Politecnico di Torino

Politecnico di Torino

Master's Degree in Engineering and Management

Master's thesis:

Guest-SI Methodology:

Creation of a methodological standard for the management of innovations in the social field

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Abstract

GUEST methodology was conceived as a simple and innovative framework for business management. Actually, this procedure was designed to enhance the efficiency and overall quality of companies by providing a structured approach applicable throughout the decision-making process. Its five distinct phases, Go, Uniform, Evaluate, Solve, and Test, are aimed at controlling a project from conception to implementation. A notable feature of guest methodology is its emphasis on stakeholder engagement, ensuring that their needs and perspectives are integrated into the process.

This thesis focuses on the adaptation of GUEST methodology, originally developed by researchers at Politecnico di Torino, to guide the management and decision-making processes of projects based on social innovations. This improved methodology was named GUEST-SI (GUEST for Social Innovation) and is specifically tailored to address the most important tasks to achieve the project's objectives like the identification of end-user segments, their needs, and strategies to effectively engage them.

In addition, this methodology was applied in this work to the SINFONICA project, which focuses on promoting inclusive and cooperative mobility solutions across Europe. The SINFONICA project, which stands for "Social INnovation to FOster INclusIve cooperative, Connected and Automated mobility," adopts a bottom-up approach, actively involving diverse societal segments, particularly vulnerable and underrepresented groups, through participatory processes. The project's primary goal is to develop innovative strategies that engage users, mobility providers, and other stakeholders in the realm of Cooperative, Connected, and Automated Mobility (CCAM).

Chapter 1

1. INTRODUCTION TO GUEST METHODOLOGY

1.1 GUEST METHODOLOGY

Developed by researchers at the Politecnico di Torino, GUEST methodology was created with the aim of providing an innovative framework for business management. This is easy to understand, and it is applicable to the entire decision-making process, so as to increase the efficiency and quality of companies. GUEST methodology is divided into five steps (Go, Uniform, Evaluate, Solve, Test) and its purpose is to control the process, from the original idea to its implementation. [1] With this method, particular attention is paid to stakeholders, so that they can communicate their vision and their needs. Standardization of the documents and tools used is also guaranteed, making them easy to understand and easy to use. Therefore, engaging people with different backgrounds and limited business knowledge is possible. Another innovative aspect of the methodology concerns the implementation of the same through a multi-channel system, not exclusively digital, which makes it also applicable to organizations/companies with different levels of information technology.

1.2 THE 5 PHASES OF GUEST METHODOLOGY

The five steps of GUEST methodology are briefly presented below:

1. **GO:** the term “Go” highlights the importance of the presence on site of the researcher, so that he can fully understand the system, the actors and their interactions. The objective of this phase is to establish a first contact with the company, to explore and start collecting basic information that will then be used to estimate the potential of the project;

2. **UNIFORM:** the second phase involves standardising the information collected previously, with more detail. In particular, during this phase, the aim of researcher is to understand the business model and the type of the governance of the company;

3. **EVALUATE:** the third step of the methodology is, actually, the first operational one. Its goal is to judge the current state of the company by examining the results of the first two steps and the external environment and, subsequently, start solving problems and/or developing opportunities. It describes the entire cost and revenue structure and, finally, identifies a number of challenges and opportunities for which action plans are drawn up, as well as KPIs to measure their effectiveness;

4. **SOLVE:** At this point, given the action plans, solutions to previously identified problems are analysed in detail;

5. **TEST**: the last step involves the effective implementation of the operational plans and the subsequent evaluation of their results, which are then shared. Although this represents the last phase of the methodology, this could be the new starting point for the application of the methodology itself in the perspective of continuous improvement.

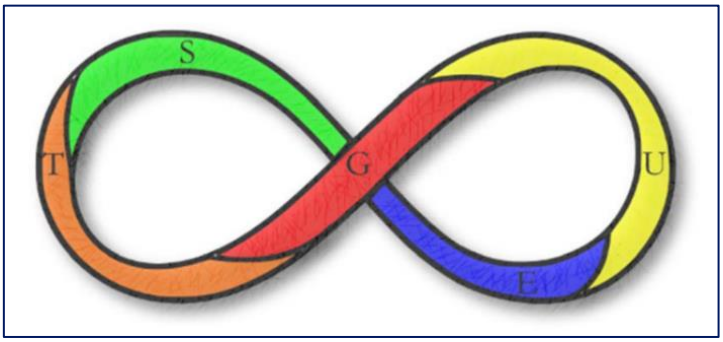

Figure 1-1 – GUEST Methodology Scheme

Figure 1-1 shows the scheme of the phases. These form the infinity symbol, precisely to indicate that this new methodology can also be used with a view to continuous improvement. [24]

1.3 THE FUNCTIONS OF GUEST METHODOLOGY

GUEST methodology is structured to systematically support business management, with a specific focus on improving the efficiency and quality of companies. The main functions of this approach are based on an integrated and iterative method that aims to guide the entire decision-making process, from conception to project implementation, actively involving all stakeholders.

One of the fundamental functions of GUEST methodology is to facilitate a deep understanding of the business system, both internally and externally. Through the initial phase, called "Go", researchers come into direct contact with the company and its ecosystem, collecting preliminary information that allows them to obtain a global view of the processes and interactions between the various actors. This approach allows to quickly identify business dynamics, stakeholder needs and development potential.

Another crucial aspect of the methodology is the standardization of the information collected, which takes place during the "Uniform" phase. This step not only ensures the consistency and quality of the data, but also facilitates communication between the different parties involved, regardless of their professional background or level of experience. The standardization of the documents and tools used makes it possible to make the methodology accessible even to individuals with limited knowledge in the managerial field.

In the next phase, "Evaluate", the methodology focuses on critically assessing the current state of the company. The cost and revenue structures are examined in detail and the opportunities and challenges present are identified. This function is strategic, as it allows for the development of targeted action plans accompanied by Key Performance Indicators (KPIs) to assess the effectiveness of the proposed interventions. The assessment allows for a contextual analysis of the business model with respect to the external environment, ensuring that decisions are based on concrete and relevant data.

Another central function of GUEST methodology is problem-solving and solution development, which takes place in the "Solve" phase. Here, researchers take a deep look at the problems identified in the previous phase and develop concrete operational solutions that are tailored to the specific needs of the company. This step focuses on creating strategies that directly address the challenges previously identified, taking into account both internal resources and the opportunities offered by the market.

Finally, the last function of the methodology is related to the practical implementation of the solutions and their verification in the "Test" phase. The application of the planned actions is carefully monitored, and the results are analyzed to evaluate the effectiveness of the strategies adopted. Sharing these results with stakeholders ensures transparency and fosters a continuous

improvement approach. The results obtained from the final phase can, in fact, constitute the starting point for new iterations of the process, thus promoting a virtuous cycle of learning and optimization. [1]

In conclusion, the functions of GUEST methodology represent a cyclical model that guides the entire decision-making and implementation process within the company, favouring a dynamic and inclusive approach. Thanks to its standardized tools and its multi-channel approach, this methodology is also applicable in business contexts characterized by different levels of technology and management complexity. The system, as a whole, is designed to improve not only business performance, but also the ability of the company to adapt and respond to the needs of its stakeholders effectively and proactively. [24]

1.4 STEP 1: GO

This section introduces the initial stage of GUEST methodology, referred to as the "Go" phase. The primary objective of this phase is to establish a formal relationship with the client organization and develop a foundational understanding that will support the collaboration between the consultant and the client. To achieve this, a standardized questionnaire is employed to collect predominantly qualitative data about the organization and its operational environment. The questionnaire is administered in a face-to-face format, necessitating a meeting with key stakeholders such as the company owner, project manager, and other relevant individuals involved in the project. This face-to-face interaction is essential, as it allows the researcher to assess the quality of the responses, including the client's knowledge, preparedness, and the comprehensiveness of the provided information. The ultimate outcome of the "Go" phase is the creation of a formal description of the company from both the client's and the consultant's perspectives.

The following steps out line the process for this phase:

- Initiating contact with the company owner or project manager;
- Conducting a meeting with the prospective client and administering the questionnaire. The timing of this meeting and the administration of the questionnaire is flexible and subject to the consultant's judgment, depending on the unique characteristics of the client's organization;
- Sharing the completed questionnaires (from both the client and the consultant) with the team to review and analyze the collected data;

- Scheduling a follow-up meeting with the prospective client to present and discuss the results of the questionnaire. [24]

1.4.a GO QUESTIONNAIRE

As mentioned earlier, the primary purpose of the questionnaire is to gather essential knowledge about the client company, which will serve as a foundation for the subsequent work. The questionnaire represents a thoughtful combination of elements from the Business Model Canvas (BMC) and the Basel II Manual for SMEs [2], and it consists of two sections that include both open-ended and closed-ended questions. The Basel II Manual for SMEs is a guideline aimed at helping small and medium-sized enterprises (SMEs) assess their business conditions before approaching financial institutions, in accordance with the Basel II Accord and EU directives. These guidelines were found to be highly compatible with the goals of the "Go" phase, and as such, were used as a reference in the design of the questionnaire.

The questionnaire is divided into seven distinct sections:

1. **General information**: this section seeks to provide a comprehensive overview of the company's identity and offers the client an opportunity for self-assessment, examining their goals, vision, and the environment in which they operate. This allows for a more accurate evaluation of the company's current situation and future steps;
2. **Activities**: this part builds on the previous one by gathering detailed information about the company's operations, the objectives of its management team, the feasibility of those objectives, and the distinction between core and supporting business activities, as well as their geographical reach;
3. **Commercial information**: this part of the questionnaire is dedicated to understanding the company's commercial structure, including whether a formal sales department exists, the type of commercial network employed, the distribution channels used, and an assessment of commercial goals. This section was deemed necessary, particularly for start-ups, as they often have fully developed products or services without the requisite commercial capabilities to bring them to market;
4. **Customers**: this section collects information regarding the company's customers, including the number of customers, their geographic

distribution, and any potential for customer loyalty growth, as well as possible threats that could lead to customer attrition;

5. **Suppliers**: here, the company's supplier network and the bargaining power of those suppliers are examined. This is important because, in considering the company's environment, all potential interactions within the broader system must be taken into account;
6. **Competitors**: this section focuses on gathering information about the company's competitors and assessing market conditions, including barriers to entry and exit;
7. **Evaluation**: the final section prompts the client to provide a general assessment of their business, including the quality of the products or services they offer, the level of innovation, and the quality of relationships with suppliers and customers. This evaluation serves to gauge the client's understanding of their own business.

Both the client and the consultant are required to complete the "Go" questionnaire, although with slight variations between the two versions. While the structure of both versions is largely the same, the consultant's version incorporates a Likert scale to assess the responses provided by the client. This scale ranges from 1 to 5, where 1 represents strong disagreement and 5 represents strong agreement, allowing the consultant to evaluate the client's level of spontaneity and preparation. The consultant conducts this evaluation during the face-to-face meeting, while additional sections are completed later, following a thorough market analysis. This comprehensive process enables the consultant to formalize the information provided by the client, supplemented by external data.

1.4.b ACTOR ID CARD

At this point, for each type of stakeholder identified through the questionnaire, the Actor ID is provided, i.e., a semi-fictitious profile created through the collection of demographic, behavioural and psychographic data of the actors. It helps to understand the stakeholders in order to develop targeted services and create more effective marketing strategies. In Figure 1-2, a scheme that reports all the information needed for the construction of an Actor ID card is presented. As said before, it is fundamental to know all the actors involved in the project, with particular attention to their needs. For this reason, it's important to collect all the

data that could be advantageous, also the platforms that can be used to address their interest [3].

Figure 1-2 – Actor ID Card

The questions on the Actor ID Card are crucial for effectively managing projects, improving communication, and a thorough understanding of the key actors involved.

Personal information, such as age, gender, marital status, geographic location, and education level, permits to build a more complete picture of the person, helping to understand their personal and social priorities. These elements can influence the actor's willingness to engage in the project and indicate the most effective ways to communicate, taking into account any cultural or situational differences.

Professional information, such as job title, role, career history, company, and skills, provides a clear understanding of the specific contribution the actor can make to the project. Additionally, knowing what the actor's previous experience is helps assess whether their background aligns with the project's goals and how to make the most of their skills. Knowing the career goals and challenges the actor faces is essential to motivate their involvement. When a project can support the achievement of the actor's professional goals, the actor is likely to put in more dedication. At the same time, being aware of the challenges that can hinder its progress allows to adopt proactive strategies to overcome those difficulties and keep your project on track.

The actor's interests and hobbies are also relevant, as they provide an opportunity to form a more personal relationship, building a human connection that can facilitate collaboration. Understanding the actor's passions and areas of interest can help create a more positive and cohesive work environment, fostering synergy between the various actors in the project.

In addition, knowing the actor's preferred communication platforms is crucial to ensure a continuous and effective dialogue. Choosing the right communication channel prevents misunderstandings or delays, ensuring that the flow of information between the parties involved is smooth and timely.

Finally, identifying in advance how an actor can negatively impact the project is a risk prevention exercise. Understanding whether there are potential conflicts of interest, time constraints or visions that diverge from the project objectives permits to plan appropriate solutions and implement strategies that minimize the impact of these factors.

1.4.c PEST ANALYSIS

In business education, PEST refers to the examination of Political (P), Economic (E), Social (S), and Technological (T) factors within the external business environment (Figure 1-3). This analytical framework is commonly employed by companies to aid in their strategic evaluation processes.

Through the PEST analysis, a company is able to gain an overview of external dynamics, gaining a competitive advantage that allows it to better prepare for future changes. It is a tool that allows not only to monitor external developments, but also to predict them. The ability to anticipate these evolutions, which can occur in areas such as regulatory or technology, offers the company the opportunity to react in a timely manner, avoiding negative impacts or, in many cases, transforming possible threats into opportunities for growth [4].

This type of analysis is also essential for identifying and assessing both the opportunities and risks present in the market. Thanks to it, a company can identify new areas for development or recognize potential dangers that could compromise its objectives. The PEST is therefore not only an observation exercise, but also a tool that guides the development of long-term strategies, based on concrete data relating to the external context.

In terms of business planning, PEST analysis provides valuable support for making informed strategic decisions, influencing choices on crucial aspects such as expansion into new markets, product diversification or technological investments.

It allows the company to align its strategies with external dynamics, thus improving its ability to compete in a constantly changing environment.

In addition, the analysis of external factors helps in risk management, identifying potential problems before they become real threats. On a regulatory level, it allows the company to operate in compliance with laws and regulations, avoiding costly litigation or penalties. On the technological front, analysis allows you to stay up to date on the latest innovations, allowing the company to adopt new tools and methodologies that optimize its operational processes.

Figure 1-3 – PEST Analysis

1.5 STEP 2: UNIFORM

The second stage of GUEST methodology has the goal of expanding and solidifying the understanding of the company acquired during the Go phase and of establishing a standardized knowledge base for the client's company, facilitating comparison with past and future cases.

In the Uniform phase, one of the main tools employed is the Business Model Canvas (BMC), a widely recognized framework, particularly popular in the start-up sector. This tool was developed by Alexander Osterwalder and is thoroughly discussed in his publication *Business Model Generation* (Osterwalder, 2010) [5].

The Business Model Canvas outlines the business model of a company, detailing how an organization creates, delivers, and captures value. It includes all the critical information needed for the development of new business ventures, the creation of innovative start-ups, or the restructuring of existing businesses. Due to its graphic format, the BMC allows users to easily visualize and define the company's entire business model, facilitating hypothetical scenario testing and the evaluation of trade-offs between various system components.

Much of the data necessary to construct the BMC is gathered during the Go phase via the questionnaire. In the Uniform phase, the researcher collaborates with the client to further develop the Canvas. The simplicity and intuitiveness of the BMC allow for a constructive working relationship between the two parties.

The Business Model Canvas proves especially useful in the early stages of business formation when it is crucial to collect and organize the fundamental parameters on which the new business will be based, or to redefine an existing business structure. The BMC’s success can be attributed to its straightforward graphical design, which highlights key areas of focus while illustrating the relationships between different components. Additionally, the model provides a logical sequence for constructing the canvas.

The BMC is also employed in the Evaluate phase to assess the company's current assets. It consists of nine essential components that demonstrate how a company intends to generate revenue. These nine components are grouped into four major business areas: customers, offerings, infrastructure and financial health.

1.5.a BUSINESS MODEL CANVAS (BMC)

The Business Model Canvas is composed of nine core components (Figure 1-4):

1. Customer Segments;
2. Value Proposition;
3. Channels;
4. Customer Relationships;
5. Revenue Streams;
6. Key Resources;
7. Key Activities;
8. Key Partnerships;
9. Cost Structure.

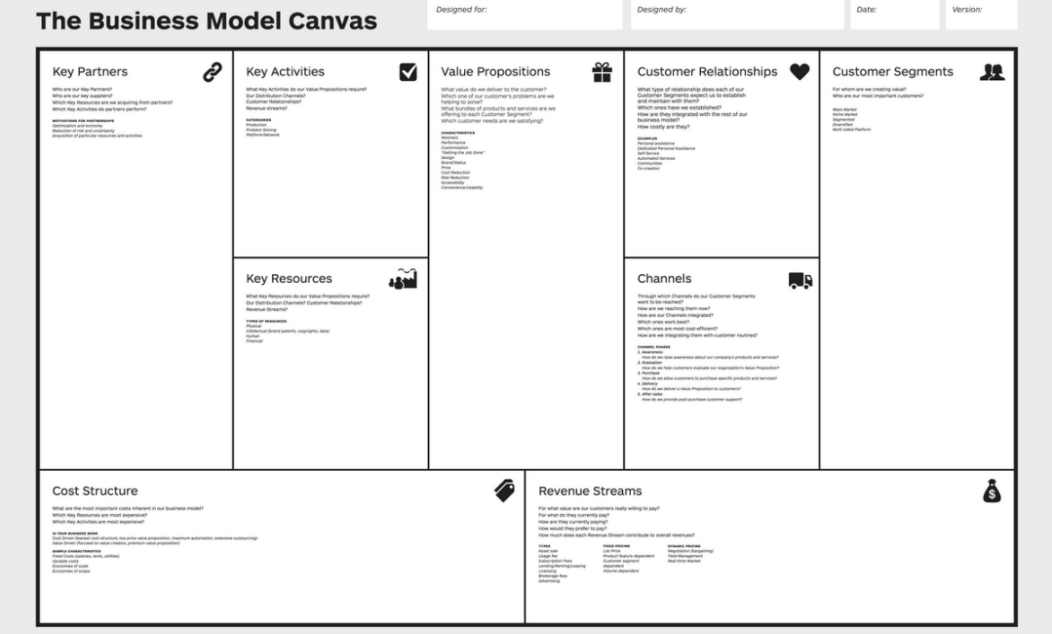

Figure 1-4 – Business Model Canvas

The interpretation of the Canvas starts at the centre and moves rightward before addressing the left side. At the heart of the Canvas lies the value proposition, which outlines the value offered to customers from their perspective. On the right side are the ideal features that a business should aim for in order to operate effectively, while the left side outlines the tools necessary for executing the company's strategy.

1.5.a.i CUSTOMER SEGMENTS

The customer segments section identifies the various groups of individuals or organizations that the business aims to serve. Customers are vital for the survival of any business; without profitable customers, the business has no purpose. Therefore, it is crucial to understand and satisfy customers' needs in the most efficient manner. This requires dividing customers into specific groups based on similar needs, behaviours, or other characteristics. Segments can range from broad to niche, provided they are accurately defined.

Key criteria for customer segmentation include:

- Different customer needs may require unique offerings;
- Customers may be reached via distinct distribution channels;
- Various customer groups may necessitate different types of relationships;
- Profitability may vary significantly between customer groups;
- Customers may value different aspects of the offering.

1.5.a.ii VALUE PROPOSITION

The value proposition represents the set of products and services that generate value for a specific customer segment, explaining why customers choose one business over another. It addresses a customer’s problems and satisfies their needs through a combination of elements.

Value can be quantitative (such as price or service speed) or qualitative (such as design or customer experience). Some common elements contributing to value creation include: novelty, superior quality, performance, customization, design, competitive pricing, cost and risk reduction.

1.5.a.iii CHANNELS

Channels define how a business interacts with its customer segments to deliver its value proposition. These include communication, distribution, and sales channels, which serve as touchpoints between the company and its customers. Channels are essential for creating a positive customer experience.

Channels serve several functions, including increasing customer awareness of products and services, helping customers understand the company's value proposition, facilitating purchases and providing after-sales support.

Channels can be either direct (such as an in-house sales team or a company website) or indirect (such as partner-owned retail stores). Direct channels offer higher profit margins but may incur higher operational costs, whereas indirect channels enable wider market reach through partnerships, though often with lower margins.

1.5.a.iv CUSTOMER RELATIONSHIPS

This component outlines how the company interacts with each customer segment. This section expands upon the data gathered during the Go phase, detailing how the company attracts, retains, and grows its customer base.

Different customer relationship models include:

- Personal assistance: direct human interaction with customers to provide personalized help and support;
- Dedicated personal assistance: assigning a specific individual to each client (e.g., financial advisors), creating a close, trust-based relationship;
- Self-service: providing support through indirect interaction, often facilitated by digital platforms, including online FAQs;
- Automated services: a more advanced version of self-service, enabling customers to manage services independently (e.g., online banking);
- Community: encouraging customer involvement and interaction through social networks or online forums around a product or service;
- Co-creation: allowing customers to participate in value creation, influencing offerings through feedback or decision-making (e.g., crowdsourced product features via social media).

Strategically, it's vital to determine which relationship models align with the company's business model and which are best suited to the identified customer segments.

1.5.a.v REVENUE STREAMS

Revenue streams define how a company earns income from its customer segments. Key variables include pricing strategies and payment methods, both of which are critical for managing financial flows.

There are several ways to generate revenue, including product sales, usage fees, subscription fees, lending, leasing, or renting, licensing, brokerage fees, advertising.

To ensure long-term sustainability, it is crucial to analyse how customers pay, what they pay for, and whether the pricing structure is aligned with competitors and market expectations.

1.5.a.vi KEY RESOURCES

The key resources section identifies the essential assets a company requires to implement its business model. These resources can be categorized into:

- Physical resources (buildings, equipment, technology);
- Intellectual resources (patents, proprietary knowledge, partnerships, customer databases);
- Human resources (critical for service-oriented industries);
- Financial resources (lines of credit, cash reserves).

It is essential to focus on those resources that are critical for delivering value to specific customer segments.

1.5.a.vii KEY ACTIVITIES

Key activities encompass the strategic tasks a company must perform to deliver its value proposition, reach customers, and generate revenue. These activities differ based on the industry. Key activities fall into three main categories:

1. Production: activities related to creating and delivering products;
2. Problem solving: common in service-based industries;
3. Platform/network maintenance: required for businesses like Google that rely on digital platforms.

These activities, along with key resources and partnerships, form the basis of the company's cost structure.

1.5.a.viii KEY PARTNERSHIPS

Key partnerships refer to the network of collaborators and suppliers essential to executing the business model. No company operates in isolation and external partnerships are critical to enhancing the business's success.

Different types of partnerships include:

- Strategic alliances between non-competing businesses (supplier partnerships);
- Cooperation between competitors (companies providing similar value propositions through different channels);
- Joint ventures for new business development.

Partnerships may be driven by the need to optimize operations, reduce risk, access new markets, or acquire key resources.

1.5.a.ix COST STRUCTURE

The cost structure defines the expenses the company incurs to operate. This is the last block to be defined in the Business Model Canvas, as it depends on key activities, resources, and partnerships. Businesses may focus on cost-driven models, aiming to minimize expenses, and value-driven models, prioritizing premium value or customized services.

Cost structure can be composed of:

- Fixed costs (salaries, rent);
- Variable costs (fluctuate with production volume);
- Economies of scale (cost reductions with increased output);
- Economies of scope (cost savings from offering a wider range of products or services).

A sustainable business model ensures that revenue streams outweigh costs. Misalignment in pricing, payment methods, or resource allocation can undermine business success, making it difficult to adjust once the product is on the market.

1.6 STEP 3: EVALUATE

The third phase of GUEST methodology, called the Evaluate phase, is closely linked to the Uniform phase, as it builds upon the current state of the company as outlined in the Business Model Canvas (BMC). The objective of this phase is to outline the company's ideal future state, which will be achieved through collaboration between the consulting firm and the client.

There are two key tools utilized during this phase:

1. SWOT Analysis;
2. ICE Diagram.

1.6.a SWOT ANALYSIS

The SWOT analysis is a tool for strategic planning that effectively pinpoints the characteristics of a project or organization, along with its interactions with the external environment, thereby offering a structure for formulating strategic objectives. The acronym stands for Strengths, Weaknesses, Opportunities, and Threats (Figure 1-5), each representing a different aspect of the evaluation process. Through this analysis, an organization can gain insights into its current situation and better plan for the future.

- Strengths: these are the internal advantages or capabilities that give the organization a competitive edge. Strengths may include things like having a well-established brand, access to unique resources, superior technology, or a highly skilled workforce;
- Weaknesses: these represent internal factors that hinder progress or create challenges for the organization. Examples could be inefficient processes, limited financial resources, or gaps in expertise. Identifying weaknesses helps the organization understand where it is vulnerable and where improvements are necessary;
- Opportunities: these are external possibilities or circumstances that could benefit the organization if leveraged effectively. They might arise from emerging trends, new markets, changes in regulations, or technological innovations;
- Threats: these are external risks or obstacles that could negatively affect the organization. These might include increased competition, economic

downturns, shifts in consumer behaviour, or unfavourable legal developments.

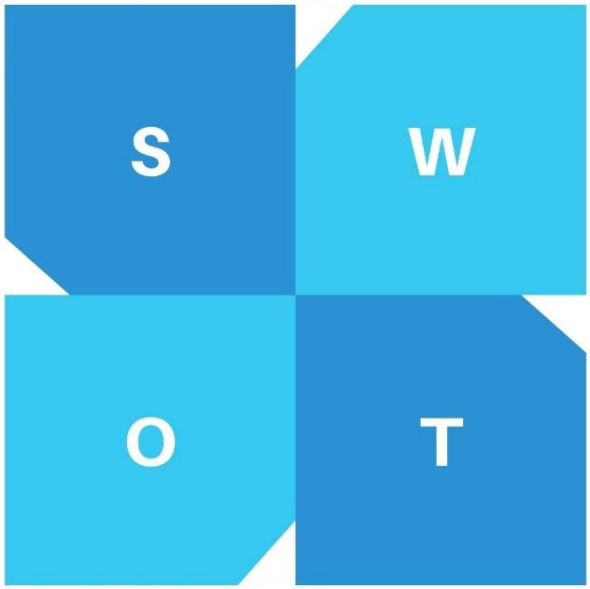

Figure 1-5 – SWOT Analysis

This approach enables the simultaneous consideration of both internal and external variables when determining the goal to be achieved. The analysis plays a crucial role in supporting the decision-making process by addressing the need for a logical and structured approach. It functions as a diagnostic tool for self-assessment and its effectiveness is largely contingent on the thoroughness and completeness of the initial analysis. For optimal outcomes, a comprehensive evaluation of the situation must be conducted, detailing all relevant aspects, relationships, and potential synergies. As such, a deep understanding of the particular issues and their contexts is essential for constructing an overarching perspective. [6]

The results of the SWOT analysis are typically consolidated into a diagram that illustrates both internal factors (strengths and weaknesses) and external factors (opportunities and threats arising from external conditions).

The main goal of the analysis is to provide opportunities for regional or organizational growth by capitalizing on strengths and minimizing weaknesses. This is facilitated by examining alternative scenarios, enabling the identification of the key elements that could impact the success of a particular strategy.

The benefits of SWOT analysis can be summarized in the following key points:

- The examination of the company's operational environment through early-stage observation and data collection, followed by the interpretation of this information, leads to precise strategic design;
- Regular comparisons between the evolving demands of the organization and the strategies implemented ensure improved effectiveness;
- Involving all relevant stakeholders in the analysis helps build greater consensus regarding the strategies that are ultimately chosen.

However, there are also notable limitations associated with this type of analysis:

- The potential to oversimplify complex realities;
- The necessity for a high level of collaboration between participants, as a lack of cooperation may result in a gap between theoretical results and actual outcomes;
- The risk of choosing actions based on subjective interpretations.

The decision was made to integrate the SWOT analysis as one of the standard tools in GUEST methodology, as its results serve as a critical foundation for the ICE Diagram.

1.6.b ICE DIAGRAM

The ICE Diagram, which stands for Identify-Control-Evaluate (Figure 1-6), is a tool used to manage and optimize processes within a project. It is composed of three sections: Identify, Control and Evaluate.

In this first column, the main problems that the project is addressing are identified and the opportunities that can be exploited are described. This step is essential to establish a basis from which to start and better understand the challenges and potential of the context. It involves making a detailed mapping of the critical points or areas of potential improvement.

After identifying the problems and opportunities, the second column of the ICE Diagram is dedicated to defining the actions or solutions that will be put in place to manage these elements. Here action plans are established, resources are allocated

and responsibilities are defined. The goal is to bring the situation under control, taking advantage of the opportunities identified and solving the problems that have emerged.

The third column is divided into three sections:

1. KPIs: the key performance indicators that will be used to measure the effectiveness of the implemented solutions are defined. These indicators help to understand whether the actions taken are leading to the expected results;
2. Economic resources**:** in this section economic resources necessary to implement the solutions are specified. It includes budgeting and financial planning, which are essential to ensure that resources are available to carry out established actions;
3. Calendar of actions: a timeline is established for the implementation of the actions. This time schedule helps to ensure that tasks are performed in a timely manner and that there is a clear sequence of operations.

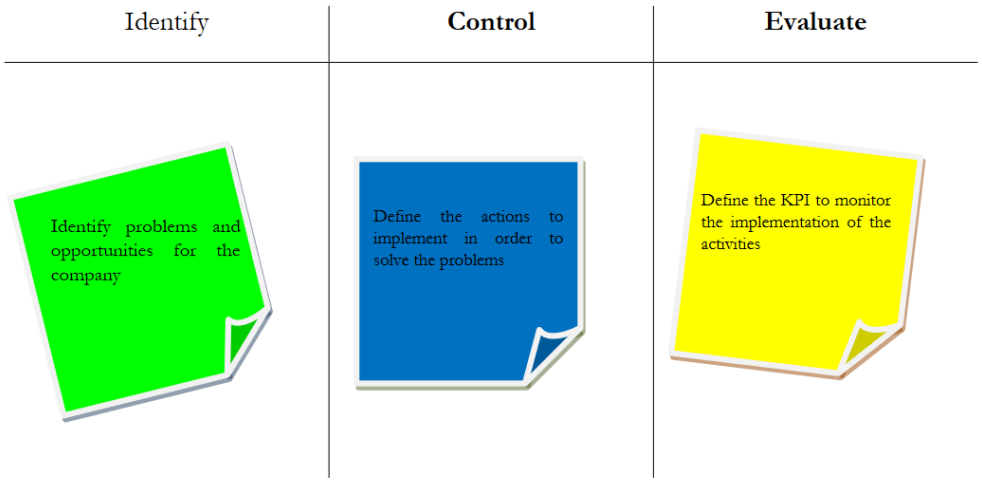

Figure 1-6 – ICE Diagram

1.7 STEP 4: SOLVE

The purpose of this stage is to meticulously examine the potential solutions that address the challenges and issues identified in earlier phases of the process. This step not only provides a structured approach to problem-solving, but also ensures

that the proposed solutions are feasible, efficient, and adaptable to the specific needs of the project.

This step requires a deep dive into each potential solution, assessing its strengths and weaknesses, and evaluating how well it aligns with the goals of the project. The ultimate objective is to identify the most effective strategies for overcoming the previously identified challenges, laying the groundwork for successful implementation in the subsequent stages.

1.7.a SOLUTION CANVAS

In the fourth step of the methodology, this Solution Canvas provides an organized framework to analyze and plan a project using GUEST methodology (Figure 1-7). Each tile represents a critical aspect of the decision-making process, resource management, and implementations related to a solution.

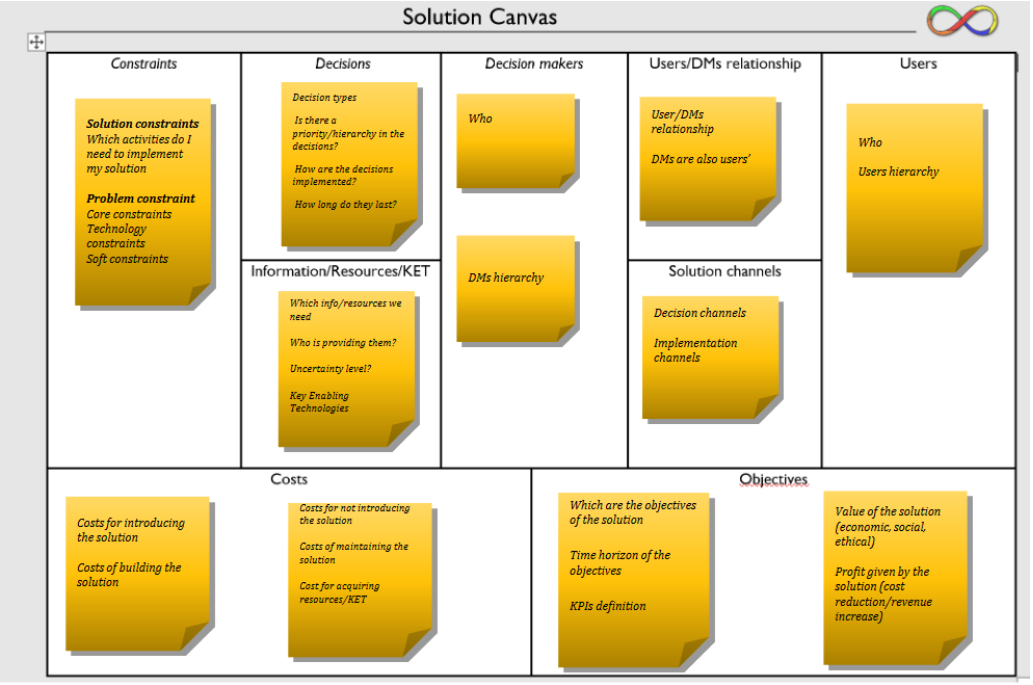

Figure 1-7 – Solution Canvas

The description of each box is reported in detail:

1. **Constraints**:
   - Solution constraints: this pane covers the limitations that affect the implementation of the solution, i.e., what requirements must be met

in order for the solution to be successfully implemented. Technical or resource restrictions can be considered;

- Problem constraints: here limitations related to the problem that the solution seeks to address are identified, such as budget constraints, strict timelines, or rules and laws that must be adhered to.

2. Decisions:

This box outlines the crucial choices to be made, such as the approach to be adopted, the resources needed and the timing to implement the solution.

3. Decision makers:

- Who: this is where people or groups in charge of making important decisions about the solution are defined;
- Hierarchy of decision-makers: the hierarchical structure of the people who make decisions is clarified, to highlight the order of responsibility.

4. Relationship between Users and Decision-Makers:

- Who: it is specified who the users are and their relationship with the decision-makers are described;
- Decision-makers or just users? The question arises whether decision-makers are also users of the solution, or whether the two figures are distinct.

5. **Users:** this pane describes who will use the solution, including their hierarchical structure, whether there are different roles or levels among users.

6. Information/Resources/Enabling Technologies:

- "What information/resources are needed?": The essential resources or information needed to complete the solution are listed;
- "Who provides them?": It specifies who is responsible for providing the requested resources or information;
- Key enabling technologies: the key technologies that facilitate the implementation of the solution are identified.

7. Solution Channels:

- Decision channels: it describes the means or methods by which decisions related to the solution are made;

- Implementation channels: it indicates the processes and channels through which the solution is implemented and put into practice.

8. **Costs:**
   - Costs to introduce the solution: the initial expenses required to implement the solution, such as investments in resources and infrastructure, are analyzed;
   - Maintenance costs: this includes recurring costs to keep the solution up and running over time;
   - Solution development costs: it describes the costs involved in designing and actually building the solution;
   - Costs to acquire key assets/technologies: it collects the expenses required to obtain the critical assets or enabling technologies that support the solution.

9. **Objectives:**
   - "What are the goals of the solution?": This tile defines the main goals that the solution aims to achieve;
   - Goal time horizon: it specifies the expected time frame for achieving the defined goals;
   - Definition of performance indicators (KPIs): the main indicators that will be used to evaluate the effectiveness and success of the solution are described;
   - Solution Value (profit): it estimates the value the solution can generate, both in terms of economic benefits (such as cost reduction or increased revenue) and in terms of resource savings or efficiency.

1.8 STEP 5: TEST

GUEST methodology establishes a uniform framework for all tools employed in coaching small and medium-sized enterprises (SMEs) in their efforts to create new businesses or introduce startups to the market. Nonetheless, it is essential to also standardize the implementation process of this methodology. This can be achieved through the use of a tool designed to oversee and assess the progress and effectiveness of the entire process.

1.8.a KANBAN

The Project Kanban was created based on the principles of the Kanban system used in Lean Production, following the identification of the necessary technical requirements for the desired functionality. Kanban is an operational method designed for the systematic management of information flow within a company and, in some cases, between the company and its suppliers. This approach aids in simplifying production planning while reducing waste by preventing overproduction. The word “Kanban” is derived from two Japanese terms: "Kan," meaning “visual,” and “Ban”, meaning “signal”. [7] The use of visual cards in Kanban inspired the development of standardized post-it notes used in GUEST Methodology.

The essence of Kanban is to make work processes more visible and organized by using boards, where tasks are represented as individual cards or notes. These cards are moved between columns that represent different stages of the workflow (for example, “Pending”, “Ongoing” and “Completed”). This setup allows teams to track progress in real-time.

In the Project Kanban system, the various stages of the project are represented through distinct columns on the board (Figure 1-8). These columns mirror the workflow, which is segmented into five key phases based on the principles of the Lean Production Kanban method:

- Backlog queue: this section lists tasks that are overdue or pending and have yet to be addressed. These tasks are prioritized to ensure they move swiftly into the next phase, known as the “To Do” stage, where they will receive immediate attention. The backlog functions as a repository for all unfinished work that must be managed in a timely manner to avoid bottlenecks;
- To do: in this phase, tasks that are deemed urgent or of high importance are categorized. The activities here represent the next set of priorities, which need to be tackled by the team. It is crucial that these tasks are scheduled to begin as soon as possible, reflecting their high priority in the workflow. This phase ensures that all team members are aware of the most pressing tasks;
- Work In Progress (WIP): the tasks that are actively being worked on are housed in this column. The activities here are in various stages of execution, with team members dedicating their efforts to completing these tasks. A crucial aspect of this phase is maintaining a limit on the number of tasks in progress to avoid overloading the team and ensure efficient use of resources. By doing so, the flow of work remains smooth and manageable, preventing delays and enhancing productivity;

- Done: once tasks have been completed, they are moved into this phase. However, before they can be finalized, these tasks must undergo a review process conducted by the Project Manager. The review ensures that the activities have met the necessary standards and project requirements. Only after receiving approval can these tasks be considered fully complete. This step provides an additional layer of quality control, ensuring that no errors or issues are passed on to the next phase;
- Sent: after the Project Manager's approval, tasks transition into this final stage. Here, the completed and approved activities are prepared for delivery to the client. This phase signals the end of the internal workflow, where tasks are ready to leave the project team's hands and be sent to the intended recipient. The "Sent" phase marks the conclusion of the task's journey within the Kanban system, ensuring that all work has been reviewed, approved, and is now prepared for external delivery.

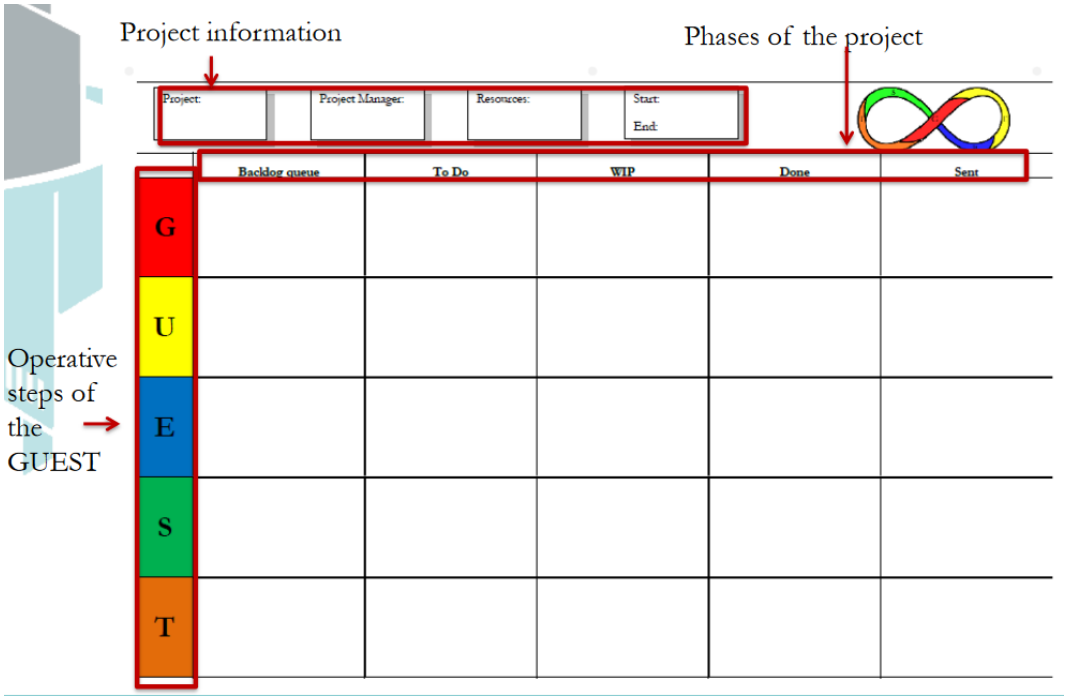

Figure 1-8 – The Project Kanban

1.8.b KEY PERFORMANCE INDICATORS (KPIS)

The use of key performance indicators (KPIs) in the testing phase of a project plays an essential role in ensuring an accurate and evidence-based evaluation.

The relevance of KPIs lies in their ability to provide a detailed and measurable snapshot of the progress of the project. Through the analysis of specific indicators, such as the duration of the processes, the effectiveness in the use of resources or the quality of the results, it is possible to determine whether the solutions adopted are producing the expected results. KPIs also permits to compare current performance to initial goals, making it easier to spot deviations from the planned plan.

In addition, KPIs play an important role in facilitating dialogue between all stakeholders involved in the project. With clear and concrete indicators, the team can provide transparent updates on progress, highlighting successes and issues in a way that managers or customers can understand. This approach permits to make improvements quickly, avoiding having to deal with more complex problems in the advanced stages. [8]

1.8.c DIFFERENCE BETWEEN KPIs AND METRICS

In project management, both metrics and KPIs are vital tools for measuring and monitoring performance, but they differ significantly in purpose and application.[8]

Metrics are quantitative measures that provide data on various aspects of a project's performance. They encompass a broad spectrum of information, such as the number of tasks completed, total hours worked, budget utilization, defect rates, and customer complaints. Metrics offer a general overview of the project's operational status and health. However, they often remain disconnected from the strategic objectives of the project. While they supply valuable insights into daily activities and processes, they might not directly influence the project's overall success.

Below, some common examples of metrics used in project management across various domains are reported:

- Progress completion rate: it represents the proportion of tasks or key milestones finished compared to the entire project schedule;
- Budget deviation: it indicates the variance between the planned expenditure and the actual amount spent at a given point in the project;
- Timeline deviation: it assesses how the actual project progress stacks up against the projected schedule, indicating whether the project is ahead or delayed;

- Resource allocation efficiency: it measures the effectiveness with which team members or other resources are utilized during the project (hours allocated versus hours worked);
- Error frequency: it indicates the count of defects or mistakes found in deliverables during development;
- Change order rate: it tracks how often changes or adjustments are requested throughout the project;
- Stakeholder grievances: it indicates the number of complaints raised by clients or stakeholders during the project's execution.
- Team output efficiency: it evaluates the productivity of project team members, typically based on their work output over a defined period;
- Value Achieved (VA): it assesses the work completed, expressed in terms of the budget allocated to that specific work;
- Client feedback score: it measures the satisfaction levels of end-users or clients, often derived from surveys or other forms of feedback.
- Resolution time for issues: it is the average duration it takes to solve project-related problems after they have been recognized;
- Team attrition rate: it indicates the frequency with which team members leave the project and must be replaced with new personnel;
- Task distribution balance: it tracks how work is allocated among team members to ensure an even distribution of duties.

Key Performance Indicators, in contrast, are a specialized subset of metrics that are intrinsically linked to the strategic goals and critical success factors of a project. KPIs are carefully selected to reflect the most important aspects that determine whether the project is on track to achieve its intended outcomes. Examples of KPIs include the percentage of project milestones achieved on time, return on investment, customer satisfaction levels, adherence to deadlines, and budget variance percentages. These indicators focus on the areas that have the most significant impact on the project's success or failure.

Below, some examples of KPIs commonly used in project management are reported:

- On-time delivery: this KPI measures the percentage of project milestones or deliverables completed by the scheduled deadline. It focuses on whether the project is progressing as planned in terms of time;
- Budget adherence: this KPI assesses whether the project is staying within its allocated budget. It helps determine how well financial resources are being managed;
- Return on Investment (ROI): This KPI evaluates the financial gains or benefits derived from the project compared to its cost;
- Customer Satisfaction (CSAT): typically gathered through surveys, this KPI measures how satisfied clients or end-users are with the project's services provided;
- Project completion rate: it tracks the percentage of project tasks or deliverables that have been successfully completed relative to the total planned work;
- Scope changes: it monitors the number and significance of changes to the project scope, helping to control scope creep and its potential impact on time and budget;
- Team productivity rate: it measures the efficiency of the project team by tracking the volume of work produced relative to time, resources, or specific output targets;
- Risk mitigation effectiveness: it indicates the ability of the project team to identify, address, and resolve risks that could negatively affect the project;
- Quality of deliverables: it monitors the number of defects or quality issues in the deliverables produced by the project. Fewer defects indicate higher quality;
- Stakeholder engagement level: it tracks the degree to which key stakeholders are actively engaged and involved in the project, often measured through participation in meetings or feedback provided;
- Employee retention: for long-term projects, it measures the rate of turnover within the project team. A stable team usually indicates a well-managed project environment;
- Cycle time: it focuses on how quickly certain tasks or project phases are completed, helping to measure the efficiency of processes;

- Earned Value (EV): this KPI is used to determine how much value has been earned by the work completed relative to the planned value, providing a measure of both progress and budget performance;
- Cost Performance Index (CPI): it evaluates the cost efficiency of the project by comparing the value of work performed to the actual cost. A CPI greater than 1 indicates that the project is performing well in terms of cost;
- Schedule Performance Index (SPI): this KPI is used to assess how efficiently the project is utilizing its time, comparing the work completed to the scheduled plan. An SPI greater than 1 suggests the project is ahead of schedule.

The primary difference between metrics and KPIs lies in their relevance to the project's core objectives. While all KPIs are metrics, not all metrics qualify as KPIs. Metrics provide a wide-ranging view of performance, but KPIs focus on the critical elements that directly affect the achievement of the project's goals. The importance of using KPIs instead of solely relying on metrics in project management is multifaceted.

Firstly, KPIs ensure alignment with the project's strategic goals. By focusing on the most crucial performance indicators, the project team can direct their efforts toward what truly matters for success, avoiding distractions from less significant data points.

Secondly, KPIs support informed decision-making. They highlight the key areas that require attention, enabling project managers to prioritize resources effectively and address issues promptly. While metrics can offer detailed information, they may not always point to actionable insights that drive the project forward.

Thirdly, KPIs provide clarity and focus, helping to prevent information overload. Projects can generate an overwhelming amount of data, and not all of it is equally important. KPIs filter out the less critical information, allowing the team to concentrate on the factors that have the greatest impact on the project's outcome.

Moreover, KPIs facilitate effective communication with stakeholders. They offer a concise and meaningful snapshot of the project's progress in relation to its key objectives, which is particularly valuable for stakeholders who may not be interested in the granular details provided by general metrics.

Lastly, KPIs are essential for monitoring and controlling the project. They serve as benchmarks for success and enable early detection of deviations from the plan. By keeping a close eye on KPIs, project managers can implement corrective actions before minor issues escalate into major problems.

Chapter 2

2. INTRODUCTION TO SINFONICA PROJECT

2.1 SINFONICA PROJECT

SINFONICA, which stands for "**S**ocial **IN**novation to **FO**ster i**N**clus**I**ve cooperative, **C**onnected and **A**utomated mobility", is a project that follows a bottom-up approach to understand and analyse the mobility needs of European citizens. In particular, special attention is paid to the vulnerable users and under-researched groups: different segments of society will be represented and directly involved in a participative process. The project is funded by Horizon Europe and its goal is to develop functional and innovative strategies to involve users, providers and other stakeholders of CCAM (Cooperative, Connected and Automated Mobility). The project brings together 18 partners from 6 European countries; it started in September 2022 and will end in August 2025. The project's logo is shown in Figure 2-1. [9]

Figure 2-1 – SINFONICA's Logo

This project includes all aspects of R&D related to the mobility of the future: connected, shared and autonomous. In recent years, it has already been shown that the transport sector, particularly road transport, is undergoing profound changes and research promises to achieve goals that, until now, were unthinkable. Some examples are the drastic reduction of emissions, the optimization of traffic flows, the reduction in the number of road accidents. However, in order to achieve these goals, it is necessary that the innovative solutions of this new mobility paradigm are as inclusive, resilient, sustainable, accessible and reliable as possible. For this reason, the *SINFONICA* project aims to design and develop new strategies, in addition to functional and efficient tools, to enable the actors involved to collect and fully understand the needs, expectations, concerns and ambitions related to autonomous mobility, connected and shared.

These actors include users, suppliers, citizens (including vulnerable groups), transport operators, public administrations, service providers, researchers, vehicle manufacturers and technology providers. Particular attention will be paid to collect and understand the needs, expectations, concerns and desires of different categories of Vulnerable Road Users (elderly, children, immigrants, disabled...) and also to people who are temporarily in a vulnerable situation (pedestrians and cyclists). The ultimate goal will be to make innovative products and services more inclusive and accessible. [10]

2.2 WHO ARE VULNERABLE PEOPLE?

Vulnerability means “susceptibility” and has a specific connotation in health care referring to those people who have health problems. All people can be at risk statistically by having the potential for some illnesses base on a genetic predisposition. Moreover, all the individuals can be vulnerable at any given point in time because of life circumstances or events. To be a member of a vulnerable population doesn’t necessarily include having health problems. In fact, all people that focus on their weaknesses rather than their strengths can be considered vulnerable only in certain contexts. For example, nurses who work in emergency rooms are vulnerable to violence, or immigrants that have few days living in a foreign country are considered fragile subjects because they don’t understand the language of the country they live in. [11]

Other examples of vulnerable groups might include people who pick up hitchhikers, divers who drink alcohol, people who travel on airplanes during flu season and people who are caught in natural disasters. There is a tendence in our culture to judge some vulnerable people as being at fault for their own vulnerability.

2.3 VULNERABLE POPULATIONS

Vulnerable populations in terms of health care are those with a higher-than-average risk of developing health problems due to their marginalized sociocultural status, their limited access to economic resources, or their personal characteristics, such as age and gender. For example, members of ethnic minority groups have often been marginalized even when they have a good instruction and good salaries. Immigrants and the poor don't have a good access to health care in some countries because of the way health insurance is obtained, for example in the United States.

Chapter 3

3. GUEST-SI METHODOLOGY

3.1 INTRODUCTION TO GUEST-SI METHODOLOGY

The adaptation of GUEST methodology for the *SINFONICA* project is mainly based on its application in social innovation contexts, where the correct definition of potential end-user segments, the identification of their needs, requirements and strategies to involve them, are fundamental tasks for the achievement of the final objectives of the project.

For these reasons, GUEST-*SI* (*GUEST* for Social Innovation) methodology pays particular attention to the definition of the potential segments of end-users of the products and services developed and tested in the project and to the identification of their needs and requirements and their interactions with other actors and stakeholders. This thesis aims to present the GUES-SI methodology, which represents an adaptation of GUEST methodology to social innovations. Like the traditional GUEST methodology, it consists of 5 phases: Go, Uniform, Evaluate, Solve and Test.

3.2 AIM OF THE THESIS

The aim of the thesis is to define the structure of innovation management activities, adopting an innovative methodology based on GUEST methodology to control and guide the *SINFONICA* process. The result of this work will be a solid structure that keeps the entire project compact, guaranteeing that each step is managed and executed in an objective, provable and replicable way.

3.3 STEP 1: GO

In the first phase of the methodology, it is necessary to identify the business of the sector under analysis and, subsequently, the stakeholders and end users of the innovative products and services, paying particular attention to their needs and requirements. For this reason, the understanding of all the actors involved in the project is required. The tools that are used in this part of description of the stakeholders are the following:

- Questionnaire Go;
- Stakeholder Analysis Matrix;
- Spider Diagram;
- Actor ID card.

Moreover, it is important to obtain a picture of the environment. To describe the external environment the following tools are used:

- 5 Porter's forces;
- PEST Analysis.

Compared to traditional GUEST methodology, stakeholder analysis tools are added. If in GUEST methodology a questionnaire is used to collect the needs and requirements of stakeholders, in GUEST-SI methodology an analysis of the data and results collected through the questionnaire is added through Stakeholder Analysis Matrix and Spider Diagram. Thanks to these, in fact, it is possible to classify information regarding the project's stakeholders more efficiently. In addition, Spider diagram is used to recognize and divide the skills of each category of stakeholders identified. With these tools, Actor ID Cards are realized more professionally. With the Actor ID Card, a profile is provided for each category of stakeholders identified. This aims precisely to make the analysis personalized, since these are projects aimed at social innovations. In addition, a deeper analysis of the external environment is added through 5 Porter's Forces, in order to identify problems and possible solutions that will be dealt with in the next step, the UNIFORM phase.

3.3.a QUESTIONNAIRE

As first part of the analysis of the stakeholders, it is important to understand the point of view of all the actors that could be influenced by the project. For this reason, a form with the goal of identifying the opinions on the mobility sector of all the stakeholders is used. It has the goal of individuating the main needs and requests

of the customers. To carry out the questionnaire, the groups of people with mobility difficulties to be involved were identified, according to their priorities, assigning each category a priority level among the following: [25]

1. High priority.
2. Potential priority.
3. No priority.

Five categories of people with mobility difficulties have been identified, according to the following definitions:

1. **Elderly**: the elderly population is defined as people aged 65 and over. In addition, this population is particularly vulnerable to loneliness and social isolation, conditions that can have serious health repercussions (hypertension, heart disease, obesity, weakened immune system, anxiety, depression, cognitive decline, Alzheimer's disease and even death). Barriers in transportation can accentuate social isolation and loneliness. It is always appropriate to consider gender balance;

2. **People with cognitive disabilities**: people with cognitive disabilities are those who have impairments in intellectual abilities (reasoning, problem-solving, planning, abstract thinking, judgment, school and experience learning) and adaptive behaviour (compliance with developmental and sociocultural standards for the individual's independence and ability to fulfil their social responsibilities). A broad definition of cognitive disabilities is adopted, including both intellectual disabilities developed during childhood and cognitive deficits due to traumatic brain injury, Alzheimer's disease and other dementias, as well as conditions such as stroke. People with cognitive disabilities are among the groups of people with mobility difficulties, facing obstacles in transport. It is always appropriate to consider gender balance.

3. **Digitally vulnerable people**: digitally vulnerable people are those who do not have access, do not wish to access or encounter difficulties in using information and communication technologies, such as computers, smartphones and the Internet. Again, gender balance should be considered;

4. **Gender-related vulnerabilities**: gender-based violence, harassment and a general sense of insecurity have a significant impact on people's mobility patterns. To ensure high-quality, accessible and affordable public transport for all, a gender-sensitive approach in transport policies is needed. Within this category, the aim is to ideally involve women, men, transgender, cisgender, non-binary, agender, gender non-conforming, gender fluid, genderqueer and, in general, LGBTAI+Q representatives. Again, gender balance must always be considered;

5. **Young people**: the United Nations defines young people, for statistical purposes, as persons between the ages of 15 and 24, without prejudice to other definitions. Youth is understood as a period of transition from the dependence of childhood to the independence of adulthood. Therefore, this category is more fluid than other well-defined age groups. However, age is the simplest criterion for defining this group, especially in relation to education and employment, as 'youth' often refers to people who are in the period between the end of compulsory education and the start of their first job. This category includes all people between the ages of 18 and 24. Again, gender balance must always be considered.

The questionnaire is characterized by a structure with the following sections (APPENDIX):

- Participants;
- Section A;
- Section B;
- Section C;
- Section D;
- Section E;
- Section F;
- Section G;
- Showcards.

Here's a summary of what each section includes:

- **Participants:** information about the survey, including the survey period, number of participants, location, target group, and dates;

- **Section A - Travel Behaviour and Transport Use**: questions about the regular forms of transportation participants use and their reasons for choosing them;

- **Section B - Motives behind transport choices**: it explores reasons for not using public transport or preferences for shared mobility, it also explores perceived barriers to mobility, such as physical, social, or infrastructural challenges;

- **Section C - Special Needs:** questions on how accessible and inclusive participants find current transportation options, especially for vulnerable groups;

- **Section D - Use of Technology and Digital Devices (for transport):** it includes participants' awareness and usage of technological solutions in mobility, such as apps and digital services;

- **Section E - Familiarities with the CCAM Concepts:** preferences and experiences with public transport, including frequency of use and factors that influence their satisfaction;

- **Section F - Feelings, Emotions, Attitudes Toward Autonomous Vehicles:** participants' concerns regarding safety and comfort while using various modes of transportation;

- **Section G - Socio Demographics:** information to understand the respondent's background and socio-economic context;

- **Showcards:** the section provides options for responses used in multiple-choice questions across different sections. [25]

At this point, all the information and data collected from the surveys are used for the realization of Stakeholder Analysis Matrix.

3.3.b STAKEHOLDER ANALYSIS MATRIX

The stakeholder analysis matrix is a tool used to identify, assess, and manage all the stakeholders of the project. All the categories of stakeholders are listed along the rows in the matrix, while the columns include:

1. A description of the basic characteristics of the stakeholders, highlighting their role within the project;
2. The level of stakeholder interest in the project or initiative;
3. The level of influence or power that stakeholders can exert on the project;
4. The actions or measures necessary to address stakeholders' interests.

This matrix provides a comprehensive overview of the stakeholders involved, allowing the project team to develop effective engagement, communication, and relationship management strategies. This tool helps ensure that relevant stakeholders are identified, understood, and engaged in the right way throughout the project lifecycle. [12]

Below, the matrix that analyzes the mobility sector is reported (Table *3-1*):

Stakeholder and basic characteristics	**Interests and how affected by the problem(s)**	**Capacity and motivation to bring about change**	**Possible actions to address stakeholder interests**
Fragile people: people with disabilities, the elderly, children, people with temporary healthy problems	They need more road safety and inclusive services.	Limited political influence; high interest in road safety and clearer and more accessible mobility.	To assure more road safety and more accessible structures.
Local government and regulatory bodies (municipal, regional or national authorities)	They are responsible for urban planning, public transportation, road infrastructure, and transportation sector regulation.	High political influence	To present a project that will capture the attention of the most of the citizens.
Public transport agencies: they operate public transport services (buses, trams, trains, subways)	They are involved in the design and implementation of transportation service improvements.	High technological resources	To realize new and modern means of transport.

Private transport operators: companies and organisations that offer private transport services (taxi companies, ridesharing services and sharing mobility).	They are influenced by mobility policies and projects.	High technological resources; Limited political influence	To offer cashbacks and awards to the organizations that apply new mobility policies and projects.
Transport users: (commuters, urban residents, tourists).	They use transportation services.	Limited political influence; High interest in simpler and clearer mobility	To offer a safer mobility and more usable services.
Automotive industry (vehicle manufacturers, transport technology providers, fuel infrastructure providers and other players in the transport industry)	They are influenced by mobility policies and projects.	High technical, technological and economic resources; Fair amount of political influence.	To offer new mobility projects they can be involved in.
Academic and research institutions (research institutes, universities, such as the Politecnico di Torino)	They conduct research on the mobility sector, technological innovation and sustainable transport models.	High technical, technological and economic resources; high capacity for the design of innovative systems.	To present projects that could be objects of research
Local Communities	They live and work in the areas affected by the mobility projects.	Fair amount of political influence	To make policies and projects that pay attention to the identity of the local communities.
Communities interested in climate change	They are interested in policies of reduction of emissions.	Fair amount of political influence	To make policies and projects that respect the theme of the climate change (reduction of emissions for example)
Immigrants	They are interested in policies that help the understanding of the mobility policies.	Low political influence	To offer more usable services and clear road signs.

Table 3-1: Stakeholders Analysis Matrix

3.3.c SPIDER DIAGRAM

The spider diagram is a chart used for a clear and concise visualization of data. It is composed of a series of lines that come out of a central point, similar to the lines of a spider web. Each "wedge" represents a different variable, and the values are represented as points. This type of diagram is especially useful when the aim is to compare multiple variables across different categories. In this case, it is used to assess the competencies of a particular type of stakeholder in different areas. This way, it is very easy to identify the strengths and weaknesses of the different categories. There are 4 levels presented in the graph:

- Level 0: dramatic improvement needed;
- Level 1: significant room for improvement;
- Level 2: some scope for improvement;
- Level 3: highly effective.

In Figure 3-1, the scheme of the diagram is shown.

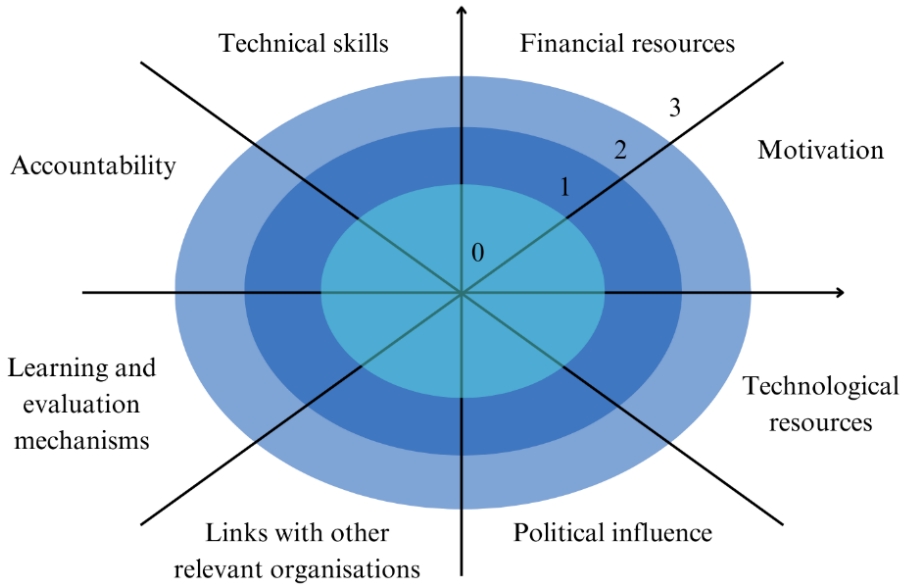

Figure 3-1 – Spider Diagram Scheme

From Figure 3-2 to Figure 3-11 all the graphs referring to each category of stakeholders are reported with their description. [13]

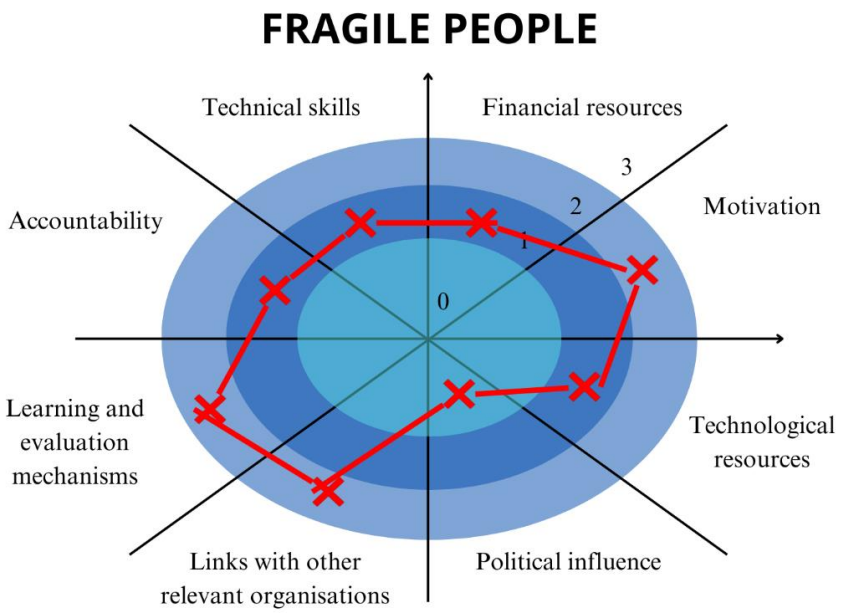

Figure 3-2 – Fragile People's Spider Diagram

- **Technical Skills (Level 1):** they may have a basic knowledge of the necessary technical skills, but may not be highly specialized;
- **Financial Resources (Level 1):** they may have limited financial resources due to economic or social challenges;
- **Motivation (Level 2):** they may be motivated to participate in the field of mobility, but they may also be limited by obstacles such as lack of resources or limited access;
- **Technological Resources (Level 1):** they may have limited access to the necessary technological resources, such as digital devices or reliable internet connection;
- **Political Influence (Level 0):** they may have little or no political influence in the field of mobility due to innumerable factors such as absence of political representation or social marginalization;
- **Links with Other Relevant Organisations (Level 2):** they may have links with other relevant organisations in the field of mobility, for example community organisations or support groups;

- **Learning Mechanisms (Level 2**): they could have access to learning mechanisms such as training programmes or educational resources;

- **Accountability (Level 1):** they may take some responsibility in the field of mobility, but they may also be limited by limited resources or support.

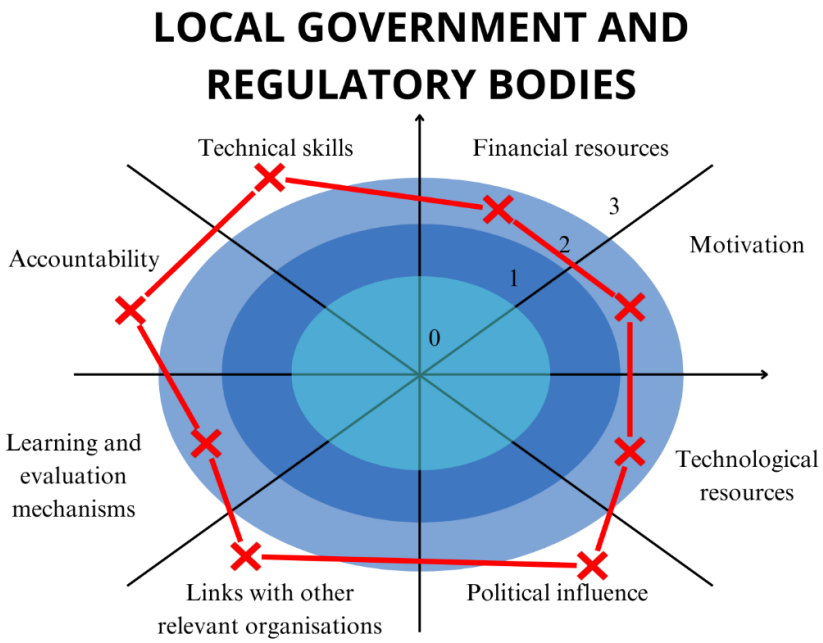

Figure 3-3 – Local Government and Regulatory Bodies' Spider Diagram

- **Technical Skills (Level 3):** they usually have highly qualified and specialised staff in the field of mobility;

- **Financial Resources (Level 2):** they often have financial resources to invest in mobility-related projects and infrastructure, but may be limited by tight public budgets;

- **Motivation (Level 2):** they are generally motivated to improve mobility within their jurisdictions to meet the needs of citizens and promote sustainable development, but the motivation may vary according to the priority given to the field of mobility compared to other problems;

- **Technology Resources (Level 2):** they tend to have access to advanced technological resources to monitor and manage traffic, implement intelligent transport systems, and develop innovative mobility solutions;

- **Political Influence (Level 3):** they have a high political influence in the field of mobility because they are responsible for the formulation and implementation of public transport policies within their jurisdictions;

- **Links with Other Relevant Organisations (Level 3):** they have close links with other relevant organisations, such as transport agencies, regional authorities and community organisations, to collaborate on projects and initiatives;

- **Learning Mechanisms (Level 2):** they invest in training and professional development programmes for their staff to ensure that they are up to date on best practices and new technologies in the field of mobility;

- **Accountability (Level 3):** they have a strong responsibility to ensure that mobility within their jurisdictions is safe, efficient and accessible to all citizens.

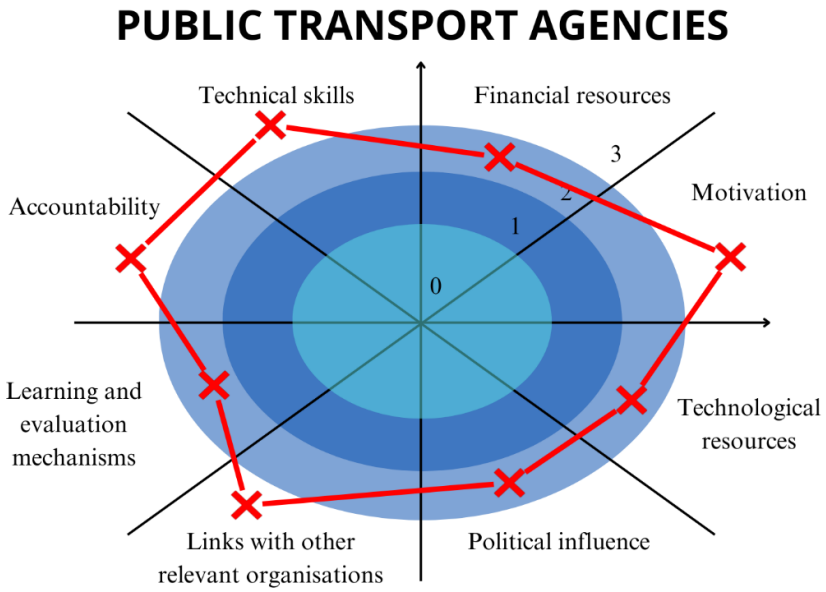

Figure 3-4 – Public Transport Agencies' Spider Diagram

- **Technical Skills (Level 3):** they usually have highly qualified and specialised transport personnel, including engineers, transport planners and technicians;

- **Financial Resources (Level 2):** they may have significant financial resources available from fare revenue, public grants and other sources of funding but they could also be subject to budgetary limitations that limit the availability of resources;

- **Motivation (Level 3):** they are motivated to provide efficient and accessible services to meet the mobility needs of the citizens they serve;

- **Technology Resources (Level 2):** they often use advanced technologies to monitor and manage their services, for example through electronic payment systems, real-time vehicle tracking and passenger apps but some agencies may not adopt innovative technologies;

- **Political Influence (Level 2):** they may have some degree of political influence, as they often operate under the aegis of local or regional governments but it may vary depending on the political context and priorities of the government;

- **Links with Other Relevant Organisations (Level 3):** they often collaborate with other relevant organisations, such as local authorities, regulators, mobility providers and community organisations, to improve the quality of services offered;

- **Learning Mechanisms (Level 2):** they may have training and professional development programmes for their staff in order to keep skills up to date and address emerging challenges in the transport sector;

- **Accountability (Level 3):** public transport agencies have a strong responsibility to provide safe, efficient and accessible services for passengers, as well as to ensure infrastructure safety and regulatory compliance.

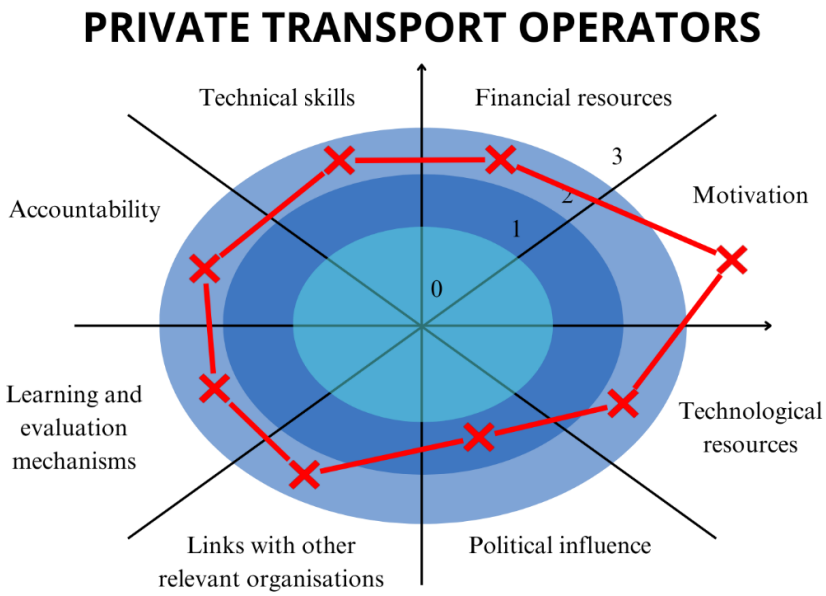

Figure 3-5 – Private Transport Operators' Spider Diagram

- **Technical Skills (Level 2):** they have personnel with sufficient technical skills to manage and maintain their vehicles but they may not have the level of specialisation and experience typical of public transport companies;
- **Financial Resources (Level 2):** they may have variable financial resources available for the purchase and maintenance of vehicles, as well as for daily operating expenses but they could be subject to stronger financial pressures;
- **Motivation (Level 3):** they are often motivated by the desire to provide high quality services and meet the needs of their customers to grow their business;
- **Technology Resources (Level 2):** they can use technologies to improve operational efficiency and deliver a better customer experience but they could be limited in the financial resources available to invest in advanced technologies;
- **Political Influence (Level 1):** they may have limited political influence over public bodies or large transport companies, as they operate mainly in the free market and are subject to government regulations;
- **Links with Other Relevant Organisations (Level 2):** they can collaborate with other relevant organisations in the field of mobility, for example through partnerships with public transport providers or sector associations;

- **Learning Mechanisms (Level 2):** they can provide training and professional development opportunities for their staff in order to improve the skills and quality of the services offered;

- **Accountability (Level 2):** they have a responsibility to their customers and the safety of their operations, but may be subject to less stringent regulatory supervision than public bodies.

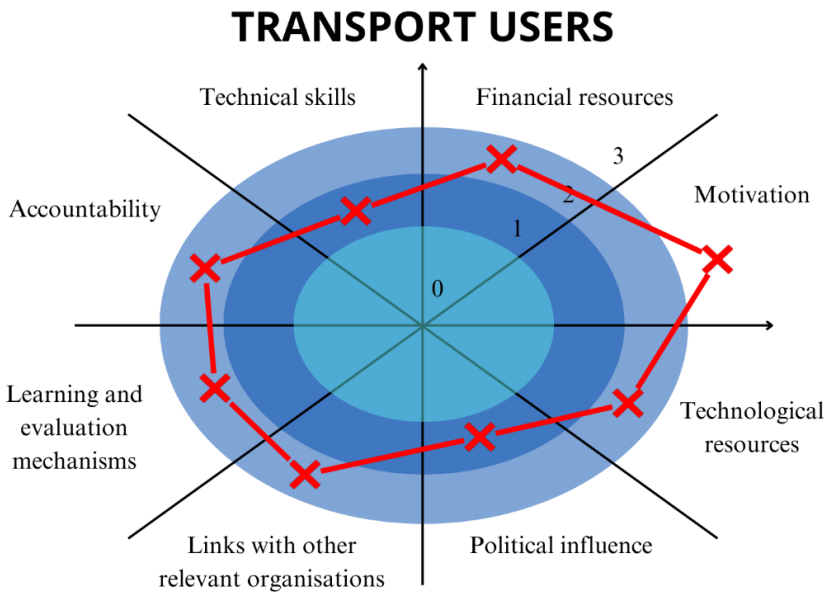

Figure 3-6 – Transport Users' Spider Diagram

1. **Technical Skills (Level 1):**
   a. Commuters: they have a basic knowledge of the transport systems used for their daily journeys, but not necessarily advanced technical skills in the field of mobility;
   b. Tourists: they have limited knowledge of the city's transport systems they are visiting;
   c. Urban Residents: they have a basic knowledge of urban transport systems, but may not have advanced technical skills;

2. **Financial Resources (Level 2):**
   a. Commuters: they may have enough financial resources to cover the costs of their daily commutes, but transport costs can be a significant part of their budget;

b. Tourists: they have financial resources available to cover transport costs during their stay;
c. Urban Residents: they may have sufficient financial resources to cover transportation costs within the city;

3. **Motivation (Level 3):**
   a. Commuters: they are highly motivated to use transportation to reach their workplaces or other daily commitments;
   b. Tourists: they are motivated to use transportation to explore the city they are visiting;
   c. Urban Residents: they are highly motivated to use urban transport to access services, work, education and leisure within the city;

4. **Technology Resources (Level 2):**
   a. Commuters: they can use technologies such as public transport apps, digital maps and electronic payment systems to improve the experience of their travels;
   b. Tourists: they can use technologies such as travel apps, digital maps and ride-sharing services to simplify their travel during their stay;
   c. Urban Residents: they can use technologies such as public transport apps, ride-sharing services and digital maps to facilitate their travel within the city;

5. **Political Influence (Level 1):**
   a. Commuters: they have little political influence over transport services;
   b. Tourists: they have a low political influence towards the transport services of the city they visit;
   c. Urban Residents: they can exert some political influence through their involvement in local decision-making processes and support or opposition to urban transport policies;

6. **Links with Other Relevant Organizations (Level 2):**
   a. Commuters: they may have links with other relevant organizations, such as unions or commuter associations, to address transport-related issues;
   b. Tourists: they have limited links with other relevant transport organizations;
   c. Urban Residents: They may have links with other relevant transport organizations, such as neighbourhood associations or activist groups, to influence urban transport policies;

7. **Learning Mechanisms (Level 2):**
   a. Commuters: they have access to informal learning mechanisms, such as travel experiences and information sharing with other commuters;
   b. Tourists: they can learn through direct experience during their stay;
   c. Urban Residents: they can have access to training programs and information on urban transport through local organizations and online resources;

8. **Accountability (Level 2):**
   a. Commuters: they have a certain responsibility to plan and manage their daily journeys, but the overall responsibility for transport services belongs to service providers and regulators;
   b. Tourists: they have a responsibility to use transport safely and respectfully during their stay;
   c. Urban Residents: they have a responsibility to help maintain efficient urban transport services through responsible use.

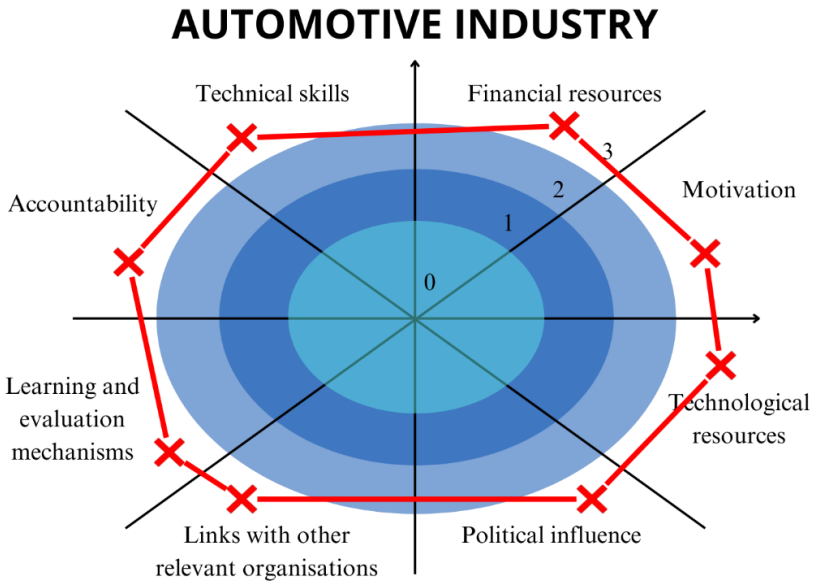

Figure 3-7 – Automotive Industry's Spider Diagram

- **Technical Skills (Level 3):** it has a huge number of highly qualified engineers, designers and technicians who own advanced skills in vehicle design, production and maintenance;

- **Financial Resources (Level 3):** companies have considerable financial resources to invest in research and development, engineering, manufacturing and marketing;

- **Motivation (Level 3):** companies are highly motivated to achieve excellence in the field of mobility. Global competition and growing consumer demands are constantly pushing companies to innovate;

- **Technology Resources (Level 3):** they invest heavily in the development and implementation of advanced technologies in their vehicles. This includes electric vehicle technologies, advanced driver assistance systems, vehicle internet connectivity, artificial intelligence, etc.;

- **Political Influence (Level 3):** companies have significant political influence at the global and national level. They actively work with governments to influence policies and regulations regarding the automotive industry;

- **Links with Other Relevant Organizations (Level 3):** they collaborate with a big number of relevant mobility organizations, including component suppliers, universities, research institutes, government and non-governmental organizations;

- **Learning Mechanisms (Level 3):** they are dedicated to the implementation of effective learning mechanisms, which include in-house training programs, collaborations with academic institutions, and investments in research and development;

- **Accountability (Level 3):** they have a strong social, environmental and economic responsibility. They are committed to producing safe vehicles, reducing emissions, promoting sustainability and contributing to the well-being of the communities in which they operate.

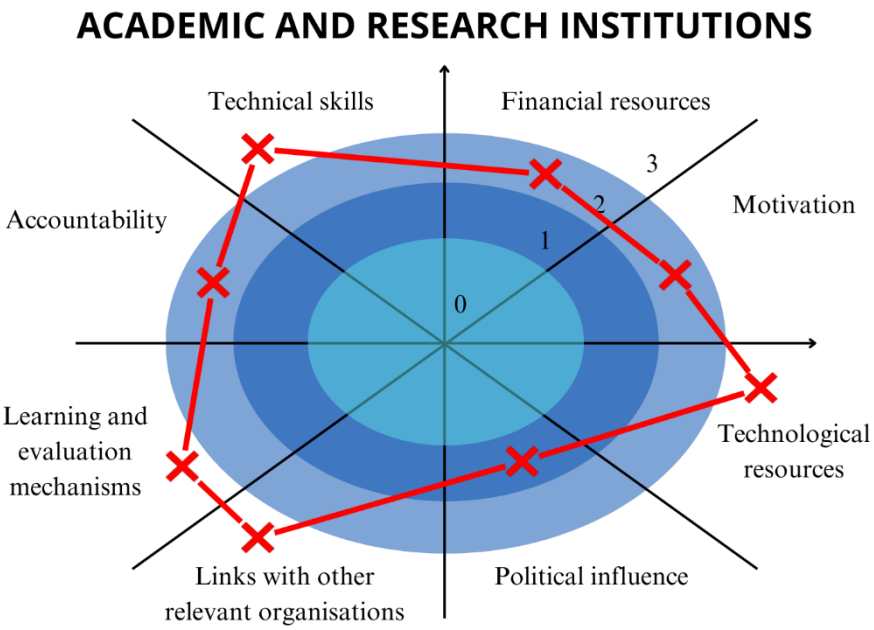

Figure 3-8 – Academic and Research Institutions' Spider Diagram

- **Technical Skills (Level 3):** universities are equipped with highly qualified staff, including professors, researchers and students specializing in engineering, motor science, transport technology and related disciplines;

- **Financial Resources (Level 2):** although universities may have access to funds through public funding, donations and collaborations with industry, their financial resources may be limited compared to those of large corporations;

- **Motivation (Level 2):** they are motivated by the pursuit of knowledge and innovation in the field of mobility. Although they may not be as profit-driven as companies, they are interested in the development of sustainable solutions;

- **Technology Resources (Level 3):** they have laboratories equipped with high-tech instrumentation and collaborate with industry and other institutions to develop and test new technologies for vehicles, infrastructure and intelligent transport systems;

- **Political Influence (Level 1):** their main role is to provide technical knowledge and skills rather than to directly influence government policies.

- **Links with Other Relevant Organizations (Level 3):** they actively collaborate with other organisations in the field of mobility, such as automotive companies, government agencies, non-profit organisations and local communities;

- **Learning Mechanisms (Level 3):** they offer advanced study programmes, training courses, seminars and workshops for students, professionals and community members interested in mobility. They participate in collaborative projects that foster continuous learning and development in the field of mobility;

- **Accountability (Level 2):** they have a responsibility to society and the environment, both through the production of knowledge and technologies that can improve mobility in a sustainable way.

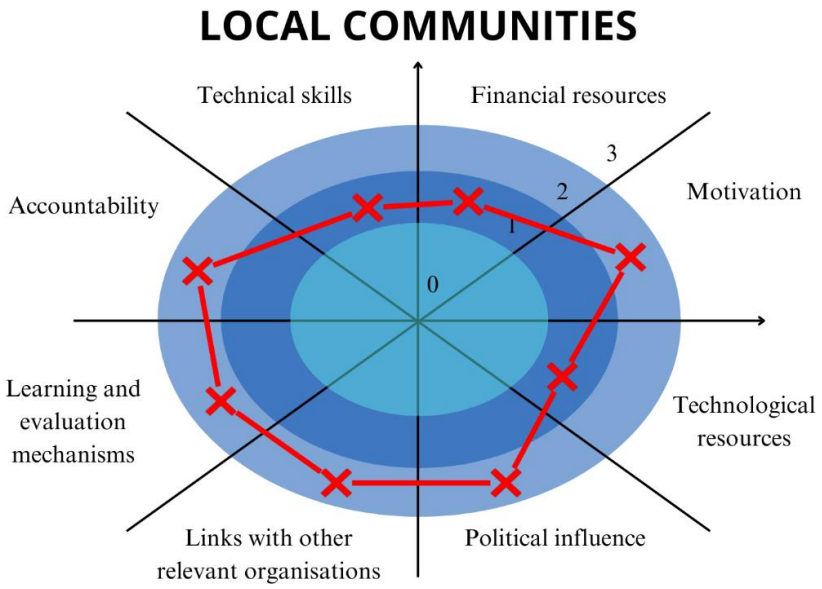

Figure 3-9 – Local Communities' Spider Diagram

- **Technical Skills (Level 1):** they may have limited technical knowledge in the field of mobility, as they may not be directly involved in the technical development of transport systems;

- **Financial Resources (Level 1):** the financial resources of local communities could be limited related to those of larger entities such as companies or research institutes;

- **Motivation (Level 2):** they are motivated to improve local mobility to meet the needs of residents, improve the quality of life and promote local economic development;

- **Technology Resources (Level 1):** they may not have advanced technological resources in the field of mobility;

- **Political Influence (Level 2):** they can have a degree of political influence on decisions concerning local mobility through involvement in decision-making at municipal or regional level;

- **Links with Other Relevant Organizations (Level 2):** they can establish links with other relevant organisations in the field of mobility, such as local transport companies, non-profit organisations, research institutes or government agencies;

- **Learning Mechanisms (Level 2):** they can implement learning mechanisms such as workshops, public meetings, training courses and collaborations with external experts to obtain knowledge and skills in the field of local mobility;

- **Responsibility (Level 2):** they have a responsibility to their residents to ensure a safe, efficient and sustainable mobility system, they may adopt policies and initiatives aimed at promoting social and environmental responsibility.

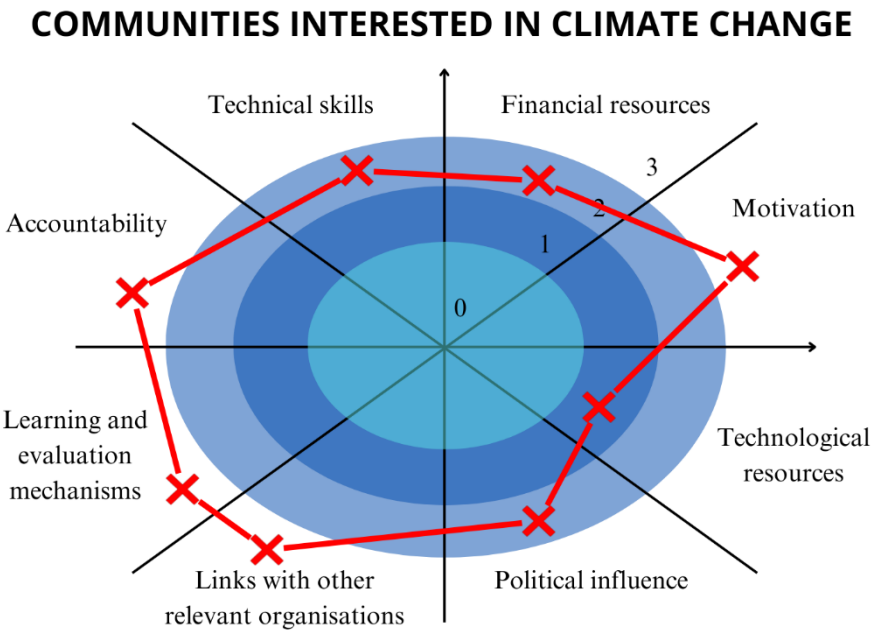

Figure 3-10 – Communities interested in Climate Change's Spider Diagram

- **Technical Skills (Level 2):** they may have moderate technical knowledge in the field of mobility, which may derive from local experts, consultants or partnerships with research institutes;

- **Financial Resources (Level 2):** they may have moderate financial resources, which may come from public funds, donations or voluntary contributions;

- **Motivation (Level 3):** they show strong motivation to promote sustainable mobility solutions to combat climate change and reduce greenhouse gas emissions;

- **Technology Resources (Level 2):** they can have access to technological resources to promote sustainable mobility, such as applications for sharing electric bicycles or low-emission car sharing services;

- **Political Influence (Level 2):** although they may have good political influence at the local or regional level, they don't have the same level of influence as large corporations or government organizations;

- **Links with Other Relevant Organizations (Level 3):** they can establish strong links with other relevant organisations in the field of sustainable mobility, like environmental organisations, activist groups, research institutes, etc.**;**

- **Learning Mechanisms (Level 3):** they can organize workshops, educational events, study groups and other activities to promote about sustainable mobility.

- **Accountability (Level 3):** they feel a strong responsibility to promote actions that reduce the environmental impact of mobility and contribute to the fight against climate change.

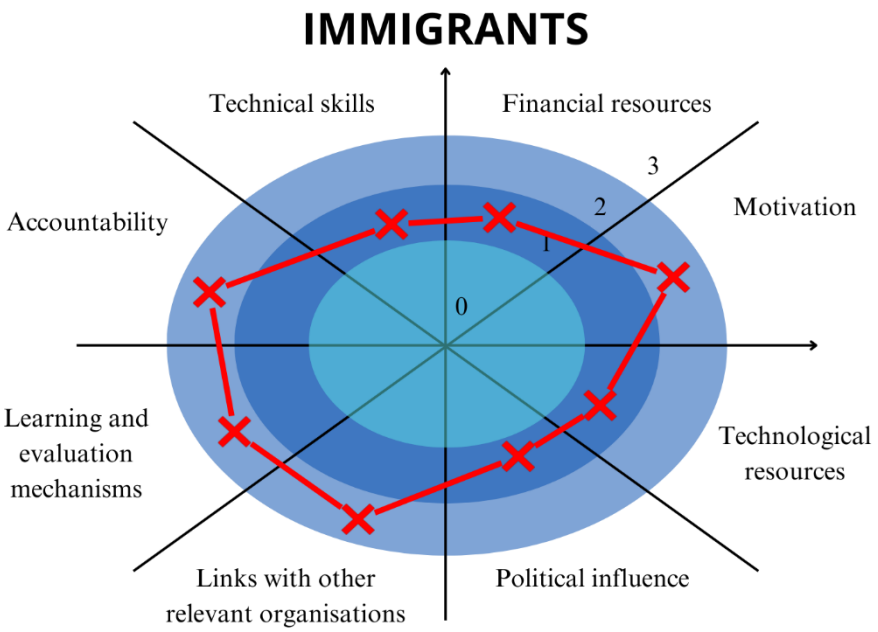

Figure 3-11 – Immigrants' Spider Diagram

- **Technical Skills (Level 1):** in the field of mobility, they may not have advanced technical skills, but they may have transferable competencies from other areas that can be applied to the field of mobility once they have experience;

- **Financial Resources (Level 1):** they may not have important financial resources, as they may face economic challenges in the process of integration into a new country;

- **Motivation (Level 2):** they could be highly motivated to integrate into the host society and contribute to their personal and professional development;

- **Technology Resources (Level 1):** they may not have direct access to advanced technological resources in the field of mobility, unless they work in sectors of industry that require such resources;
- **Political Influence (Level 1):** they have limited political influence in the field of mobility, since they are not fully integrated into the host country's political system;

- **Links with Other Relevant Organizations (Level 2):** they can establish significant links with other relevant organisations in the field of mobility, such as immigrant associations, non-profit organisations or activist groups;

- **Learning Mechanisms (Level 2):** they can attend training courses, work placement programmes, internships or other professional development opportunities;

- **Accountability (Level 2):** they are responsible for contributing positively to the host society and the mobility sector through their work and commitment.

3.3.d ACTOR ID CARD

At this stage, an Actor ID is assigned to each stakeholder category, representing a partially fictional profile created by gathering demographic, behavioral, and psychographic data. This approach aids in gaining a clearer understanding of the stakeholders, facilitating the development of customized services and more efficient marketing strategies. As previously mentioned, it is essential to have comprehensive knowledge of all the stakeholders involved in the project, with a particular focus on their requirements. Therefore, it is crucial to gather all potentially beneficial data.
Now, for each type of stakeholder, the Actor ID scheme with his comment is reported from Figure 3-12 to Figure 3-23. For Fragile People, three Actor IDs have been created, dividing "Children", "Elderly" and "Disabled" as they represent 3 groups with different characteristics and needs (from Figure 3-12 to Figure 3-14).

FRAGILE PEOPLE

Figure 3-12 – Children's Actor ID

Figure 3-13 – Disabled's Actor ID

Figure 3-14 – Elderly's Actor ID

The main goals are to provide accessible infrastructure and transportation that meets specific needs. Key challenges include limited mobility, architectural barriers, and inadequate transportation for the elderly, disabled, or children. Their interests involve social activities and access to healthcare, while hobbies vary from

community walks to recreational activities for children. They rely on physical support and verbal communication, as unfamiliarity with digital platforms and resistance to new technologies hinder their participation.

LOCAL GOVERNMENT AND REGULATORY BODIES

Figure 3-15 – Local Government and Regulatory Bodies' Actor ID

The main goal is to create inclusive transportation projects that improve quality of life, focusing on safety and accessibility. Key challenges include budget constraints, regulatory complexities, and public pressure. Interests involve sustainable development and urban improvement, with hobbies in political or community activities. Government platforms are used for communication. However, bureaucracy and differing priorities may slow progress and overlook the needs of vulnerable individuals.

PUBLIC TRANSPORT AGENCIES

Figure 3-16 – Public Transport Agencies' Actor ID

The main goals are to provide safe, accessible, efficient, and modern public transport while enhancing passenger satisfaction. Challenges include infrastructure maintenance, adopting new technologies, and improving accessibility for vulnerable groups. Interests focus on new mobility technologies, sustainability, and energy efficiency, with hobbies including participation in industry conferences and sustainable transport advocacy. Communication relies on public transport apps and online portals. Resistance to changes that disrupt services and challenges in quickly adapting to new technologies are potential obstacles.

PRIVATE TRANSPORT OPERATORS

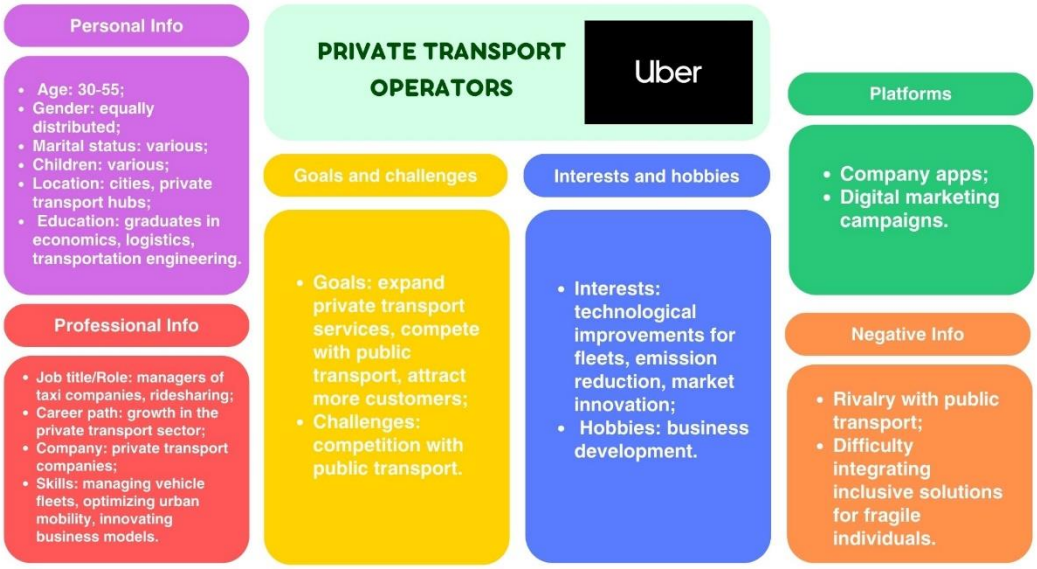

Figure 3-17 – Private Transport Operators' Actor ID

The main goals are to expand private transport services, compete with public transport, and attract more customers. Challenges include competition with public transport, regulatory restrictions, and integrating advanced technologies. Interests include fleet improvements, emission reduction, and market innovation, with hobbies centered on business development. Platforms used include company apps and digital marketing. Obstacles involve rivalry with public transport and difficulty integrating inclusive solutions for vulnerable individuals.

TRANSPORT USERS

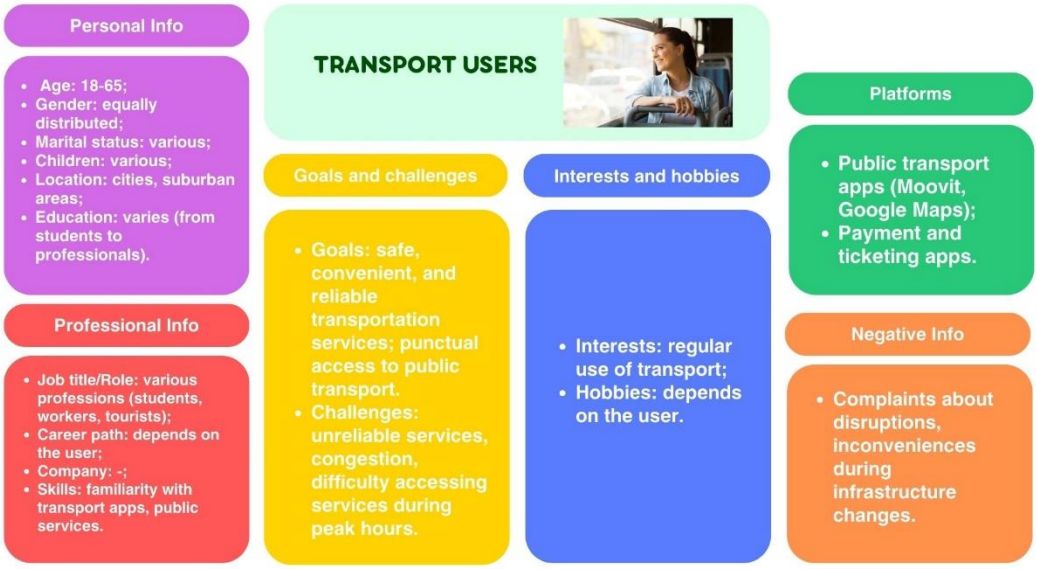

Figure 3-18 – Transport Users' Actor ID

The goals are to provide safe, convenient, and reliable transportation with punctual public transport access. Challenges include unreliable services, congestion, and limited access during peak hours. Interests involve regular use of transport for work, study, or leisure, while hobbies vary widely. Platforms used include public transport and ticketing apps. Issues include complaints about disruptions and inconveniences during infrastructure or service changes.

AUTOMOTIVE INDUSTRY (VEHICLE MANUFACTURERS, TECHNOLOGY PROVIDERS, FUEL INFRASTRUCTURE PROVIDERS)

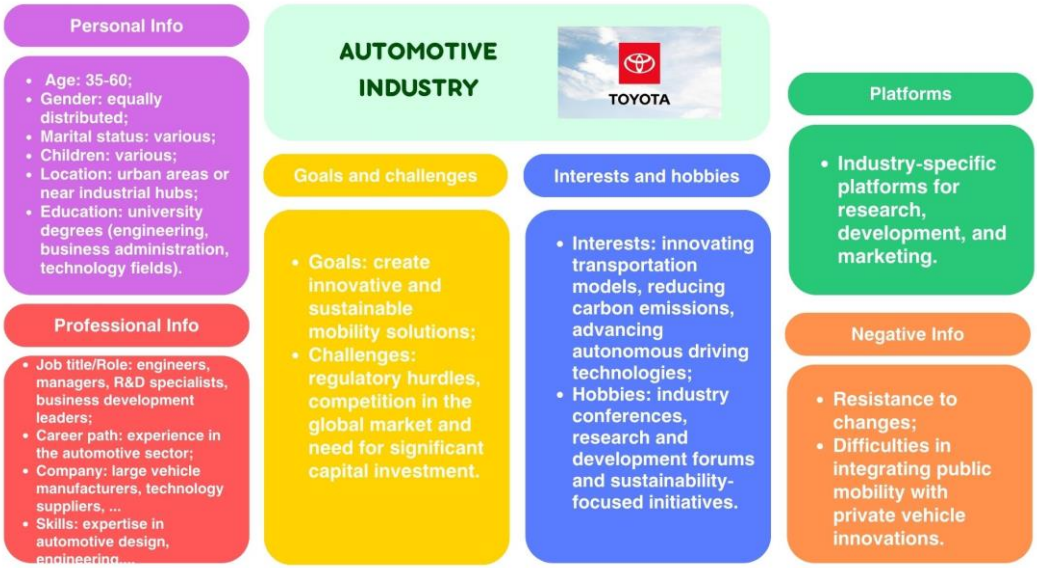

Figure 3-19 – Automotive Industry's Actor ID

The goals are to develop innovative and sustainable mobility solutions, focusing on electric vehicles, autonomous driving, and fuel efficiency. Challenges include regulatory hurdles, global competition, and the high capital investment needed for new mobility models. Interests are in transportation innovation, emissions reduction, and advancing autonomous technologies, with hobbies involving industry conferences and sustainability initiatives. Platforms used are industry-specific for research, development, and marketing. Challenges include resistance to changes affecting traditional business models and integrating public mobility with private vehicle innovations.

ACADEMIC AND RESEARCH INSTITUTIONS (UNIVERSITIES, RESEARCH INSTITUTES)

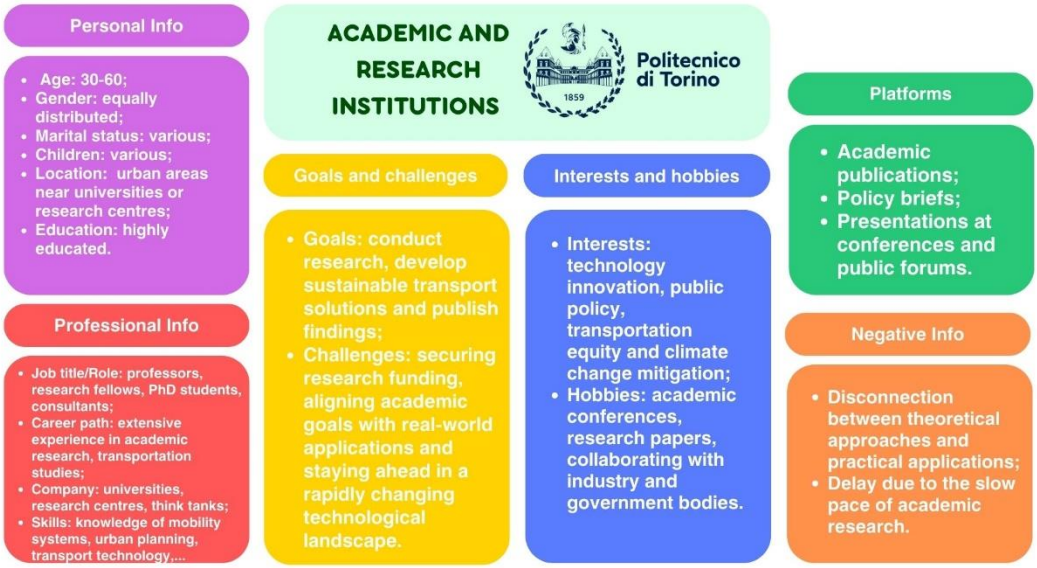

Figure 3-20 – Academic and Research Institutions' Actor ID

The goals are to research future mobility, develop sustainable transport solutions, and publish influential findings. Challenges include securing funding, aligning research with practical applications, and keeping up with technological advances. Interests include technology innovation, public policy, transportation equity, and climate change mitigation, with hobbies involving conferences, publishing, and collaboration. Platforms used are academic publications and policy presentations. Issues include a disconnect between theory and practice, and the slow pace of research potentially delaying immediate project needs.

LOCAL COMMUNITIES

Figure 3-21 – Local Communities' Actor ID

The goals are to have reliable, safe, and affordable transportation connecting them to jobs, education, and services. Challenges include reliance on inefficient systems, exclusion from decision-making, and risks of displacement due to large projects. Interests focus on community identity, safety, and access to public spaces, with hobbies including local events and advocacy. Platforms used are community forums, social media, and public meetings. Issues include resistance to disruptive changes, distrust from lack of engagement, and the risk of misinformation if community concerns are overlooked.

COMMUNITIES INTERESTED IN CLIMATE CHANGE

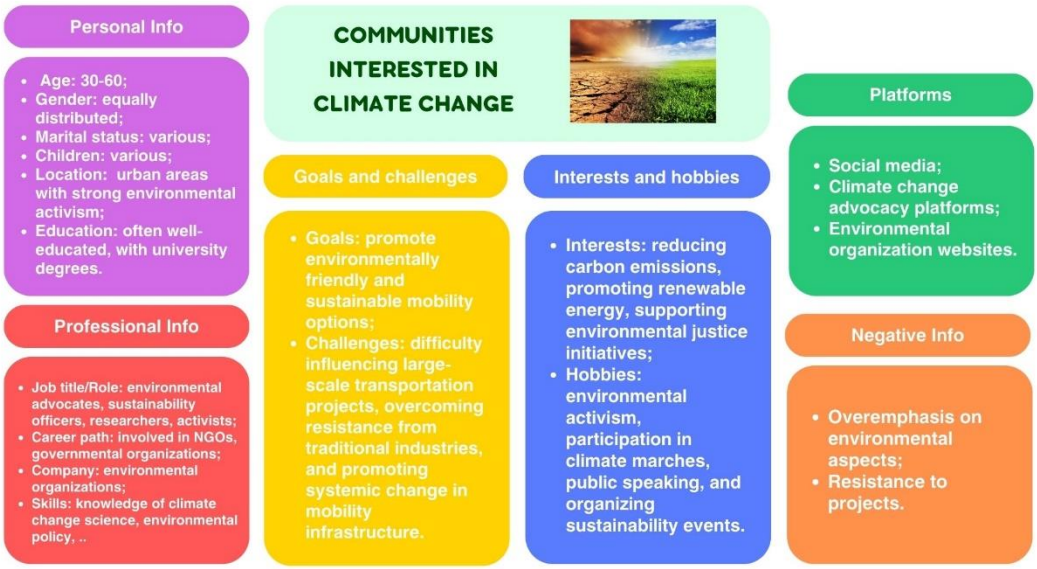

Figure 3-22 – Communities interested in climate change's Actor ID

The goals are to promote sustainable mobility options that lower carbon emissions and combat climate change. Challenges include influencing large-scale projects, overcoming resistance from traditional industries, and advocating systemic infrastructure changes. Interests focus on reducing emissions, renewable energy, and environmental justice, with hobbies involving activism, climate marches, and public speaking. Platforms used include social media, advocacy websites, and environmental organization sites. Issues include an overemphasis on environmental goals without addressing financial or social constraints, and resistance to projects seen as insufficiently sustainable.

IMMIGRANTS

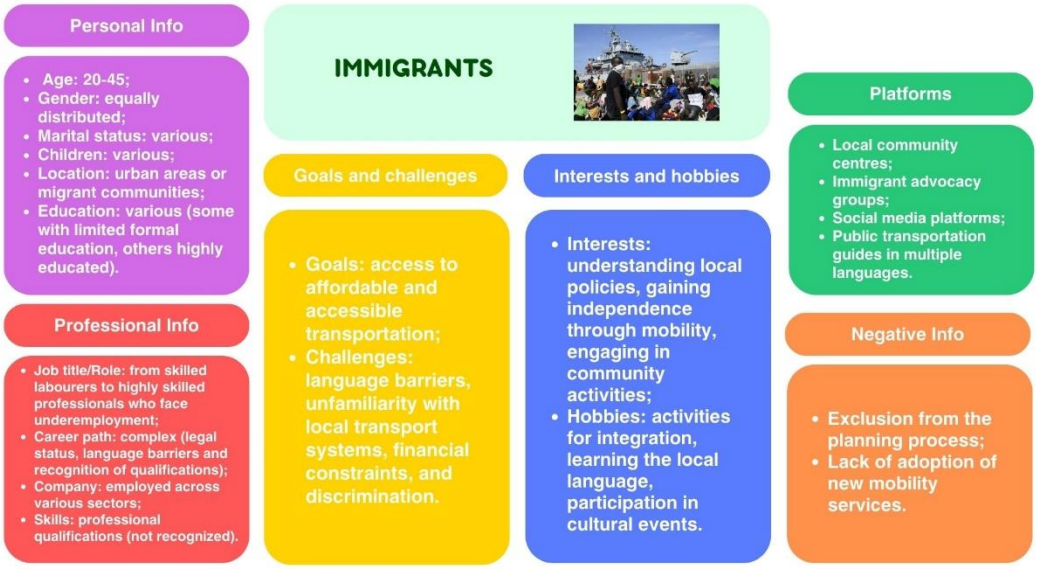

Figure 3-23 – Immigrants' Actor ID

The goals are to have affordable, accessible transportation for community integration and access to employment, education, and services. Challenges include language barriers, unfamiliarity with transport systems, financial constraints, and discrimination. Interests involve understanding local policies, gaining independence, and community engagement, with hobbies focused on integration, language learning, and cultural events. Platforms used include community centers, advocacy groups, social media, and multilingual transport guides. Issues include exclusion from planning due to language barriers or legal status, leading to disengagement and poor adoption of new services.

3.3.e 5 PORTER'S FORCES

Applied to the mobility sector, this is how 5 Porter's forces could be evaluated: [14]

1. **Bargaining power of suppliers:**

   The contracting power of suppliers depends on the market segment. Autonomous vehicle technology providers, in fact, have significant bargaining power, because they offer important solutions for innovation in the industry. Nevertheless, in other sectors, such as the production of traditional vehicles, the bargaining power of suppliers is modest, since there are many suppliers available.

2. **Bargaining power of customers:**

   In this sector, the contractual power of customers is moderate. Even though customers have a huge number of options to choose from, (public transport, use of private vehicles, use of ridesharing services), they can be limited by existing infrastructure, tariffs and regulatory restrictions. But, changes in consumer preferences or the emergence of new technologies could increase customer bargaining power.

3. **Competitive rivalry:**

   The intensity of competition between existing companies is high. There are many companies that compete with each other in numerous segments of the industry, such as car manufacturers, airlines, public transport companies and ridesharing platforms. This competition can lead to competitive prices, innovation and improved quality of service.

4. **Threat of new entrants:**

   In the mobility sector, the threat of new entrants can be restrained. The entry into the transport market often necessitates significant investments in infrastructure and technology but there are always new opportunities in areas such as road, rail, maritime and air transport. However, entry barriers can be very high due to the need to obtain licenses, conform to regulations and face competition from established companies.

5. **Threat of substitutes:**

   The threat of substitutes can be high. There are many alternatives to traditional transport, such as bicycles, ridesharing services, car-sharing services, improved

public transport systems, and emerging technologies like self-driving vehicles. The availability of these options can affect traditional transport demand.

3.3.f PEST ANALYSIS

A PEST analysis is a valuation method that aims to understand the context in which a sector operates. The acronym PEST represents four categories of environmental factors that can influence an organization: Politico-legal, Economic, Socio-cultural and Technological. The method is applied to the field of mobility: [15]

As for the **Policy-Legal category**, the mobility sector in recent years is influenced by environmental laws and current emissions regulations, which are increasingly aiming for green and sustainable solutions, such as electric and hybrid cars. Another very important point concerns road safety. In 2022, in fact, there was an increase in deaths in road accidents of 9.9% compared to the previous year. [16]

An **economic analysis** shows that fluctuations in oil prices directly affect the operating costs of transport companies and may push for alternative solutions such as electric vehicles when oil prices are high. The sale of electric cars and green vehicles is also influenced by interest rate trends. These have a huge impact on the accessibility of loans and financing for the purchase of vehicles and the implementation of infrastructure projects in the field of mobility.

From a **social and cultural point of view**, however, consumer preferences are changing towards more flexible and sustainable forms of mobility, such as car sharing, bike sharing and ride sharing. Another important factor is the ageing of the population, resulting in an increased demand for transport services adapted to the needs of the elderly. Finally, there is a growing environmental awareness, especially among young people, which is pushing for more ecological and sustainable mobility solutions.

Finally, as regards **technology**, progress is revolutionising the mobility sector, with implications for safety, road infrastructure and business models. The integration of sensors and connectivity in vehicles and infrastructure is enabling more intelligent management of traffic and mobility services. Developments in battery technology and charging infrastructure are also very important as they are pushing for greater adoption of electric vehicles, reducing the environmental impact of the mobility sector.

Considering these factors, it is clear that the mobility sector is undergoing a significant transformation, with an increasing focus on sustainability, technological innovation and changing consumer needs.

3.4 STEP 2: UNIFORM

The second phase of GUEST methodology has two main objectives: develop and consolidate the information collected during the first phase and create a knowledge base following a standard format, making it possible to compare current and past cases. It has been chosen to use the Lean Model Canvas instead of the Business Model Canvas.

3.4.a CHOOSING BETWEEN BMC AND LMC

The Lean Model Canvas is an adaptation of the Business Model Canvas, and it aims to make it more appropriate for the world of startups that are in the early stages of their life cycle. Although it has maintained the original nine blocks of the Business Model Canvas, in fact, the LMC has added new elements that allow the highest risk variables to be verified and to proceed with their verification. Lean Canvas is particularly useful in situations where there is uncertainty and complexity. In order to work on innovative projects or initiatives that explore new markets or business models, Lean Model Canvas is useful to quickly identify risks and opportunities, as well as to iterate on ideas rapidly and efficiently. For this reason, in this project the Lean Model Canvas is used. [17]

3.4.b LEAN MODEL CANVAS (LMC)

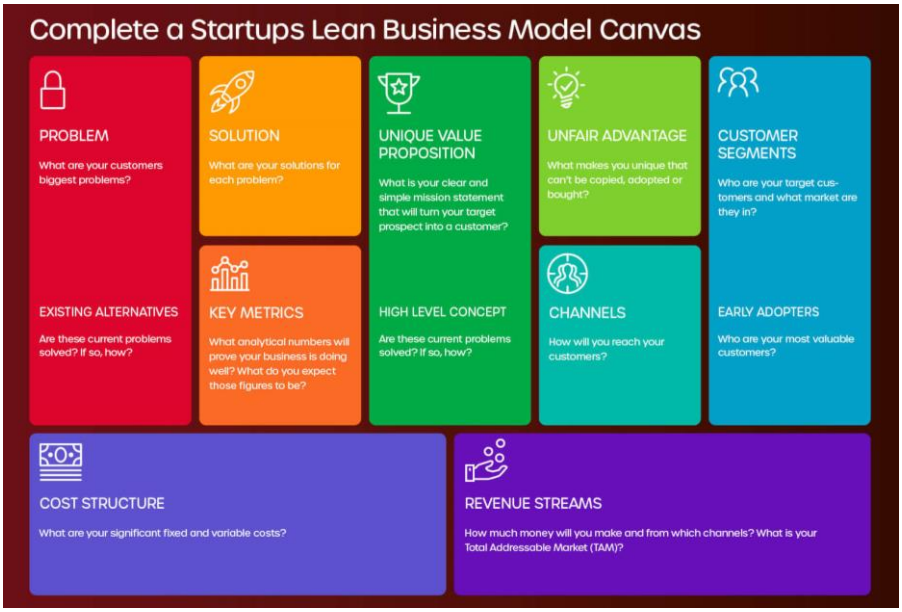

Figure 3-24 – Lean Model Canvas

The Lean Canvas is similar to the Canvas Business Model, but focuses specifically on the main aspects of an entrepreneurial idea in a concise and focused manner. It is comped of nine key elements (Figure 3-24): [18]

1. Problem: What is the main problem the model is trying to solve? Who are the customers and which are their requests?
2. Solution: What is the value proposition? How is it possible to solve the customers' problem?
3. Unique Value Proposition (UVP): What is the unique promise to customers? Why would they choose this product or this service over the rivalry?
4. Key Metrics: What are the main indicators of success for our business? Which metrics are significant for measuring performance?
5. Channels: How is it possible to reach customers? Through which marketing channels?
6. Cost structure: What are the key costs of the business? Which are the main investments?
7. Revenue Stream: How is it possible to earn money? What are the business's sources of income?

8. Customer segments: Who are the target customers? Which are their characteristics?
9. Key Activities: What are the key actions required to create value for customers and make a business work?

3.4.c LMC APPLIED TO THE MOBILITY SECTOR

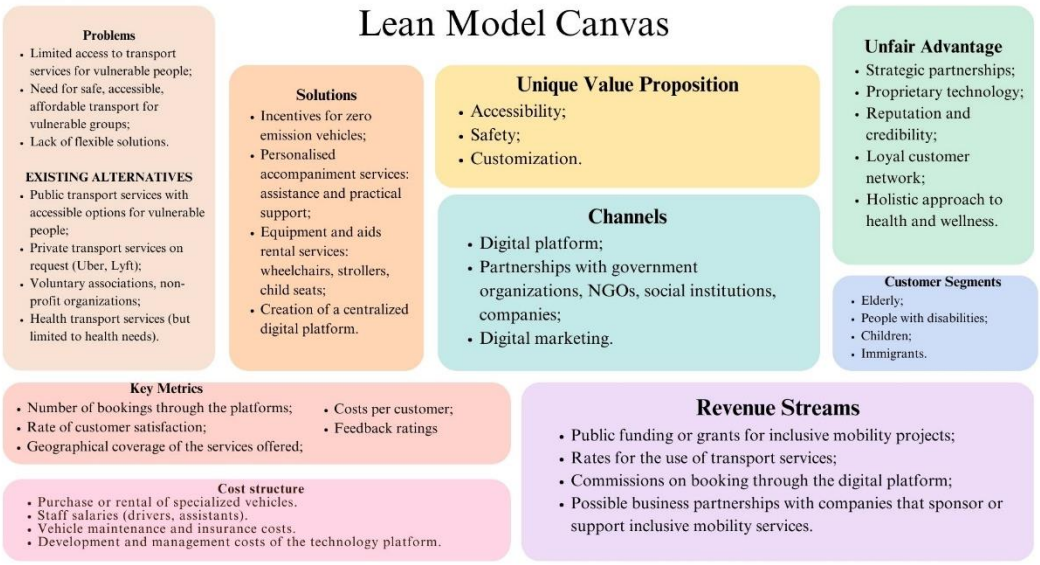

Figure 3-25 – Lean Model Canvas (Mobility Sector)

At this point, an example of the use of the Lean Model Canvas in the mobility sector is reported (Figure 3-25), in particular with reference to fragile subjects: [19]

1. PROBLEMS

This section outlines the primary difficulties experienced by the target demographic. These challenges revolve around inadequate access to transportation services, high prices for available transport, and the absence of versatile, adaptable options. The situation is especially severe in isolated or rural areas where existing solutions often fail to meet the population's needs, exacerbating the transport divide;

2. SOLUTIONS

The proposed solutions focus on delivering cost-effective, convenient, and flexible transportation services via a digital platform. The approach combines shared and private transport options, working in conjunction with local providers to expand service availability. The goal is to better serve communities in remote or under-resourced areas, where conventional transport systems are either unaffordable or unavailable. The current transport options discussed here include traditional public transport systems, ride-hailing services, and personal vehicle ownership. Although these methods are in place, they do not fully resolve the issues of high cost, limited reach, and lack of flexibility, especially for those in more remote locations. This highlights the need for a more tailored solution;

3. UNIQUE VALUE PROPOSITION

The distinct value offered by this solution lies in its accessibility and ability to provide personalized, on-demand transportation that meets individual needs. Special emphasis is placed on catering to groups with specific transportation requirements, such as elderly or disabled individuals, offering a solution that is more inclusive and responsive to varying user demands;

4. CHANNELS

In terms of distribution, the service will be made available through digital means, including mobile apps and websites. This will be complemented by collaborations with local organizations and NGOs to extend the service's reach. Additionally, digital marketing efforts will be employed to raise awareness and attract users, ensuring a broad adoption of the solution across different customer segments;

5. UNFAIR ADVANTAGE

What sets this model apart from competitors is a combination of proprietary technology, strategic alliances, and the ability to offer high-quality, adaptable services, particularly in underdeveloped regions. This unique combination creates barriers to entry for competitors, providing the business with a significant competitive edge;

6. CUSTOMER SEGMENTS

The target market for this service consists of individuals residing in rural or remote areas, those from low-income backgrounds, and people who face

challenges in accessing transport due to physical or logistical barriers. These groups often struggle with a lack of affordable and convenient transportation, making them ideal candidates for the proposed solution;

7. KEY METRICS

Success will be measured using specific performance indicators, including the volume of bookings made through the digital platform, the rate of returning users, user satisfaction, and service quality. These metrics will help assess the overall performance of the service and identify areas for improvement;

8. COST STRUCTURE

The major operational costs include expenditures related to the development and upkeep of the digital platform, collaboration with local service providers, and administrative costs. Effective management of these expenses will be crucial to maintaining the long-term viability of the service;

9. REVENUE STREAMS

The business will generate revenue from several sources, including public funding and grants aimed at supporting inclusive transportation initiatives. Additional income will be derived from fees for transport services, commissions on bookings made through the platform, and partnerships with companies that support or sponsor mobility-related projects;

In summary, this canvas details a comprehensive strategy for addressing transportation issues in underserved regions, focusing on affordability, flexibility, and inclusivity.

3.5 STEP 3: EVALUATE

In the third step of GUEST-SI methodology, the same tools present in the traditional GUEST are used. The primary objective of this analysis is to identify avenues for regional or organizational development by leveraging existing strengths and addressing weaknesses. By evaluating various potential scenarios, it helps to pinpoint the crucial factors that may influence the effectiveness and outcomes of a given strategy, thus facilitating informed decision-making for growth and improvement. The SWOT analysis will then be used as the basis for the ICE Diagram.

3.5.a SWOT ANALYSIS APPLIED TO THE MOBILITY SECTOR

Below, the SWOT analysis of the mobility sector, with particular attention paid to fragile subjects is reported (Figure 3-26). [20]

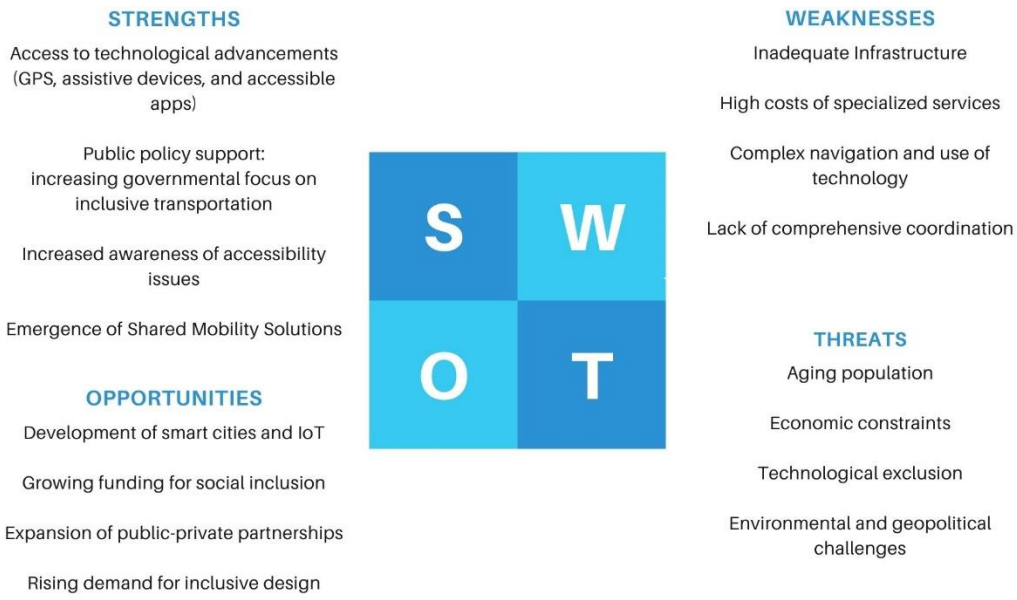

Figure 3-26 – Mobility Sector's SWOT Analysis

- **STRENGTHS**
  This section emphasizes several significant benefits. First, there is strong availability of modern technologies such as GPS systems, assistive tools, and mobile applications that enhance access for a diverse range of users. These technological advancements are supported by favourable governmental policies, with increasing attention given to making transportation more inclusive. Additionally, societal recognition of accessibility concerns has been growing, fueling the demand for better mobility solutions. The rise of shared mobility services further strengthens these advantages by offering creative alternatives to traditional transport options;

- **WEAKNESSES**
  The weaknesses section points to various notable obstacles. A major limitation is the insufficient infrastructure, which inhibits the rollout and efficiency of inclusive transportation solutions. Furthermore, the high costs

associated with specialized transport services create barriers, particularly for those with lower incomes. Another issue is the complicated nature of modern technology, making it difficult for certain groups, such as older adults or those less familiar with digital tools, to navigate. Finally, a lack of seamless coordination among the different entities involved in transportation service delivery results in fragmented systems that fail to work optimally;

- **OPPORTUNITIES**
  This section outlines several potential growth areas. One key opportunity lies in the advancement of smart cities and the Internet of Things (IoT), which can enable greater integration of transportation systems, improving accessibility across networks. Increasing availability of financial support for social inclusion initiatives provides another valuable opportunity for expanding these services. Additionally, strengthening collaborations between the public and private sectors could help close resource and infrastructure gaps. Finally, the rising emphasis on inclusive design in transportation systems reflects a growing societal demand for solutions that cater to the varying needs of all users;

- **THREATS**
  This section identifies several risks that could undermine the progress of inclusive transport efforts. One challenge is the aging population, which will likely increase demand for specialized services, putting pressure on already limited resources. Economic limitations, such as budget constraints, could restrict the funding necessary for maintaining and improving transportation services. The risk of technological exclusion is also a concern, especially for those who may not have access to or the ability to use newer technologies. Lastly, geopolitical and environmental challenges could disrupt the implementation and expansion of inclusive transportation solutions, especially in areas facing political instability or resource scarcity.

3.5.b ICE DIAGRAM APPLIED TO THE MOBILITY SECTOR

In Table *3-2*, is reported the ICE diagram referring to the mobility sector, paying particular attention to fragile subjects.

IDENTIFY	CONTROL	EVALUATE
Problems:	**Actions to be implemented:**	**KPIs:**
Limited accessibility: traditional means of transportation are not adequately equipped to accommodate people with disabilities, the elderly, or children.	**Vehicle adaptation**: equip vehicles with ramps, elevators, and safety systems suitable for people with disabilities or the elderly.	**Service Usage Rate:** number of fragile individuals who use the transport service.
Language and cultural barriers: immigrants may face difficulties in using transportation services due to language barriers or lack of familiarity with the transportation system.	**Staff training**: train drivers and transport service operators to provide assistance to people with specific needs, including communication in different languages.	**User satisfaction:** user feedback on the quality and accessibility of the service. **Reduction of barriers to accessibility:** percentage of stops and infrastructures adapted to the needs of vulnerable people.
Safety: children and the elderly require more attention to safety when traveling.	**Creating an inclusive booking system**: developing digital and non-digital platforms, easily accessible by people with different abilities and cultural backgrounds.	**Operational efficiency:** punctuality and frequency of the services offered.
Inadequate infrastructure: public transport stops and pedestrian paths may not be easily accessible or		**Language inclusion:** percentage of users who

safe for people with disabilities. **Cost of customized transport services**: specialized or on-demand services for fragile individuals tend to have higher costs, which can limit access for low-income users. **Opportunities:** **Development of accessible vehicles**: enhance and increase the use of accessible vehicles equipped with assistive technologies. **Integration of multilingual digital platforms**: create apps and booking systems in multiple languages, easy to use even for those unfamiliar with technology. **Collaboration with local authorities and associations**: form partnerships with local communities and associations to improve access to services.	**Public grants**: collaborate with government bodies to obtain funding and grants that reduce the cost of services for vulnerable individuals. **Infrastructure improvement**: upgrade public transportation stops and pedestrian paths to make them accessible and safe for all users. **Resource allocation:** **Human resources:** training and employment of qualified personnel for the management of transport services and assistance to fragile subjects. **Financial resources:** investments for the purchase of accessible vehicles and the	find the multilingual booking service useful. **Economic resources:** **Vehicle adaptation budget:** funds needed to equip means of transport with access and safety systems. **Public and private funding:** grants and investments to support the development of accessible infrastructure and staff training. **Maintenance costs:** resources required for the maintenance of vehicles and adapted infrastructure. **Action Calendar:** **First 6 months:**

Implementing an inclusive and safe transport system: define specific safety and accessibility standards for these fragile users.	upgrading of infrastructure. **Collaborations:** creation of partnerships with local authorities, transport companies and non-profit organizations for the shared management of the project.	study of the specific needs of the users and training of the staff. **6-12 months:** infrastructure implementation and vehicle adaptation. **12-18 months:** service launch and initial performance monitoring. **Over 18 months:** evaluation of results and planning of any improvements.

Table 3-2: ICE Diagram Applied to the Mobility Sector

3.6 STEP 4: SOLVE

In the penultimate step of GUEST-SI methodology, the same tool as the traditional GUEST methodology is used. The Solution Canvas is crucial because it provides a structured framework for identifying key components, decisions, and challenges in implementing a solution. It helps to visualize the relationships between various factors, ensuring that all aspects of the solution are considered and aligned with user needs. This approach supports informed decision-making and strategic planning, especially for complex projects like inclusive mobility systems.

3.6.a SOLUTION CANVAS

Here, the Solution Canvas based on the mobility factor is reported (Figure 3-27**Errore. L'origine riferimento non è stata trovata.**).

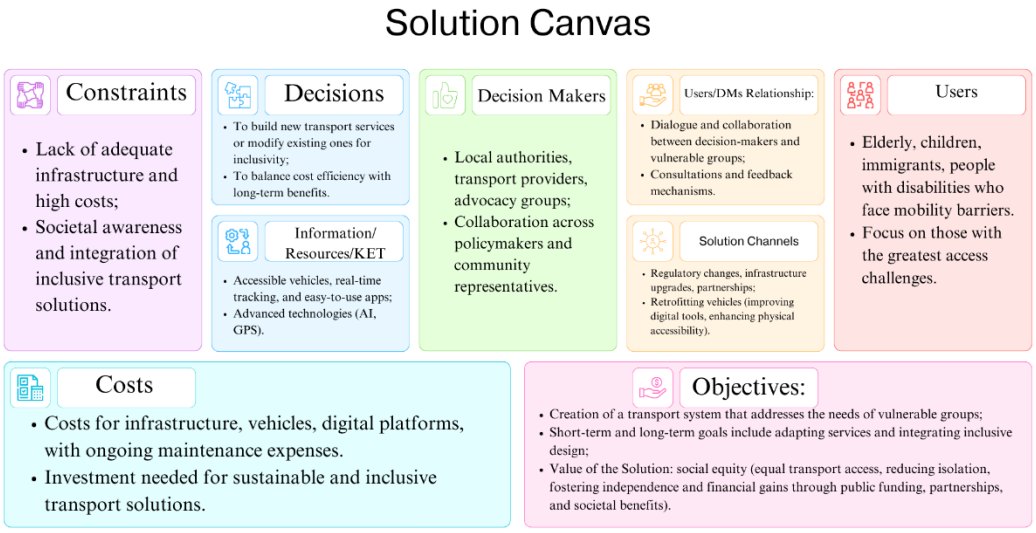

Figure 3-27 – Solution Canvas (Mobility Sector)

1. **CONSTRAINTS**
   The key limitations are tied to the necessity of implementing transport services that are more inclusive and accessible for vulnerable groups such as older adults, children, immigrants, and people with disabilities. On a structural level, the main barriers are inadequate transport infrastructure, expensive specialized services, and the challenge of ensuring universal

accessibility. Additionally, there are societal constraints, such as the need for broader awareness and acceptance of inclusive transport design, as well as the integration of such solutions into existing systems.

2. **DECISIONS**
   The critical choices involve determining whether to build new transportation services or to modify existing ones to better serve fragile populations. Decision-makers need to focus on whether to expand the transport system or make it more adaptive, prioritizing how technology can support the inclusion of these populations. The challenge is to find the right balance between costs and long-term benefits while ensuring that the transportation needs of vulnerable individuals remain central to the decision-making process;

3. **DECISION MAKERS**
   The people responsible for making these decisions are local authorities, transportation service providers, community organizations, and advocacy groups for vulnerable populations. This decision-making process involves multiple layers, ranging from policymakers and government officials to transport company executives and representatives of the groups being served, ensuring that decisions are informed by those directly impacted;

4. **USERS/DECISION MAKERS RELATIONSHIP**
   In terms of the interaction between decision-makers and end-users, the process must involve continuous dialogue and collaboration. It's crucial that representatives of vulnerable groups, such as the elderly, disabled, and immigrant communities, have a say in how these transportation services are shaped. Regular consultations, surveys, and community meetings are vital for capturing the real needs and preferences of these populations;

5. **USERS**
   The primary users of the transportation solution include groups that face barriers to mobility, such as senior citizens, children, immigrants, and people with physical or cognitive disabilities. These users have varied needs, with those who face the greatest obstacles to transportation access requiring priority in the design and delivery of services;

6. **INFORMATION/RESOURCES/KET**
   The essential resources required to bring these solutions to life include specialized transport vehicles that are equipped for accessibility, real-time tracking systems, and mobile applications that simplify usage for everyone.

For immigrants, multilingual apps and interfaces will be key, while assistive technologies will help the elderly and disabled. Cutting-edge technologies like AI, smart infrastructure, and advanced GPS will be critical enablers, and partnerships between public agencies and private firms will ensure resource provision;

7. SOLUTION CHANNELS

The pathways for implementing these solutions will involve a mix of regulatory changes, investments in infrastructure, and collaborations between governments and private companies. On-the-ground changes would include retrofitting current vehicles to meet accessibility standards, improving digital tools to assist users in navigating transport options, and ensuring that physical infrastructure like ramps and lifts are widely available;

8. COSTS

The financial outlay for implementing these inclusive transport solutions will include upfront costs for redesigning and updating infrastructure, purchasing accessible vehicles, and developing user-friendly digital platforms. Beyond initial investment, there will be ongoing costs related to maintaining these systems and ensuring that they remain up-to-date with user needs and technological advancements;

9. OBJECTIVES

The key goal is to create a transport system that addresses the unique mobility challenges of vulnerable populations. This involves making services more accessible, ensuring affordability, and offering convenient transport options that cater specifically to the needs of people with disabilities, the elderly, immigrants, and children. The objectives should be met both in the short-term by adapting current services and in the long-term by fully integrating inclusive design into all transport networks. KPIs could include tracking the increase in usage by these groups, satisfaction rates, and improvements in service accessibility;

Value of the Solution

The value of the proposed solution is in enhancing social equity, allowing vulnerable groups to have equal access to transportation services. Improved mobility for these populations will lead to greater independence, reduce isolation, and foster better integration into the community. While the primary return is in societal benefits, there could be financial gains through public funding, partnerships, and subsidies aimed at improving overall

transport inclusivity. Ultimately, the solution contributes to a more equitable and connected society.

3.7 STEP 5: TEST

The testing phase in GUEST-SI methodology is one of the critical elements to verify the correspondence between the planning and the actual implementation of the activities. In fact, in this phase not only Kanban and KPIs are used to evaluate the efficiency of the project, but it is also important to verify the advancement of the project in more practical terms, analysing the evolution of the activities in terms of time and costs. In this phase, the main focus is on the detailed analysis of the discrepancies between the project plan, generally represented by a Gantt chart, and the actual progress of the project, with particular attention to costs and time.

3.7.a GANTT CHART

Gantt chart is used to visually track planned tasks, providing a clear representation of the time relationships and dependencies between the various phases of the project. During the testing phase, this tool is essential because it serves as a benchmark against which actual progress is measured. The times and resources actually used are compared with those budgeted, to verify the correct execution of the project according to the original plan.

3.7.b MONITORING

An important metric used in comparison with Gantt chart during the testing phase is Earned Value Analysis (EVA), which involves the use of key metrics such as BCWP (Budgeted Cost of Work Performed) and ACWP (Actual Cost of Work Performed). The BCWP, also known as Earned Value (EV), represents the value of the work actually done up to a certain point in the project, as planned. It is used to measure how much work has been completed compared to the budget allocated at that point in the project. In contrast, the ACWP represents the actual costs incurred for the work done up to that point. [21]

Comparing BCWP and ACWP allows to identify any deviations. If the BCWP is greater than the ACWP, it means that the project is progressing more efficiently than expected, i.e., more work has been completed than actually incurred. Conversely, if the ACWP is higher than the BCWP, this indicates an increase in costs compared to

what was planned, highlighting potential problems in resource management or time planning.

In addition to cost analysis, another important parameter in the testing phase is the BCWS (Budgeted Cost of Work Scheduled), which represents the planned cost of work expected up to that point. The comparison between the BCWS and the BCWP allows you to assess compliance with the planned timelines. If the BCWP is lower than the BCWS, it means that the project is behind schedule; if the BCWP is higher, it means that the project is ahead of schedule. [22]

An additional control tool in the testing phase is the CPI (Cost Performance Index), which is calculated as the ratio of BCWP to ACWP. A CPI above 1 indicates more efficient use of resources than the plan, while a value below 1 indicates cost overruns. Similarly, the SPI (Schedule Performance Index), calculated as the ratio of BCWP to BCWS, measures efficiency in time management. An SPI above 1 indicates that the project is progressing faster than expected, while an SPI below 1 indicates delays.

These metrics have the goal of gaining a clear and quantitative view of the project's progress against the schedule. However, it is crucial that the data collected in the testing phase is accurate and up-to-date in order to make informed decisions. If there are any discrepancies between the plan and the actual execution, corrective measures can be taken, such as reallocating resources, revising deadlines, or introducing new strategies to improve efficiency.

Finally, in the testing phase, it is important not only to analyze the quantitative data, but also to conduct a qualitative assessment to understand the reasons behind any deviations. Factors such as technical unforeseen events, difficulties in communication between team members, or changes in project requirements can affect the progress of the work and must be taken into account to prevent future problems in similar projects.

In summary, the testing phase in this project management methodology is not limited to a simple check of the status of the project, but represents a crucial moment to identify any inefficiencies, understand the causes of the deviations and make the necessary corrections, thus ensuring that the project can be completed on time and on budget, with the utmost respect for the set objectives.

3.7.c GANTT DETAILS

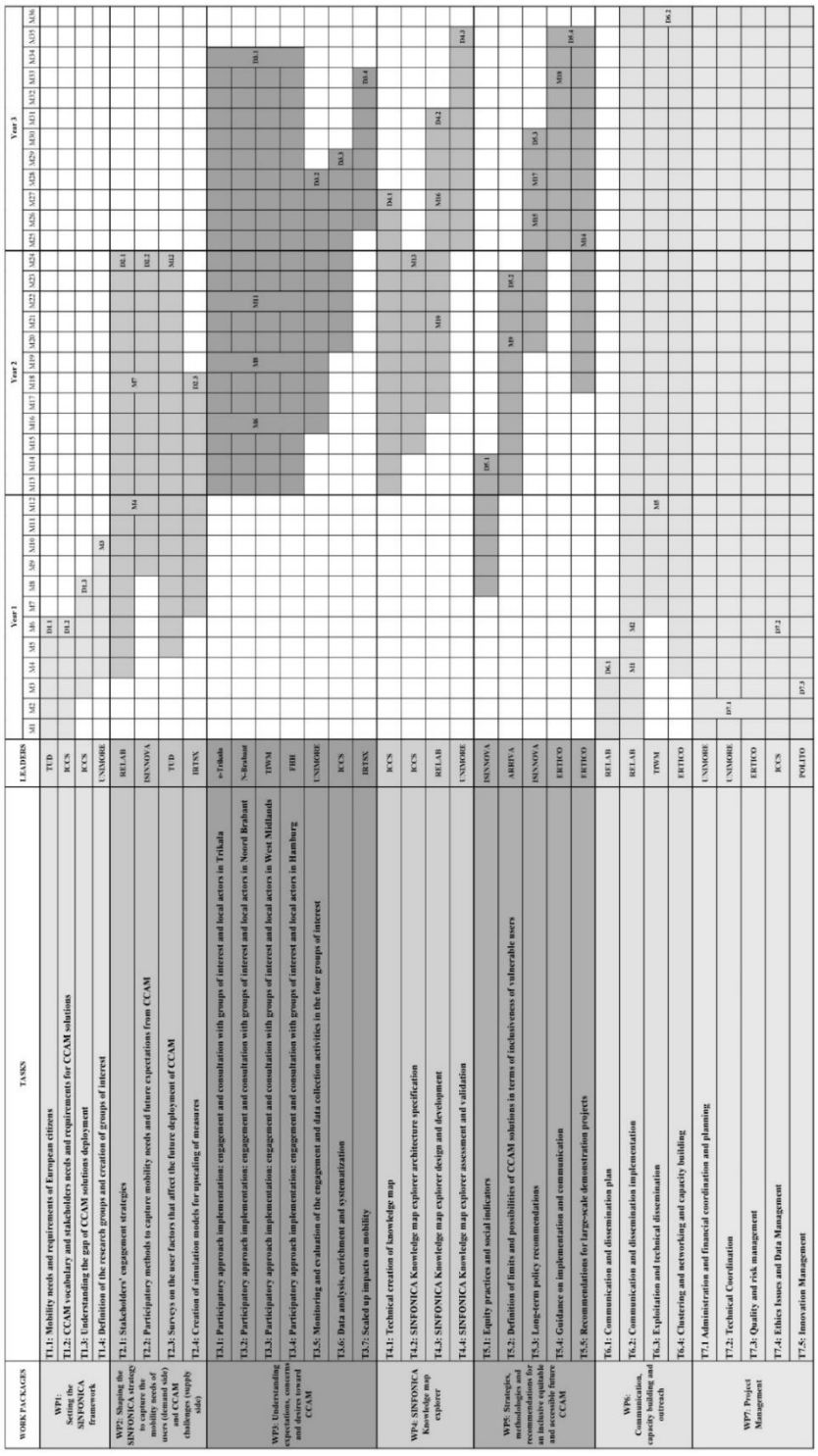

Figure 3-28 – SINFONICA's Gantt Chart

Gantt chart shown in Figure 3-28 provides a detailed view of the SINFONICA project schedule, showing the main activities divided by weeks and years. Below, a more detailed analysis and some guidance on how this Gantt could be used in the testing phase of the project, comparing the schedule to the real trend are reported.

STRUCTURE OF ACTIVITIES

1. **Main activities**: Gantt appears to be organized into key activities that cover the entire project lifecycle, from the initial planning stages through to final delivery. These tasks can include steps such as: [23]

    - Initial preparation (project definition, requirements, planning);
    - Design (technical design, system architecture);
    - Development (software development or physical implementation of infrastructures);
    - Testing (validation, functionality verification);
    - Final implementation (solutions or operational launches);
    - Monitoring and evaluation (final performance check).

2. **Time range**: the time axis is divided into weeks, which allows you to clearly see the duration of each task. Tasks that take longer are shown with longer bars, while shorter tasks only cover a few weeks. This detail helps you understand the project timeline and when the different tasks overlap.

3. **Overlapping tasks**: having multiple tasks running in parallel indicates that the project follows a multi-tasking or parallel approach. For example, the design and development of some parts can take place simultaneously to optimize delivery times. This overlap can lead to challenges in resource management and communication, but also improve the overall efficiency of the project.

4. **Duration of tasks**: some tasks last only a few weeks, while others, more complex, cover longer periods of time. Longer tasks may indicate complex processes that require careful management, while shorter tasks may represent specific milestones or control steps.

COMPARISON OF PLANNED VS. PLANNED TIMELINES REAL

All the main activities planned in Gantt must be verified against their real timelines. Comparing timelines is essential for evaluating project efficiency. Significant delays in key tasks such as development or implementation can negatively affect the overall delivery of the project. Overlapping tasks require special attention, as a delay in one could have a knock-on effect on the others.

COMPARISON BETWEEN BCWP AND ACWP ACTIVITIES TO MONITOR

It is essential to consider all activities that have a significant impact on costs, such as development, purchasing resources, or implementing technologies. Cost monitoring is essential to verify the economic sustainability of the project. Any discrepancies between projected and actual costs can reveal inefficiencies, unexpected costs, or poor resource management.

CHECKING DEPENDENCIES BETWEEN TASKS

Interdependent activities in Gantt need to be carefully analysed. Task dependencies are particularly critical, as a delay in a previous task can cause a cascading delay in later stages of the project. Monitoring these dependencies allows you to identify bottlenecks and weaknesses in project management.

COMPARISON BETWEEN BCWS AND BCWP

It is possible to compare BCWS (planned cost) and BCWP (value of work done) for critical activities, such as designing and building infrastructure or allocating resources. This comparison permits to assess whether the project is on schedule and on budget. If the BCWP is lower than the BCWS, it means that the project is delayed; if the BCWP is greater, the project is early.

EVALUATION OF CPI AND SPI

- **CPI**: monitoring the Cost Performance Index helps to assess the efficiency in the use of financial resources. A CPI of less than 1 indicates that costs are over budget;

- **SPI:** the Schedule Performance Index permits to compare actual time with planned time. An SPI value of less than 1 indicates that the project is progressing more slowly than expected.

KEY ACTIVITIES TO CONSIDER IN THE TESTING PHASE

- **Development and design phases**: these activities represent the technical "heart" of the project and are often subject to delays or budget overruns. Closely monitoring development and design allows you to intervene promptly in case of problems;
- **Testing and validation phases**: this phase is crucial to make sure that the system or solution developed works properly. Any issues at this stage may require significant changes that affect both cost and time;
- **Implementation and deployment**: the implementation of technical or physical solutions is often one of the final stages of the project. It is important to carefully monitor the timing and costs of this phase to ensure that the project is delivered on time and on budget.

Comparing planned activities and real results permits to identify structural problems in project management, intervene in time to correct any inefficiencies and improve planning for future projects. The testing phase then becomes an essential part of ensuring that the overall project is completed satisfactorily. The testing phase allows to monitor the actual progress in relation to the initial planning, with a focus on costs, time and resource management. Comparing performance metrics (BCWP, ACWP, CPI, SPI) with real data will help to optimize the final stages of the project and ensure on-time, on-budget delivery.

Chapter 4

4. DISSEMINATION OF GUEST-SI METHODOLOGY

The spread of GUEST-SI methodology is crucial to ensure that it becomes a widely utilized framework in various sectors, particularly within projects focused on social innovation. By offering a flexible structure, GUEST-SI supports the involvement of diverse groups and stakeholders, making it highly relevant for leaders and decision-makers involved in initiatives that emphasize inclusivity and collaboration. For GUEST-SI to be adopted on a larger scale, it is essential to ensure that its core concepts are understood and communicated through a variety of effective channels.

4.1 APPROACHES TO DISSEMINATION

To maximize the reach and successful adoption of GUEST-SI methodology, several strategies have been identified to promote its use:

- **Scholarly promotion**: since GUEST-SI has its roots in academic research, one of the first avenues for its dissemination should be through academic publications and presentations at relevant conferences. Publishing papers and presenting findings in forums where researchers gather will help establish the methodology's academic legitimacy and encourage further study and use within scholarly circles. Highlighting specific case studies, such as its application in the SINFONICA project, can showcase its practicality and relevance in real-world scenarios. This academic engagement will serve as a foundation for future reference and implementation;
- **Industry and practitioner engagement**: to ensure that GUEST-SI is adopted within professional environments, it is essential to introduce it to industry practitioners through specialized training sessions, workshops, and management events. These practical engagements should focus on demonstrating how GUEST-SI's five stages, "Go", "Uniform", "Evaluate",

"Solve" and "Test", can be applied to address real-world challenges. By emphasizing the concrete advantages of the methodology, particularly in stakeholder engagement and project management, professionals will be better equipped to implement it in various project settings, particularly in areas of social impact and innovation;

- **Incorporation into policy and public sector projects**: another key area for diffusion is the integration of GUEST-SI into public sector frameworks, particularly in areas related to policy development and social innovation. By collaborating with governmental agencies, particularly those involved in urban planning and transportation, the methodology can be adapted to guide large-scale, multi-stakeholder initiatives. The structured approach of GUEST-SI can provide policymakers with a reliable tool for ensuring that stakeholder engagement and collaboration are central components of their projects;
- **Leveraging digital tools and online networks**: digital platforms and collaborative tools can also play a significant role in promoting GUEST-SI methodology. By utilizing digital environments for training and knowledge-sharing, the methodology can be introduced to a broader audience. Online communities and networks focused on project management and social innovation can serve as effective platforms for sharing best practices, guidelines, and resources related to GUEST-SI. Furthermore, developing digital resources, such as templates, manuals, and case studies, will enhance its accessibility and foster wider adoption.

4.2 EVALUATING DISSEMINATION SUCCESS

The success of GUEST-SI's dissemination can be assessed through a combination of qualitative and quantitative metrics. Tracking the number of projects that adopt the methodology, the diversity of contexts in which it is applied, and feedback from stakeholders will provide valuable insights into its reach and effectiveness. Moreover, gathering feedback from early users of the methodology will offer opportunities to refine and improve GUEST-SI over time, ensuring that it remains relevant and adaptable to the evolving needs of social innovation projects.

5. CONCLUSIONS

The research presented in this thesis focused on the adaptation and implementation of GUEST methodology within the context of social innovation, particularly applied to the SINFONICA project. This approach, called GUEST-SI, demonstrated its versatility and efficacy in addressing complex, multi-stakeholder environments, with a particular emphasis on engaging vulnerable populations. The methodology was specifically tailored to account for the unique demands of social innovation projects, making it a valuable tool for ensuring the inclusion and engagement of all relevant actors.

The five-phase structure of GUEST-SI (Go, Uniform, Evaluate, Solve, Test) provided a systematic and replicable framework for guiding the decision-making processes within the SINFONICA project. Each phase contributed distinct insights and actions, from the initial identification of stakeholders and their needs to the testing and refinement of solutions. One of the key findings of this thesis is the critical role that collaboration and communication play in the successful implementation of social innovation projects. The structured approach to stakeholder engagement of GUEST-SI methodology, combined with the flexibility offered by digital tools and platforms, enabled the integration of various perspectives and facilitated informed decision-making. Moreover, the emphasis on continuous feedback and evaluation throughout the project lifecycle ensured that the solutions developed were not only relevant but also sustainable and adaptable to evolving needs. The application of GUEST-SI within SINFONICA also highlighted the potential for wider adoption of this methodology in similar contexts, particularly within public sector frameworks and policy-driven projects. By providing a structured yet flexible approach to manage stakeholder relationships and project objectives, GUEST-SI can support the creation of more inclusive and innovative solutions across various domains.

In conclusion, the findings of this thesis reinforce the importance of a comprehensive and structured methodology in managing complex social innovation projects. GUEST-SI methodology has proven to be an effective tool for fostering collaboration, promoting stakeholder engagement, and ensuring the successful implementation of innovative solutions that meet the needs of vulnerable populations. Future research activities could explore the further refinement of this methodology and its application in different social contexts, with the aim of enhancing its adaptability and impact across a wider range of industries and sectors.

6. APPENDIX

ENGLISH VERSION OF THE QUESTIONNAIRE

PARTICIPANT DETAILS	
Participant: (give a number, no name)	HF45M*
Date of interview:	
SINFONICA partner:	
Location of the interview:	

* *Coding is made of four elements:*

1. Municipality/province: H – Hamburg; T – Trikala; W – West Midlands; N – Noord Brabant
2. Gender: M – Male; F – Female; O – Other
3. Age: number of years
4. Group category: *E - Elderly; CD - Cognitive Disabilities; D - Digital Vulnerable People; W - Women and gender related vulnerabilities; Y - Young (18-25); M – Migrant; S - Single parent family; R - Rural inhabitant; C – Cyclist; PD - Physical Disabilities; L - Low income; U - University students.*

Example: HF45M = Hamburg, female, 45 years old, migrant

Section A - Travel Behaviour and Transport Use

A1 - What kind of transport modes do you use for your regular journeys?

Note to the interviewer: let the respondent talk freely about their transport habits and fill the table with the information you gather. If they hesitate you can propose some of the options. Don't list them one by one! No need to show them.

		Work		Education	Shopping	Social activities	Leisure/ Sport	Others
		Paid-work	*Care-work*					
Public transport	Bus							
	Metro							

	Tram							
	Train							
	Other							
Private car	As a driver							
	As a passenger							
Office/campus transport	Private shuttle							
	School bus							
	Other							
Taxi								
Motorbike								
Bike	Normal bike							
	Speed Pedelecs							
	Cargo bike							
	Electric bike							
Walk								
Other, specify								

A1.1 - *If they don't use Public Transport, ask* ***Why:***

Open Question:

A1.2 - *If they mentioned shared mobility in Other, then ask:* **Which one**

Note to the interviewer: let the respondent talk freely and fill the table with the information you gather. If they hesitate, you can use as a reference the following options. Don't list them one by one! No need to show them.

- ☐ Car sharing (on-street car hire via the internet or an app) (e.g. Bluemove, Zipcar)
- ☐ Carpooling (sharing car journeys so that multiple people travel in the same vehicle) (e.g. BlaBlaCar)
- ☐ *Taxi services that are booked digitally (e.g.* Cabify, Uber)
- ☐ On-street bike hire (e.g. Nextbike, Lime)
- ☐ On-street scooter or motorbike hire (e.g. Yego, Lime)

A2 - What is the approximate distance from home to your most frequent destination?

Note to the interviewer: ask them to consider the most frequent purpose/destination of their trips. No need to show the response options.

	For TfWM - 1 km = 0.62 miles
☐ 0 - 5 kilometers	☐ under 3 miles
☐ 6 - 15 kilometers	☐ 3-9 miles
☐ 16 - 30 kilometers	☐ 10- 20 miles
☐ More than 30 kilometers	☐ Over 20 miles
☐ Don't know	☐ Don't know
☐ I only know how long it takes:_____ _____	I only know how long it takes:_____ _____

Section B - Motives behind transport choices

B1 – In general, for your regular travels, what do you prioritise when choosing how to move? Please rank the first three among the following mobility motives:

Note to interviewer: mention the motives one by one. Use Showcard 1.

Time savings	Availability at any time	Safety & Security
Travel costs	Reliability	Environmental reasons
Reachability	Comfort	Health-related reasons
Cleanness	Other_____	

1	
2	
3	

B2 – Do you feel that the priorities just stated are met by the type of transportation you use on a regular basis (*answer to A1*)?

Section C - Special Needs

C1 - Thinking about your regular travels: to what extent do you feel limited by the following aspects? (from 1 to 5 where 1 means 'not at all' and 5 means 'completely')

In this question, we define "limited" as wanting to travel more but feeling unable to.

Note to interviewer: list the aspects one by one and ask to indicate to what extent the feel limited. Use Showcard 2

	Not at all limited	Slightly limited	Moderately limited	Very limited	Completely limited	Don't know/ Prefer not to answer
	1	2	3	4	5	/
The cost of the travel						
Availability of transport services (e.g. bus, trains or shared vehicles)						
Availability of infrastructure (e.g. bus stops or bike lanes)						
Concerns about the safety and security of the transport services						

Difficulty using the available transport due to special needs or disabilities						
Difficulty in *planning a trip* due to digital-related issues (such as not understanding an app or website to look up for information or buy a ticket, availability of a smartphone or lack of smartphone data)						
Difficulty *while travelling* due to digital-related issues (such as not understanding how to use digital or mobile tickets, or unlocking rental bikes)						

C1.1 - Do you feel limited because of any other reasons? If so, please specify:

_____

Comment

C1.2 – *If they mentioned difficulties because of digital issues (last two options), then ask:* **Why?**

Open question:

C2 - Are there any transport products or services that you would recommend? What is it about it that you particularly like?

Open question:

Section D - Use of Technology and Digital Devices (for transport)

D1 - Do you own or have access to a:

	Yes	No	Don't know/ Prefer not to answer
Computer (laptop or desktop)			
Smartphone - This is a mobile phone with a touchscreen that can access the Internet and run downloaded programmes -apps.			
Tablet - This is a small portable computer that uses a touchscreen but is not a smartphone. This includes eBook readers.			

D2 – *(Only if they reply 'Yes' to D1)* **Do you have mobility/transport-related App(s) that you use regularly?**

- ☐ No
- ☐ Don't know/Prefer not to answer
- ☐ Yes, specify the name of the App(s)

D2.1 - *If yes:* **How often?**

Note to the interviewer: you can propose few of the options below to help the respondent

- ☐ Many times in a day
- ☐ Every day or almost every day
- ☐ At least once a week
- ☐ Less than once a week but at least once in the last 3 months
- ☐ I last did this more than 3 months ago
- ☐ I have never done this
- ☐ Don't know/Prefer not to answer

D2.2 - What is it about these App(s) that you particularly like or dislike? Would recommend any of them?

Open question:

D3 – In general what is your level of <u>interest</u> towards technology? Rate the following sentences from 1 to 5, where 1 means 'strongly disagree' and 5 means 'strongly agree'

Note to interviewer: ask to indicate to what extent they agree or disagree with the statements in the table below. If they answer 'strongly agree' to question 1, then skip the other questions. Use Showcard 3

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know prefer not to answer
	1	2	3	4	5	
1- I have little to no interest in new technology						
2- I am excited by the possibilities offered by new technologies						
3- I try new products before my friends and neighbours						
4- I often purchase new technology products, even though they are expensive						

Comment

D4 - *(Only if they reply 'Yes' to D1)* **How <u>confident</u> are you that you can successfully perform an action on your computer, smartphone or tablet, such as plan an unfamiliar, local public transport journey or buy a ticket online? (from 1 to 5, where 1 means 'not at all' and 5 means 'completely')**

Not at all confident	Very little confident	Moderately confident	Very much confident	Completely confident	Don't know/Prefer not to answer
1	2	3	4	5	/

Comment

D5 - *(Only if they reply 'Yes' to D1)* **How do you deal when asked to provide personal detail when signing up to an App and/or to a mobility digital service (e.g. to subscribe to a car-sharing/bike-sharing scheme; to make online payments for e-tickets; etc…)?**

I don't sign up	I sign up only if the app/service increases my accessibility to the transport system and the efficiency of my travels (e.g. trip planning, online ticketing – Moovit, Waze)	I sign up no matter what	I don't know/Prefer not to answer

Comment

Section E - Familiarities with the CCAM Concepts

Make a brief introduction on the concept of CCAM, using the following definition:

In recent years, new types of buses and cars has started to become available. Some vehicles are "connected" and "cooperative" and use technology to talk to each other and infrastructure such as traffic lights. Another example are "automated" or "driverless" vehicles. These can also perform some or all of the tasks carried out by a driver, for instance

keeping the vehicle at a certain speed or within a lane. There are some systems which detect obstacles using cameras or radar. It is expected that vehicles will be able to drive themselves, perhaps initially in certain places or when the weather is good.

Collectively, we call these new types of transport Connected Cooperative Automated Mobility or CCAM.




E1 - Were you aware about the presence of these highly digital and autonomous forms of mobility in your region/city mobility system?

- ☐ Yes
- ☐ No
- ☐ Don't know/Prefer not to answer

E2 - Have you ever used them?

- ☐ Yes
- ☐ No
- ☐ Don't know/Prefer not to answer

E2.1 *If they used CCAM, ask:* **Can you briefly share your experience?**

Section F - Feelings, Emotions, Attitudes Toward Autonomous Vehicles

F1 – How would you express in one word your first immediate attitude towards these highly digital and autonomous forms of mobility?

Open question:

F2 - Please rank the first three among the following words that best represent your attitude towards these highly digital and autonomous forms of mobility (include the one you mentioned in the previous question if it's in the list below)

Note to interviewer: list all the attitudes and use Showcard 4

Confidence	Calm	Fear
Curiosity	Scepticism	Interest
Unsafety	Excitement	Freedom
Uncertainty	Easiness	Indifference
Trust	Distrust	Other (specify)_____

1	
2	
3	

Comment

F3 - How would you feel travelling in an autonomous vehicle with strangers and without the presence of a staff member?

Open question:

F4 - How would you feel travelling in an autonomous vehicle without the presence of a staff member and something goes wrong?

Open question:

F5 - If there is no staff present, what security features would make you feel safer?

Note to interviewer: you can provide few examples from the list below if people do not speak spontaneously.

Open question:

- ☐ Ability to see a person in the control room monitoring the service
- ☐ CCTV cameras
- ☐ Help buttons allowing you to talk to someone in control room
- ☐ Passenger rating system so you can give feedback on fellow passengers
- ☐ Strong light for deaf people so they can keep talking with sign language

F6 - Would you be willing to travel in an autonomous vehicle which is:

Note to interviewer: list all the options and use Showcard 5

- ☐ Private (only available to you and travel companions)
- ☐ Semi-public (available to people with similar mobility needs such as older people, people with disabilities, women, etc.)
- ☐ Public (open to anyone)
- ☐ Don't know, prefer not to reply

F7 – Can you imagine specific features of autonomous vehicles for certain categories of people with special mobility needs?

Open question:

F8 - Compared to current public transport, which advantages do the self-driving buses have and will they improve the service?

Note to interviewer: list all the options and use Showcard 6

	YES	NO	Neutral	Don't know/Prefer not to answer
Time savings				
Travel costs				
Reachability				
Availability at any time				
Reliability				
Comfort/Convenience				
Safety & Security				
Environment				
Health				
Other….				

F9 – For the future digital and automated mobility, how would you prioritise the following characteristics? Please rank the options.

Note to interviewer: list all the options and use Showcard 7

- ☐ cost (affordability)
- ☐ quality and comfort (acceptability)
- ☐ ease of access and use (accessibility)
- ☐ ease of getting from A to B (availability)

Do you want to comment on your ranking?

Section G - Socio Demographics

G1. Please give your age (in years):

- ☐ It is: _____
- ☐ Prefer not to answer

G2. What best describes your gender?

- ☐ Female
- ☐ Male
- ☐ Prefer to self-describe as_____
- ☐ Prefer not to answer

G3. Does your household own a car and/or a motorbike, and/or a bike?

- ☐ Yes, a car
  - How many? N°____
- ☐ Yes, a motorbike
  - How many? N°____
- ☐ Yes, a bike
  - How many? N°____
- ☐ Prefer not to answer

G4. What is the highest degree or level of school you have completed?

- ☐ Master degree or higher
- ☐ University
- ☐ High school
- ☐ Secondary school
- ☐ Primary school
- ☐ No qualifications
- ☐ Prefer not to answer

G5. What is your current employment status?

- ☐ Employee

- Self-Employed
- Unemployed
- Retired
- Other (Specify: _____)
- Prefer not to answer

G6. Including yourself, how many people live in your household?

N°_____

Of which, how many children?

N°_____

G7. What is your net monthly household income (in €)

- Below 2.000€
- 2.000 – 4.000€
- 4.000€ - 8.000€
- More than 8.000€
- Prefer not to answer

For TfWM 1 EUR = 0.86 GBP

- <£20,000 pa
- =>£20,000 <= £40,000 pa
- >£40,000 <= £80,000 pa
- >£80,000
- Prefer not to answer

G8. What is your current nationality (or nationalities)?

You can use different wordings for this and the next question. Alternatives are: What was your nationality/nationalities at birth?

- Name_____
- Prefer not to answer

G9. What type of area do you live in?

You can ascertain type of area using zipcode if you prefer.

- ☐ Urban
- ☐ Suburban
- ☐ Rural

Note to interviewer: at the end of the interview, ask for other comments related to the topic, suggestions, proposals or some other specific things the interviewee would like to mention that is not yet discussed.

(Time permitting) Is there anything that I have not covered that you think is relevant to add?

Comment

Showcards

Showcard 1

B1 – In general, for your regular travels, what do you prioritise when choosing how to move? Please rank the first three among the following mobility motives:

Time savings	Availability at any time
Travel costs	Reliability
Reachability	Comfort
Safety & Security	Health-related reasons
Environmental reasons	Cleanness
Other_____	

1	
2	
3	

Showcard 2

C1 - Thinking about your regular travels: to what extent do you feel limited by the following aspects? (from 1 to 5 where 1 means 'not at all' and 5 means 'completely')

	Not at all limited	Slightly limited	Moderately limited	Very limited	Completely limited	Don't know/ No answer
	1	2	3	4	5	/
The cost of the travel						
Availability of transport services (e.g. bus, trains or shared vehicles)						
Availability of infrastructure (e.g. bus stops or bike lanes)						
Concerns about the safety and security of the transport services						
Difficulty using the available transport due to special needs or disabilities						
Difficulty in *planning a trip* due to digital-related issues (such as not understanding an app or website to look up for information or buy a ticket, availability of a smartphone or lack of smartphone data)						
Difficulty *while travelling* due to digital-related issues (such as not understanding how to use digital or mobile tickets, or unlocking rental bikes)						

Showcard 3

D3 – In general what is your level of interest towards technology? Rate the following sentences from 1 to 5, where 1 means 'strongly disagree' and 5 means 'strongly agree'

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know prefer not to answer
	1	2	3	4	5	
1- I have little to no interest in new technology						
2- I am excited by the possibilities offered by new technologies						
3- I try new products before my friends and neighbours						
4- I often purchase new technology products, even though they are expensive						

Comment

Showcard 4

F2 - Please rank the first three among the following words that best represent your attitude towards these highly digital and autonomous forms of mobility (include the one you mentioned in the previous question if it's in the list below)

Confidence	Calm	Fear
Curiosity	Scepticism	Interest
Unsafety	Excitement	Freedom
Uncertainty	Easiness	Indifference
Trust	Distrust	Other (specify)_____

1	
2	
3	

Showcard 5

F6 - Would you be willing to travel in an autonomous vehicle which is:

☐ Private (only available to you and travel companions)

☐ Semi-public (available to people with similar mobility needs such as older people, people with disabilities, women, etc.)

☐ Public (open to anyone)

☐ Don’t know, prefer not to reply

Showcard 6

F8 - Compared to current public transport, do you think that CCAM will improve the following transport characteristics?

	YES	NO	Neutral	Don't know/ no answer
Time savings				
Travel costs				
Reachability				
Availability at any time				
Reliability				
Comfort/Convenience				
Safety & Security				
Environment				
Health				
Other….				

Showcard 7

F9 – For the future digital and automated mobility, how would you prioritise the following characteristics? Please rank the options.

☐ Cost (affordability)

☐ Quality and comfort (acceptability)

☐ Ease of access and use (accessibility)

☐ Ease of getting from A to B (availability)

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