cell phones.

4.1.2. Dissemination Campaigns in Educational Institutions of the Mobile Application

Getting the attention and engaging with end users using the technological tools that society demands is one of the main challenges that the marketing area of organizations faces today. The continuous evolution of technology makes us adapt traditional processes with technological tools, Marketing 5.0 is what we call the next technology that seeks to emulate human capabilities to communicate, enhance, and deliver product value throughout the customer experience (As mentioned by Kotler, Setiawan & Kartajaya, 2021). It is then that one of the solutions that we provide in this consultancy is to propose educational campaigns in coordination and joint work with schools and universities in the district to promote and teach the correct use of the Alerta Surco application.

4.2. Development of the narrative

The first step to provide a solution to a problem or improve an existing service is to conduct a brainstorming session whose purpose is generate as many ideas for solutions or ways to address the problem or need initially determined where all team members contribute creatively (Miro, 2024), this is the methodology applied to determine the solutions to the problem of lack of knowledge on the part of the district's population in the use of the Alerta Surco mobile application. According to (Municipalidad Distrital de Santiago de Surco, 2024) had a considerable increase in users in 2024 compared to the previous year, which corresponds to its launch but still does not have the desired reception. Subsequently, interviews were conducted with citizens living in the district to know their perspective of lack of dissemination and use of the application, receiving valuable feedback to make the prototype that best suits the needs determined.

Through the development of the interviews (Exhibit 1) with the inhabitants of the district, it was possible to understand the perspective of the users and to empathize with the needs and reasons why the Alerta Surco application does not have the desired acceptance. The common cause turned out to be the complexity of the application in terms of its use by the population and the lack of dissemination within the entire area of the district. This information allowed us to develop the prototypes according to the design sprint methodology, whose main objective is to follow a fast and effective creation process to build and form a prototype in 5 fundamental phases, determining the strengths, execution difficulties, and implementation challenges of the same. Being more effective in the sector of development and improvement of software and technology projects (Santander, 2024).

In order to propose solutions and improvements to the current system of the Alerta Surco mobile application, the opinion of the district's inhabitants was essential, as they gave us their needs and opinions about the security service offered by the Municipality of Santiago de

Surco. Thus, the first prototype of the solutions proposed by group number four refers to the improvement of the current application by implementing a community chat where relevant information that happens within the district can be shared in real time using as a reference the community chat project against criminal acts used in Ecuador, which aims to reduce the rate of insecurity using a WhatsApp chat to provide and receive information in real time by the Community Police (El Mercurio, 2020). This prototype was shared with the inhabitants of the district in order to know their opinion about the measures considered to promote and improve the service of the Alerta Surco application as shown (Exhibit 9), information that allowed us to correct the prototype and generate a new one to be presented to the members of the Municipality of Santiago de Surco and receive their opinion and approval. After obtaining the approval of the municipality, we corrected and implemented the suggestions given by the members of the security management of the municipality, resulting in the final prototype.

4.3. Innovative and disruptive nature of the product or service

As detailed above, two main solutions were proposed to cover the concerns of the users of Santiago de Surco: a) the implementation of the digital tool Chatbot AI and b) education campaigns on safety culture to raise awareness in future generations about safety and the proper use of the tools that the municipality provides to citizens. Within this research publications are where the advantages that Chatbot generate within the interaction processes between citizens and authorities are studied, improving communication between both parties effectively and immediately in case of emergencies (Yang, Chen, Por, & Ku, 2023).

New technologies allow us to implement processes and have unprecedented results. Today with the implementation of Artificial Intelligence within chatbots allows users to receive immediate and automatic responses, improving efficiency in the generation of reports in all sectors in which it has been implemented (Mamonov, S., & Benbunan-Fich, R., 2023).

A study conducted by the University of Michigan demonstrates how the anonymous reporting system helps prevent violence and social misconduct, allowing the student community to feel more comfortable and familiar with the culture of reporting incidents (Heinze, J. 2023). This research demonstrates how intervention in the early stages of citizens' education influences their future behavior.

The solutions proposed in this consulting project are perceived as innovative within the city of Lima, highlighting that the Alerta Surco application is an exclusive service implemented only by the Municipality of Santiago de Surco. The solutions aim to increase the efficiency and effectiveness of existing processes in the security department, and at the same time, contribute to its innovative character.

As Marchena Sekli (2023) mentioned in his presentation Chatbot Artificial Intelligences are essential and indispensable for the interaction of organizations with users being one of the main tools when we talk about Digital Marketing. Within the municipalities of Peru, the Chatbot AI is a tool in a precarious state which has not been given the importance it deserves today within the market. Currently within the website of the Municipality of Santiago de Surco there is a Chatbot service, which is why we want to improve the current service that the municipality provides to interact with the inhabitants of the district giving it an added value to interact in the same way with the emergency report within the application Alerta Surco. This will not only facilitate the interaction with the users but will also allow the municipality to standardize the information collected within the application for the elaboration of monthly reports in a more consistent way and with a better quality of information than the one currently collected, which depends a lot on the interpretation of the users when using the mobile application.

One factor to consider when arguing for the usefulness of implementing the AI Chatbot to standardize the information collected is the current system for receiving incidents or

complaints that exist within the institutions. While it is true that there are established formats, they are not applied to all situations, leaving much to the interpretation of people who are often unaware of the processes and appropriate terms to be used when making complaints. This factor conditions the processing of information and reduces the expected quality of reports that have a wide variety of information that cannot be sorted or classified efficiently. The Chatbot proposal aims to support the classification of the information that users have by means of defined and strategically elaborated questions to segregate the users' information. Likewise, the Chatbot AI database will have specific questions and keywords to determine a high-ranking emergency and automatically contact an official for immediate and personalized assistance.

4.4. Value Proposition

For the development of the value proposition of the proposed solutions, the value proposition canvas tool was taken as a reference, whose objective is to allow the value proposition of an organization to become visible and tangible, therefore, easier to create and manage to complement the function of the Business Model Canvas (BMC) tool (ICX, 2021). Within the development of the canvas of this tool, two stages are considered with different independent aspects such as jobs to be done, gains, pains corresponding to the customer segment and Products & services, Pain Relievers and gain creators corresponding to the Value proposition as can be seen in the (Exhibit 7), which allow us to determine whether the proposed solution has or contributes value to the users by satisfying the needs and problems they have.

As part of the jobs to be done corresponding to the security and welfare that the users have:

- Ensure the safety of themselves and their family members.
- Protect their belongings and have a sense of security within the district.
- Have a reliable emergency assistance service.

- To be informed in real time about events that threaten safety in the district.

These have a common characteristic which is to live in a safe environment where integrity is not affected, understanding that this work is not only of the authorities but a joint work as can be seen in (Exhibit 10), and to achieve this, they must have tools that facilitate the dissemination of information and contribute to the actions of prevention of criminal acts. Likewise, some challenges must be overcome in order to achieve a secure ecosystem, such as improving the service of the Alerta Surco application where users can interact more easily with security authorities and receive relevant information on the current state of security in the area of the district of Santiago de Surco. Another key factor to consider within the challenges to overcome and to achieve a joint work between the authorities and the community is to be able to adequately transmit the purpose and form of proper use.

Within the stage corresponding to the Value Proposition, we have the additional services that we propose to include within the Alerta Surco application, which are:

- Provide weekly information on heat maps of risk areas within the district.
- Implement a community within the application to share relevant information about events occurring within the district collected from the chatbot.
- Simplify high-ranking emergency calls with immediate interventions.
- Simplify the current emergency reporting process of the application through the use of the AI Chatbot.

The services proposed and detailed above will allow to increase the usefulness of the Alerta Surco application within the inhabitants of the district, seeking to simplify and make the Alerta Surco application more interactive for its use and contribute with valuable information to the inhabitants in matters of citizen security, taking as a reference the impact it had (El Mercurio, 2020) with the creation of communities where the work of the authorities of the inhabitants is joint.

4.5. Minimum Viable Product (MVP)

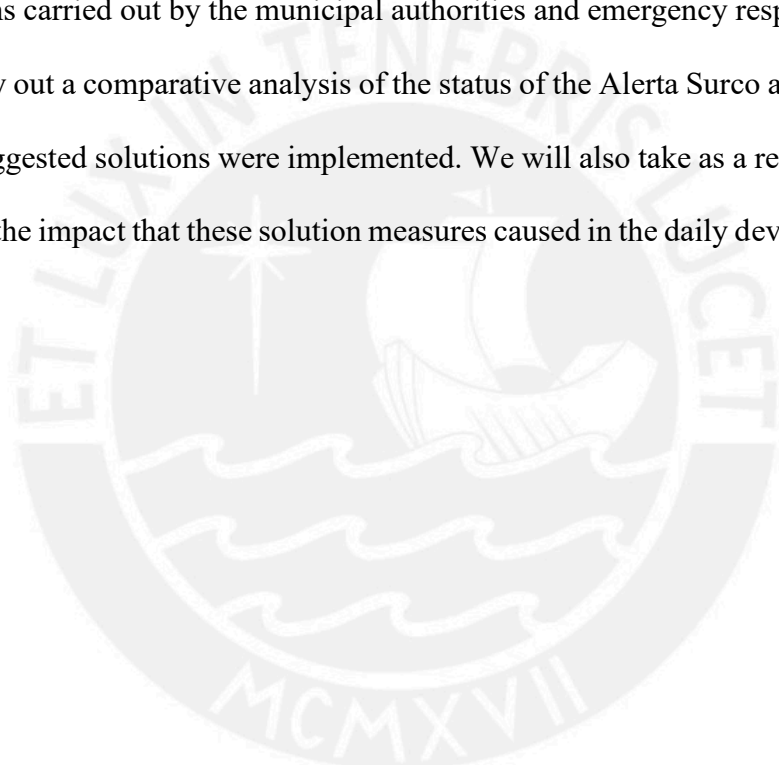
In order to meet the needs of the end users, it is important to consider improving the current service of the Alerta Surco mobile application. Currently, with its current characteristics, it does not have an effective reception among the district's population, which means that the purpose for which it was implemented does not meet the desired expectations (Exhibit 2). Thus, we consider increasing the current services and optimizing the processes within the application to generate a more valuable result for both users and the municipality, through the implementation of functions such as weekly risk maps by zones within the district, the community chat and the implementation of the Chatbot AI service to simplify the processes of data collection of user complaints.

Currently, the services offered by the application allow the municipality to know the most common types of emergencies within the district of Santiago de Surco (Municipalidad Distrital de Santiago de Surco, 2024), but on several occasions users do not enter the complaints with sufficient information for the municipality to process them efficiently (Exhibit 2). For this reason, we intend to standardize the entry of information on user complaints and claims through the AI Chatbot, a tool that is already implemented on the website of the Municipality of Santiago de Surco. Likewise, the implementation of educational campaigns regarding the safety culture and the use of the Alerta Surco application within the district is proposed in order to increase its presence among the population. It should be noted that the solutions provided are part of the existing processes within the municipality's public safety management, seeking to improve and implement them with tools that allow transforming their current processes into more efficient and effective ones, as can be seen in the process map (Exhibit 11).

Once the new functions have been incorporated into the Alerta Surco mobile application, the educational campaigns described above will continue to be carried out periodically in order to keep a monthly control of the increase in the number of users who

download the mobile application from the different application stores of the different operating systems, This information will be complemented with the register of complaints made by users within the application and the municipality's database, as can be seen in the annual report (Municipalidad Distrital de Santiago de Surco, 2024), which shows the increase in users from the launch date to June 2024.

Once the solutions described above have been implemented, the normal quarterly reports corresponding to citizen security will be developed, showing the evolution of the data and interventions carried out by the municipal authorities and emergency response, which will allow us to carry out a comparative analysis of the status of the Alerta Surco application before and after the suggested solutions were implemented. We will also take as a reference the user's experience and the impact that these solution measures caused in the daily development of their activities.



Chapter V: Business Model

5.1. Business Model Canvas

The Business Model Canvas (BMC) is a strategic management tool designed by Osterwalder and Pigneur (2009) to help organizations visualize how they create, deliver, and capture value. A variation of this model, the "B" Canvas, expands on the traditional BMC by incorporating additional elements such as problem identification, purpose, and impact metrics. This methodology is particularly relevant for public projects like the Alerta Surco App, where the focus is on generating social value, not revenue (Burkett, 2016). The solution proposed in this thesis seeks to advance the current Alerta Surco App by improving its functionalities and launching a promotion and education campaign to drive greater adoption and engagement among citizens. This "B" Canvas methodology has been applied to the project (see Exhibit 6), with detailed elaboration in this chapter.

The problems identified are persistent safety issues, inefficient communication between citizens and authorities, low levels of community engagement, and a slow or inadequate emergency response system. The solution proposed in this thesis addresses these problems with a purpose that unfolds in three stages. In the short term, the campaign will focus on raising awareness of the App's features and encouraging more community members to actively participate in reporting safety concerns. In the medium term, the goal is to improve trust and collaboration between residents and authorities by promoting transparency and faster responses through the App. In the long term, the objective is to create a safer and more engaged community, resulting in a better overall quality of life in Surco.

The value proposition is derived from an analysis of users' pains and gains, identifying pain relievers and gain creators. This process was carried out through the Value Proposition Canvas (Exhibit 7). As a result, the solution provides value to reduce communication barriers between citizens and local authorities by offering an easy-to-use platform that promotes

community engagement. Increased app usage will lead to greater transparency, with quicker access to information and prompt incident reporting being additional value drivers. By improving relationships and cooperation between users and authorities, the solution builds trust, which is important for creating a safer environment.

The solution serves several key user segments, all of whom share an interest in improving security in the area. These include residents of Surco, people who work or spend time in the district, and students from local schools and universities. All users must have access to mobile phones and stable internet to use the App effectively. These segments engage with the APP to report incidents, receive updates, and stay informed about safety issues in their area.

The relationships with users are crucial to the solution's success. It fosters community interaction through direct support and feedback, primarily delivered via a chatbot integrated into the platform. Regular updates and communication with users help maintain engagement and build a sense of security within the community. Additionally, recognition programs encourage users to participate more actively, reinforcing community bonds and collective safety efforts.

The main channel for delivering the services is through mobile application, which is easily accessible to all target segments. Moreover, educational campaigns in local institutions further promote the App, which ensures that students and families are aware of the App's features and benefits.

The value chain behind the solution includes various stakeholders, such as the municipality, law enforcement, local businesses, technology providers, community groups, and educational institutions. App users are also key players in the value chain as not only do they use the service, but their feedback and engagement are essential for driving innovation (Burkett, 2016). Therefore, understanding the different customer segments and assessing

whether they value the app's services, or its social impact is the key to refining and enhancing the platform.

Key activities for the advancement of the App include continuous development and maintenance to ensure that the platform remains user-friendly and incorporates new features based on user needs. The educational campaign plays a key role in user acquisition, engaging new users, and ensuring that the community is trained to use the App effectively. Other essential activities include training municipal personnel and law enforcement to respond efficiently to reports and using data management to analyze trends in crime and user feedback.

Resources required include technological resources, such as servers, chatbots, and cybersecurity tools, which form the backbone of the platform. These are complemented by human resources, including App developers and support staff who ensure the system remains responsive to user needs. Partnerships with law enforcement, tech support teams, and community groups further enhance the App's capabilities.

The cost structure is primarily driven by development and maintenance costs, as well as expenses related to personnel and promotional activities. The education campaign requires additional investment to reach user segments and ensure the App is widely adopted. Legal and regulatory compliance is also a necessary expense, ensuring that the App meets all local data protection laws and operates transparently.

The success of the solution is measured by some key impact metrics (see Figure 3).

Figure 3

Impact metrics- KPIs (key performance indicators)

KPI	Measurement Method	Target
Increase in App Registration (SDG)	New user registration data. Monitor the number of new registrations in the app by tracking user sign-ups monthly and quarterly.	Reach 250 new registrations monthly and 3,000 new users by the end of the first year.
Monthly Active Users (MAUs)	User activity tracking. Track monthly active users (MAUs) who log into the app, participate in reports, and comments, or engage with community content. Data will be pulled from backend analytics tools to measure engagement rates monthly.	Reach monthly 100 and 3,000 MAUs by the end of the first year.
Improved Emergency Response in Time and Information Collection	Monitor the time taken to connect users with the municipality from an emergency call made. Also, monitor the percentage of incidents where real-time video and audio data are successfully collected. This data will be reviewed monthly to ensure system efficiency.	30 seconds connection with the municipality, 90% successful profile video and audio collection.
Increase in Citizen Participation and Community Engagement	In-app report submissions and engagement tracking. Monitor the number of reports, posts, comments, and interactions with official content.	12% increase in participation and engagement within one year.
Incident Resolution Rate	Incident resolution tracking. Monitor the percentage of incidents resolved within a specified timeframe (72 hours).	75% of incidents resolved within 72 hours.
Overall Crime Rate	Crime data integration. Combine reported crime data from the app with municipal crime statistics provided by the police, PNP, and other authorities.	10% yearly reduction in reported crimes.
User Satisfaction Rating	User satisfaction surveys with specific questions. Conduct quarterly satisfaction surveys directly through the app, focusing on user experiences with reporting, response times, and overall app usability.	Achieve satisfaction score of 3.5 out of 5 within 6 months.
Reduction in Perception of Insecurity	Quarterly in-app survey targeting registered app users with questions focused on perceived safety levels in their neighborhood.	10% reduction in insecurity perception after 1 year.
SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 3: Good Health and Well-Being SDG 16: Peace, Justice, and Strong Institutions		

Note. Sourced from Authors (2024).

Given that this project is a public service initiative, there is no revenue generation. The Municipality of Surco will continue to provide budget allocations for the App's development and maintenance. There is potential for additional funding through partnerships and sponsorships with local businesses and community organizations focused on enhancing public safety.

5.2. Financial viability of the business model

The financial viability of the proposed Business Model Canvas is supported by a cost breakdown and revenue model. All calculations are based on assumed averages and can be adjusted later when numbers are more concise. The allocated budget of the municipality is not included in the breakdown, since the number is not known to the researchers. However, it can

be assumed that the point of the Break-Even User can be reached faster if this budget is considered.

The financial costs have been estimated across several essential components, as illustrated in the attached figure. The total monthly fixed costs amount to PEN 51.167 comprising key operational categories. The numbers of the cost items such as Human Resource Costs (HR Costs) or App Maintenance are based on average salaries for each of the specialists according to platforms such as Indeed Peru and Glassdoor (Indeed, n.d. and Glassdoor, n.d.). App maintenance includes updating features, fixing bugs, and ensuring app performance as the user base grows. Industry standards suggest App maintenance costs around 20% of the original development cost per year, which translates to approximately PEN 10,000 - PEN 15,000 per month for this project (Clutch, n.d.).

Figure 4
Cost Breakdown

Cost Item	Low Estimate (PEN)	High Estimate (PEN)	Average Monthly Cost	Monthly App Development Cost	Total Monthly Fixed Cost
HR Costs	18.000	27	22.500		22.500
App Development (One-time)	20.000	40.000		1.667	1.667
Server Costs	3.000	5.000	4.000		4.000
Marketing Costs	8.000	13.000	10.500		10.500
App Maintenance	10.000	15.000	12.500		12.500
Totals	59000,00	73027,00	49500,00		51167,00

Note. Sourced from Authors (2024).

Since the App does not offer a premium model, the primary revenue streams are generated through advertising and partnerships with local institutions. Based on the total fixed costs of PEN 51.167 and the revenue model, the break-even point has been calculated at 20.467 users. This means that to cover all operational costs, the App would need to engage at least 20.467 active users per month. This is achievable through strategic marketing and partnerships, as outlined in the previous chapter.

Figure 5*Break-Even Calculation*

Category	Value (PEN)
Ad revenue per user	1
Partnerships	1,5
Total Revenue per user	2,5
Total Fixed Costs (PEN)	51167,00
Break-even Users	20467

Note. Sourced from Authors (2024).

To further optimize costs, the municipality has the option to utilize Tawk.to as a chatbot service provider. The municipality is already familiar with Tawk.to, as it is integrated into the official website (Municipalidad, n.d.). By leveraging this existing relationship, the municipality can implement Tawk.to's chat agent services, which would reduce internal HR costs. The Tawk.to agents cost approximately 1 US Dollar (USD) per hour (3,70/hour in Peruvian Sol (PEN)) (Task.to, n.d.). For full 24/7 coverage with three agents, the total monthly cost would be approximately PEN 7.459 significantly reducing the HR expense compared to in-house personnel. Incorporating Tawk.to provides a cost-effective solution that maintains high-quality service, ensuring responsiveness and improved user experience, especially for emergencies and real-time reporting. This option lowers the overall cost structure, which could reduce the break-even point, allowing the municipality to achieve financial sustainability with fewer users. However, additional costs, such as training for those chat agents must be thought of in further cost analysis.

5.3. Scalability/exponentiality of the business model

Since the Alerta Surco app is a digital solution, it allows for scalability and exponential growth in terms of network expansions, data-driven improvements and potential for geographic

and partnership-based expansion. The next paragraphs are proving the scalability of the business model by providing different possibilities for expansion.

5.3.1. Digital Platform Expansion

First, the goal of the project is to increase the number of users and expand its functionalities which do not require huge amounts of resources. New features allow the app to accommodate a growing number of users. reporting incidents, sharing information, or interacting with the community features, the value of the App increases for all users. These data-driven insights can lead to more efficient emergency response mechanisms, and targeted safety initiatives. The more people who use the App, the richer the data (Evans & Schmalensee, 2016).

Furthermore, the app could offer real-time alerts about air quality, traffic accidents, or public health notifications, making it a necessity for the daily life of people living or working in the district. Incorporating features that go beyond security, such as health and wellness services, will position the App as an essential tool for overall well-being, attracting a wider audience (Adams, 2010).

5.3.2. Geographic Expansion

While the current focus is on Santiago de Surco, the mobile application model can be easily adapted to other districts within Lima. First and foremost, it would make sense for districts that share the same border to have the same safety technology. The underlying technology and features can be customized to address the specific security needs of different areas, allowing for a broader rollout.

5.3.3. Partnerships

Collaborations with local businesses, technology providers, and non-governmental organizations (NGOs) can bring in additional resources, expertise, and funding. These

partnerships can help scale the App and its reach without relying only on the budget of the municipality. Offering the services through the app to businesses, schools, and universities as part of their security protocols creates a new growth avenue. This could include tailored emergency response plans, real-time alerts for staff or students, and integration with existing corporate security systems. By adopting a business-to-business (B2B) model, the App could expand its user base while also generating revenue from corporate clients. Such business relationships tend to last long and are reliable. Additionally, with those partnerships the provider has potential to serve even more customer – other users they would not reach otherwise (Myler, 2017).

5.3.4. Revenue Streams

The introduction of small charges for verified emergency calls, potential premium features, or partnerships with local businesses opens additional revenue streams. These streams can be scaled alongside the user base, providing financial support for further expansion and feature development. As the Alerta Surco App grows, these revenues can be reinvested into the platform, driving further exponential growth.

5.4. Social sustainability of the business model

The business model for the Alerta Surco App is built on a foundation of social sustainability, which is reflected in this research paper in its alignment with the SDGs mentioned in Chapter 2.4 and the innovation sweet-spot (Exhibition 5), which considers four different elements: desirability, viability, feasibility, and integrity (Board of Innovation, n.d.).

5.4.1. Desirability

The desirability component of the App is ensuring that the application tries to solve a critical issue within the community by enhancing public safety and fostering greater community involvement. By providing a platform where residents can report incidents, share

information, and stay informed about local security issues, the App adds tangible value to the lives of its users. This level of engagement demonstrates a strong demand for such a solution, making it highly desirable for everyone within Surco, which aligns with the vision of a desirable solution according to the Board of Innovation (n.d.). The App not only meets a basic need for safety but also empowers citizens to take an active role in their community, thereby improving overall quality of life.

5.4.2. Viability

The business model is designed to be both scalable and sustainable. It leverages digital technology, which allows for the efficient scaling of services to a larger population without proportional increases in costs. The municipality can profit from existing knowledge, such as the already availability of a partner for the AI chatbot, since they already offer such a solution on their public website (Munisurco, n.d.). The potential for expanding into other services in the future or into corporate security solutions further enhances the long-term viability. By continuously evolving to meet the needs of its users and adapting to new markets, the App can maintain its relevance and financial sustainability over time.

5.4.3. Feasibility

The existing digital infrastructure supports the integration of advanced features like AI-driven chatbots and real-time data analytics, which can be scaled as needed. Additionally, the current design of the app allows for an easy addition of new features and expansion into new geographic areas. Because of the existence and feasibility of the App currently, the app will deliver its promises effectively - additionally, with the involvement of trained personnel and potential strategic partnerships with businesses and authorities.

5.4.4. Integrity

The app emphasizes transparency and accountability, providing users with accurate, up-to-date information about security incidents and local crime trends. This focus on integrity ensures that the app not only meets the needs of its users but also takes social responsibility into account. By enhancing public safety and promoting a more connected community, the Alerta Surco App has potential to have a huge impact on the community by contributing to the well-being of its users and the broader society (Sadowski & Pasquale, 2015).



Chapter VI: Conclusion

6.1. Recommendation

It is recommended to apply the solutions proposed throughout the development of the consulting project. The improvements within the Alerta Surco mobile App and the education campaigns on the culture of security in the educational institutions within the district of Santiago de Surco, which were developed according to the identification of the needs of the users and the current resources that the municipality has.

It is recommended to consider a system of sanctions for users who fail to use the Alerta Surco App appropriately, considering that when subscribing to it, personal data of each inhabitant is entered. Therefore, a suggestion for applying sanctions would be to set the amount of this sanction as the annual tax payment.

It is recommended to use the same Chatbot operating system within the different municipal departments, to optimize processes and assign maintenance, support and programming activities to a specific area dedicated exclusively to this purpose.

It is recommended to carry out a comparative analysis between the reports generated by the citizen security management before and after the implementation of the proposed solutions, in order to assess the increase in population participation, the classification of emergencies and the behavior of security indices.

It is recommended to consider as a second stage of the proposed solutions, expanding the coverage of the services provided by the application with the nearby districts, to provide better quality information to the inhabitants of the district.

6.2. Limitations

One of the primary limitations is the need for advanced technical expertise, particularly in the context of artificial intelligence and machine learning. While the proposed solution

includes features such as AI-driven surveillance and chatbots, the actual programming, integration, and fine-tuning of these technologies require a high level of specialized knowledge. Another significant limitation is the financial resources required for the comprehensive roll-out of the proposed solutions. High-end equipment such as state-of-the-art surveillance cameras, machine learning tools, and the infrastructure necessary to support AI systems comes at a considerable cost. Given the budget limitations faced by public institutions, allocating sufficient funding for these initiatives may be challenging. This limitation could result in a phased implementation that might hinder the immediate impact of the project, as full-scale deployment across the district may take years.

While significant effort has been made to understand the needs of the citizens of Surco through interviews and research, there remains a limitation in the direct interaction of researchers with end-users in their everyday contexts. Spending more time in the field to observe and experience the perspectives of the residents and authorities in various situations could yield richer insights. This would ensure that the solution is fully aligned with the specific needs and behaviors of the users, enhancing its practicality and adoption.

6.3. Future Outlook

As mentioned earlier, enhancing AI features for the Alerta Surco App presents an exciting opportunity to boost service delivery. AI chatbots, as described by Chen et al. (2021) and Luo et al. (2019), use natural language processing to simulate human conversations and are equipped with advanced speech recognition, making them capable of providing real-time responses to user queries. This technology has already been successfully deployed across various industries to manage customer support and it has achieved improved response times and operations. AI has also proven its value in public services, and recent developments have focused on making interactions feel more natural by mimicking human-like verbal, vocal, and

visual cues, which is useful when used by public service providers or government agencies efficiency (Camilleri & Troise, 2023; Bagas et al., 2024).

In the context of public safety, AI-driven chatbots could offer residents real-time, personalized assistance, helping them address security concerns quickly and with fewer barriers. These AI-enabled chatbots could also further improve the quality of labor in government bureaucracies by handling routine queries and allowing authorities to focus on more pressing matters (Bagas et al., 2024). In fact, studies suggest that AI chatbots can manage up to 87% of routine questions, leaving only complex issues to be handled by human agents (Ngai et al., 2021). Additionally, their ability to provide customized answers means they could be used to educate residents about crime prevention and offer tailored advice on staying safe based on individual needs.

Moreover, the scalability of the App offers great potential for future development. As Van Alstyne et al. (2023) pointed out, a key driving force for digital platform is the network effects, also known as demand-side economies of scale, which refers to a phenomenon in the digital economy where the value of a platform increases as more participants join. For Alerta Surco App, on the one hand, this means that as the user base grows, the data generated becomes richer, which in turn enhances the App's ability to better match public safety needs with effective responses. Therefore, the near future primary goal should be to attract new users while actively engaging the existing ones to sustain and enhance the App's effectiveness. On the other hand, achieving network effects also requires broader collaboration with municipal authorities and public safety entities because the app can increase its reach and impact through bringing more stakeholders into the platform. Improving the network effects can create a self-reinforcing cycle where the platform's value grows as it scales, leading to more efficient public safety management, better data quality, and stronger trust in the system.

6.4. Conclusion

This thesis has explored the potential of advancing and promoting the Alerta Surco App as a solution for addressing public safety challenges and improving community engagement in Santiago de Surco. The district's context reveals a complex environment where existing security measures fall short of fully addressing residents' needs. While the municipality has introduced the Alerta Surco App as a way to improve public safety, its adoption, functionality, and impact require further development to meet the district's security demands. The demographic diversity and the significant presence of a floating population complicate public safety management, calling for a more efficient and comprehensive solution.

The user analysis highlighted several key issues, including a widespread perception of insecurity, low awareness of available safety tools, minimal community engagement, and inefficient communication channels between citizens and authorities. Through interviews with residents and municipal representatives, this research identified a clear demand for faster, more reliable communication with local authorities, and greater transparency in handling incidents. Based on these insights, the proposed solution aims to improve the App's functionality by introducing new features, such as chatbots and risk maps, while also improving the current emergency reporting process. At the same time, the proposed promotion and education campaign seeks to boost user engagement, increase app adoption, and improve the overall flow of information between the community and local services.

The BMC provided a structured approach for addressing these challenges. By incorporating the Value Proposition Canvas, the research demonstrated how the App could bridge the communication gaps between citizens and authorities. One of the solution's strengths is its scalability. As a digital platform, it can grow without extensive additional resources. Increasing the user base will generate richer data, leading to better-targeted responses to public safety concerns. Additionally, the App has the potential for geographic

expansion, offering a scalable model adaptable to neighboring districts. Collaborations with local businesses and educational institutions could further expand the app's reach, making it a valuable public safety tool beyond Surco.

Looking ahead, the integration of AI features offers great opportunities for the App's development. AI-driven chatbots could handle routine inquiries, provide real-time assistance, and simplify the user experience, improving response times and reducing the workload on authorities. As the App grows, these AI-driven features can make it more adaptable and effective in addressing public safety challenges across a larger area.

In conclusion, the Alerta Surco App offers a valuable tool for improving public safety and communication within the district. The proposed advancements in functionality, paired with a focused promotion campaign, aim to address the identified challenges and contribute to creating a safer community. By aligning with the SDGs, this project aims to not only address immediate concerns but also support long-term social improvements. Continued collaboration between the authorities and the community will be essential for ensuring the App's success and growth, both within Surco and beyond.

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Appendix A: Interview Summary Citizens

Exhibition 1

Interview Summary Citizens

Summary of Citizen Interviews

Pain Points and Challenges: Across the interviews, a recurring theme was a growing sense of insecurity, particularly during the night. Interviewee 1 pointed out a noticeable rise in thefts and drug-related incidents, which they believe has worsened in recent years. Interviewee 2 shared a similar concern, highlighting how security measures have declined despite some initial improvements in previous years. Factors like the lack of police personnel (Interviewee 3) and insufficient or malfunctioning surveillance cameras (Interviewee 4) were mentioned frequently as contributing to the problem. Interviewee 5 also raised the issue of an influx of migrants, suggesting it has contributed to the rise in crime rates. Another challenge noted was the lack of awareness and use of the Alerta Surco app, with several interviewees mentioning they had either never used it or were unaware of its existence (Interviewee 6).

Needs and Expectations: Many interviewees expressed the need for more visible and consistent security measures. Interviewee 2 emphasized the importance of increasing the number of functioning surveillance cameras and ensuring they are regularly maintained, while Interviewee 4 stressed the need for better nighttime patrols. Interviewee 3 called for enhanced coordination between the municipality and the police, as a way to improve overall security efforts. Others, like Interviewee 5, suggested adopting more advanced technological solutions such as drones and artificial intelligence to help combat crime more effectively. A common point made by several interviewees (Interviewees 1, 2, and 6) was the need to strengthen relationships between security personnel and the community, advocating for more proactive communication and collaboration.

Community Perception and Feelings: While most interviewees acknowledged that the municipality had made efforts to improve public safety, there was a general consensus that these efforts have been unevenly distributed. Interviewee 4 pointed out that commercial zones have received more attention, leaving remote areas neglected. Interviewee 1 noted that although some areas have seen improvements, they still feel a general sense of insecurity. Regarding technology, younger interviewees (Interviewees 3 and 5) expressed optimism about the role of artificial intelligence in improving security, though they also recognized potential resistance from older residents who might not understand or accept the technology as readily (Interviewee 6).

In conclusion, the interviews paint a picture of a district struggling to maintain momentum in its security efforts. While there have been some initial improvements, residents continue to voice concerns about the effectiveness of the measures in place. The key areas for improvement include more widespread and reliable security measures, better use of technology, and stronger community ties with local authorities. The desire for greater trust and communication between security personnel and the community was emphasized as essential for the future success of any new safety initiatives.

Note. Sourced from Authors (2024).

Appendix B: Interview Summary Authority

Exhibition 2

Interview Summary Authority

Municipality and PNP

The interviews conducted with various stakeholders in the security system of Santiago de Surco reveal a multifaceted view of the current situation. Across the six interviews, the consensus is that while Surco's security infrastructure is advanced compared to other districts in Lima, significant pain points and needs must be addressed to enhance the system's effectiveness further.

Pain Points: The primary issues revolve around coordination and technology integration. Despite having a robust surveillance system and relatively quick emergency response times, there are challenges in data management, particularly in the accurate recognition of repeat offenders and the sharing of critical information between different security entities like the National Police and Serenazgo. The limitations of current surveillance technologies, budget constraints, and insufficient training for personnel are also significant pain points, leading to gaps in crime prevention and response.

Needs: There is a clear need for technological upgrades, including the implementation of facial recognition systems and advanced data analytics to track criminal activities more effectively. Interviewees emphasized the importance of continuous updates to security systems, better inter-agency coordination, and increased investment in equipment and training. Community involvement is also identified as a critical area needing improvement, as current participation levels in security initiatives are low.

Causes of Lack: The lack of seamless coordination between the Municipality's security unit and the National Police is a major hindrance, often resulting from differing operational protocols and logistical challenges. Budget limitations exacerbate these issues, restricting the ability to procure advanced equipment and conduct regular training. Additionally, the slow adoption of new technologies and inadequate communication between agencies contribute to inefficiencies in the system.

Interviewees' Views and Feelings: Interviewees express a mixture of pride in the advancements made in Surco's security measures and frustration at the persistent challenges. They appreciate the community's generally positive perception of the security efforts, but there is a shared feeling that more could be done to harness the full potential of available technologies and resources. The interviewees also feel a strong sense of responsibility towards ensuring the safety of Surco's residents, and they advocate for more proactive measures, including better data management, more rigorous training, and enhanced community engagement to foster a safer environment.

In conclusion, while Surco's security system has made notable strides, addressing the highlighted pain points through better coordination, technological upgrades, and community involvement is essential for continued improvement and effectiveness.

Note. Sourced from Authors (2024).

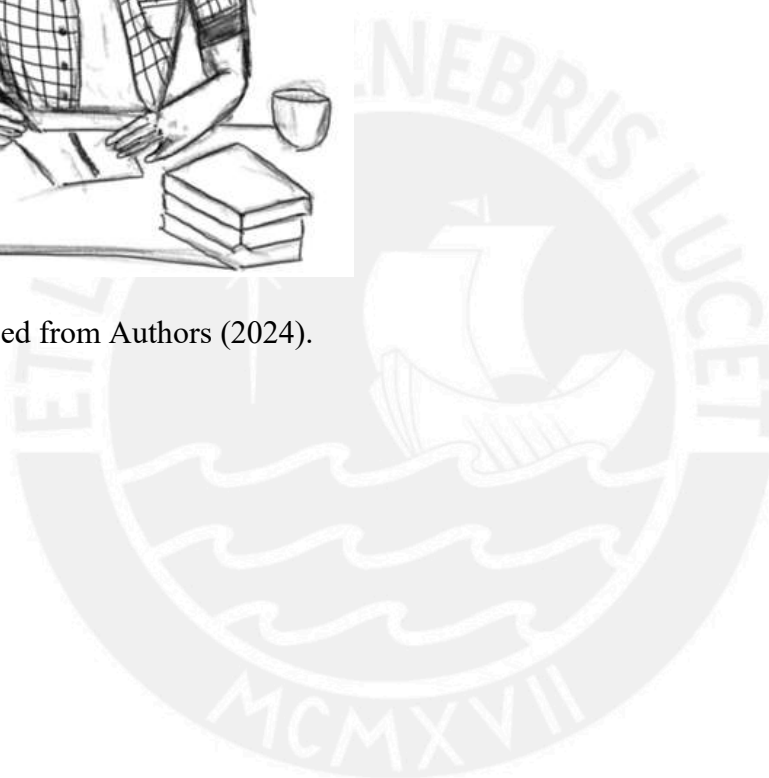
Appendix C: Meta User Carlos

Exhibition 3

Meta User Carlos



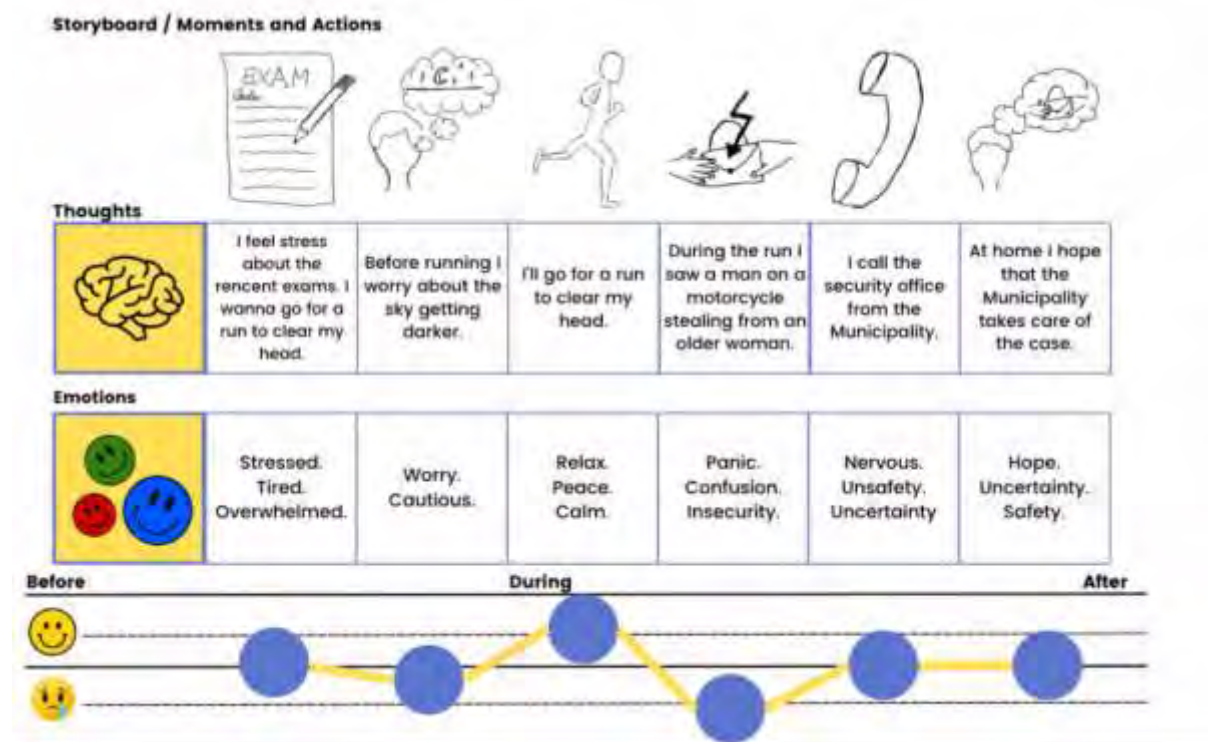
Note. Sourced from Authors (2024).



Appendix D: User Experience Map

Exhibition 4

User Experience Map

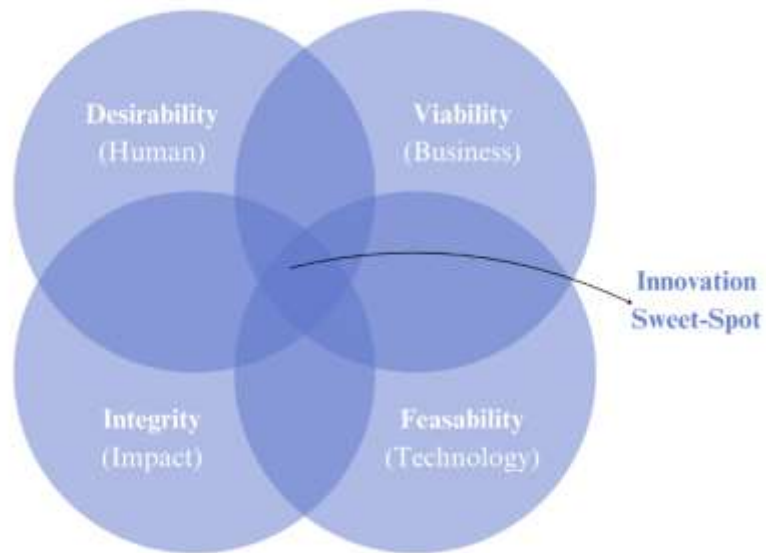


Note. Sourced from Authors (2024).

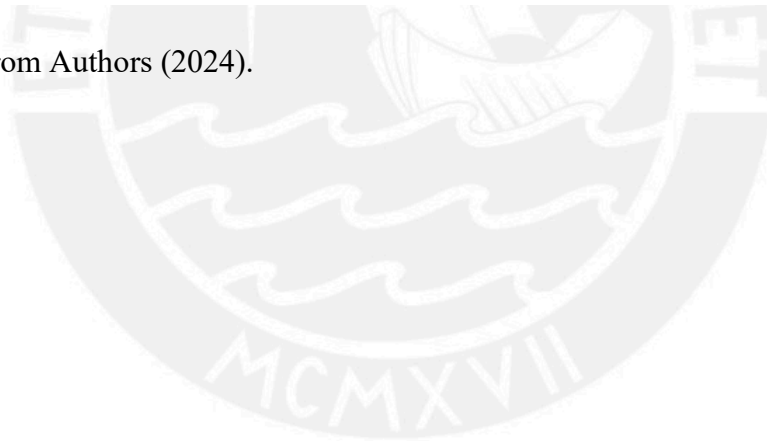
Appendix E: Innovation Sweet-Spot

Exhibition 5

Innovation Sweet-Spot



Note. Sourced from Authors (2024).



Appendix F: “B” Canvas

Exhibition 6

"B" Canvas

Canvas x B

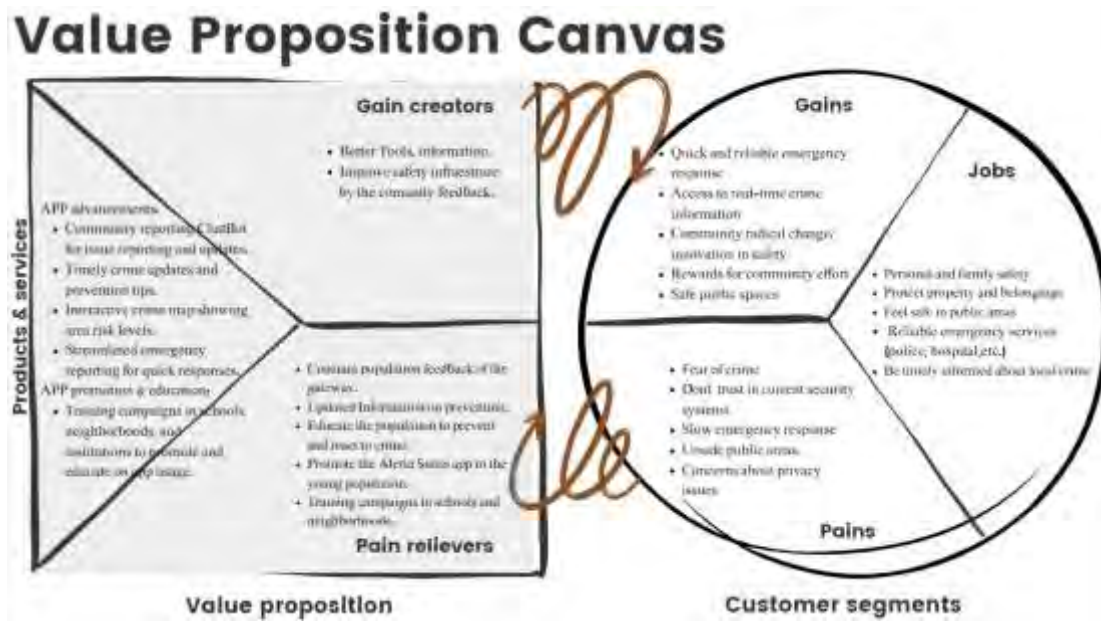
Value Chain <ul style="list-style-type: none"> Municipality APP users Law enforcement Local businesses Technology providers Community groups Local schools and institutions for promotion Neighborhood Watch agency 	Key Activities <ul style="list-style-type: none"> App development and maintenance User acquisition & engagement Training personnel Data management Key Resources <ul style="list-style-type: none"> Technology (chatbot, servers, cyber-security tools) Human Resources (APP developers, user support staff) Data & info Feed (reports, news, etc.) Partnerships: PNP, tech support, Neighborhood Watch agency 	Problems Identified <ul style="list-style-type: none"> Persistent safety concerns Inefficient communication between citizens and authorities Low community engagement Inefficient emergency report & response Purpose <p>Short-term: awareness & engagement Medium-term: stronger relationships between citizens and local authorities Long term: improvement in the quality of life</p> Value Proposition <ul style="list-style-type: none"> Reduced communication barriers between citizens and authorities Platform for community engagement Improved trust and relationships through transparency and better interaction 	Relationships <ul style="list-style-type: none"> Community interaction Support and feedback (direct communication through chatbot) Regular communication and updates Recognition programs to build community Channels <ul style="list-style-type: none"> Mobile application accessible through Alorta Surco App Education campaigns in educational institutions 	Segments <p>Citizens who use mobile phones, have access to stable internet and are motivated in improving safety</p> <ul style="list-style-type: none"> Residents of Santiago de Surco People who work in the district People who spend time in Surco Students of the schools and universities in Surco district
Cost Structure <ul style="list-style-type: none"> APP development and maintenance costs Personnel costs Promotion and engagement Data management costs Legal and regulatory compliance 	Impact Metrics <p>crime rates, community engagement in the App (user post/comments), emergency response times, perception of public safety, new user registrations</p>	Income Streams <ul style="list-style-type: none"> Continued budget allocations for public safety technology from the municipality budget Possible Partnerships/Sponsorships 		

Note. Sourced from Authors (2024).

Appendix G: Value Proposition Canvas

Exhibition 7

Value Proposition Canvas



Note. Sourced from Authors (2024).

Appendix H: Resume User Model Canvas

Exhibition 8

Resume User Model Canvas

Item	BIO
1	Name: Carlos Rodrigo Lopez Gamarra
2	Age: 26 years old
3	Address: Surco Viejo, Santiago de Surco, Lima
4	Occupation: Univeristy Student
5	Personality: Responsible Student
6	Goals: After completing university finding a Job at a big company
Item	Activities
1	University studies
2	Part time job
3	Running and gym
4	Playing football with friends
5	Reading
6	Going for a walk
7	Enjoys outdoor activities
8	Open to digitalization and AI
Item	Problems
1	Constant feeling of insecurity
2	Fear of going out at night
3	Concern for the safety of his brothers.
4	Fear of practicing physical activities at night in the parks.
5	Experienced an emergency and not perceive interest from the authorities.
6	Limited access to safe recreational spaces.

Note. Sourced from Authors (2024).

Appendix I: User Feedback Prototype I

Exhibition 9

User Feedback Prototype I

Item	Fiorella Briceño Tupayachi
1	A project of such magnitude will need an equally large security system.
Item	Renzo Tupayachi Usca
1	To foresee a fairly efficient data security system to avoid cyber attacks and data hacking attempts.
2	A project that would have an impact and would demonstrate its effectiveness in the long term.
Item	Cesar Augusto Román Baca
1	It would be interesting to evaluate the application of these technological tools to all security systems in the city of Lima.
2	Establish a penalty criteria in case people do not use the application properly.
Item	Jhon Boris Valencia García
1	A good information provided in the app would have a significant impact on the security of the district.
2	Is the police emergency response time good with the mobile application?
Item	Paola Choqueneira
1	To have an efficient system, all existing technological tools will need to be renewed.

Note. Sourced from Authors (2024).

Appendix J: User Security Perspective

Exhibition 10

User Security Perspective

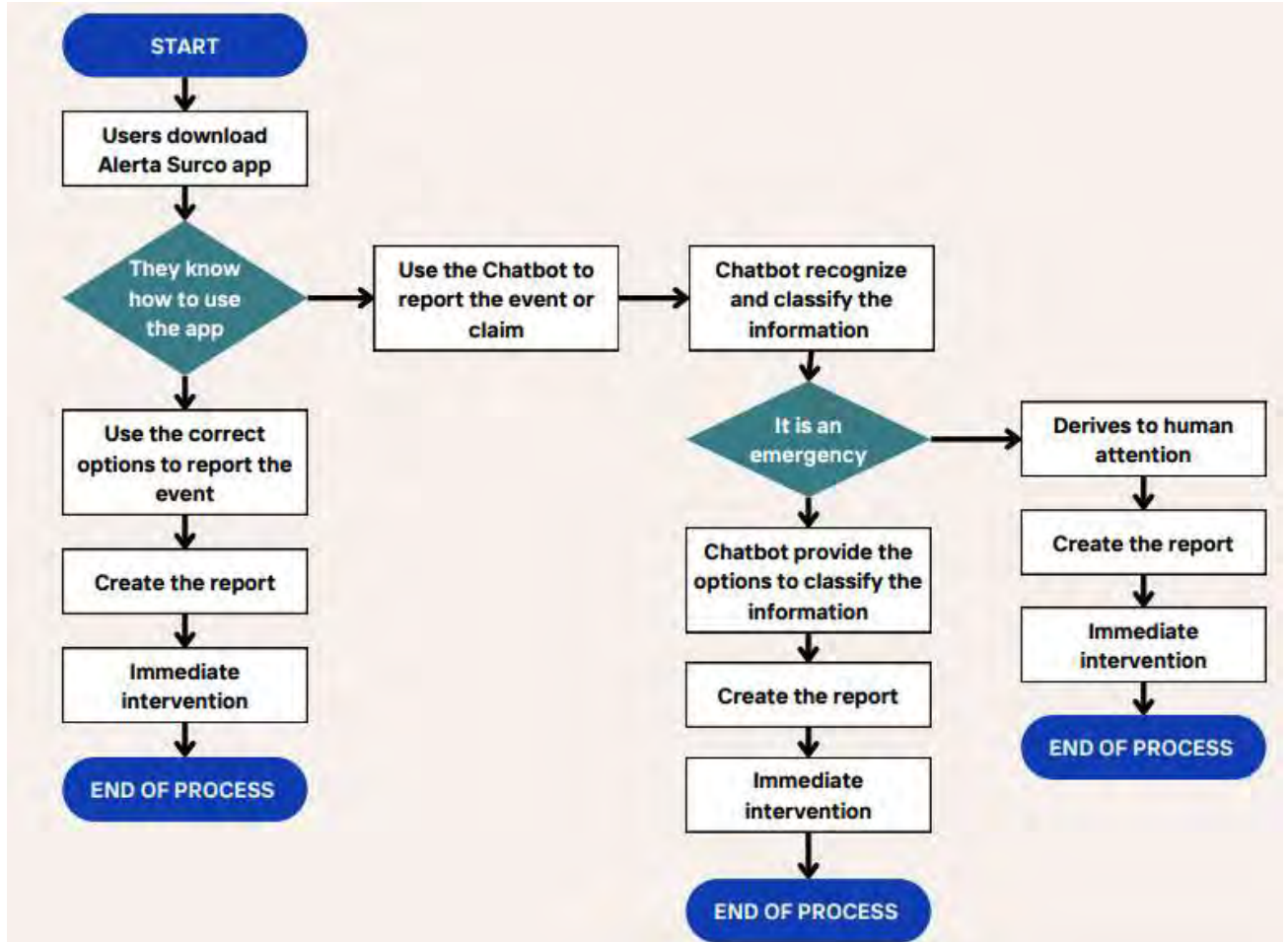
Item	Citizen Security
1	Plans of the municipality to guarantee the well-being of the inhabitants.
2	To be able to walk the streets without fear to something happen.
3	To have the freedom to carry out daily activities without fear of incidents.
4	To be able to return home at the end of your daily activities in an integrated manner.
Item	Collaborative Work among Organizations
1	In order to achieve better results, the work must be collaborative.
2	There is a lack of coordination and communication on the part of the authorities.
3	Coordination between citizens and authorities will allow us to have better results.
4	Security is not only the work of a municipality but of the whole society.
Item	Role of Technology in Citizen Security
1	Any tool that contributes to security is valuable.
2	The use of AI would have a favorable impact if it is implemented properly.
3	In order to catch criminals we need evidence and technology would help us do that.
4	It will allow us to respond to emergencies more quickly and effectively.

Note. Sourced from Authors (2024).

Appendix K: Process Map Final Prototype

Exhibition 11

Process Map Final Prototype



Note. Sourced from Authors (2024).