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GUEST Methodology & SINFONICA: How to Effectively Deploy Socio-centric Social Innovation

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Abstract

In this study, we introduce a customized version of the GUEST methodology, specifically tailored for social innovation and referred to as GUEST-SI. This specialized version accurately defines target user segments, specifying their needs and requirements, and formulates strategies for effective engagement. These tasks are deemed crucial for ensuring the successful achievement of the project's ultimate objectives.

We delineate the five phases (Go, Uniform, Evaluate, Solve, Test) of the methodology, explaining their respective goals and implementation details. Additionally, we illustrate its application in Sinfonica, a European project focused on the deployment of Cooperative, Connected, and Automated Mobility (CCAM) technologies. This comprehensive approach ensures that the GUEST-SI methodology is not only a theoretical framework but a practical and effective tool for promoting social innovation, particularly in the deployment of emerging technologies such as CCAM.

Keywords: Automated mobility, Business Models, Project Management, Innovation, Guest Methodology, Innovation Management, CCAM, Autonomous Vehicles

Introduction

In a time of fast-changing technology and society, innovation plays a key role in guiding progress. However, many obstacles can slow down or even stop the journey of technological advancements. Failing to address stakeholders' needs and expectations can lead to scepticism and resistance, and even to the complete rejection of the innovation (Brem, 2011).

This rejection unfolds as a complex mix of socio-economic, cultural and ethical factors, especially in vulnerable communities. Fragile users can comprehend people with disabilities, low-income or unemployed, migrants and ethnic minorities, digitally non-connected people.

Almost everyone will temporarily or permanently experience disability at some point in life and can be an

unpredictable experience through life of everyone (Kattari, 2017).

If the deployment of new technologies focuses only on technical aspects, forgetting to bother about acceptance and social aspects, fragile users will be disproportionately affected and unable to benefit from the innovation.

The success of new technologies is closely tied to how readily users adopt and embrace them. According to Rogers (1983) and his theory of diffusion of innovations, the acceptance and adoption of a new technology by users are crucial factors in determining its overall success.

In this paper we recognize the necessity of an inclusive approach to innovation, one that places the needs of every stakeholder, including fragile users, at the forefront of design, implementation, and policy considerations. We will present a methodology to guide innovation projects in a socio-centric way, to ensure not only the commercial success of the innovations but also real answers to society needs: the “GUEST Social Innovation methodology”, from now on referred only as GUEST-SI.

We will demonstrate its implementation in a European project focused on CCAM (Cooperative, Connected and Automated Mobility) technology. This innovation has the potential to bring significant changes in our societies and in the way transportation is conceived.

The Guest-SI, starting from a bottom-up approach, allows to address needs and desires of a wide range of users and stakeholders, in an inclusive and effective way. One of the main goals is to assess and understand the social acceptance requirements of the new technology, with a particular focus on vulnerable groups. In Sinfonica, the knowledge acquired will be used to create final decision support tools for designers and decision makers, with the scope to enhance its seamless and sustainable deployment, to be inclusive and equitable for all citizens. Testing and verification of all the activities will be at the core of the methodology and will provide foundation for reuse.

State of the Art

The GUEST Methodology

Innovation methodologies normally require specific skills and are technology-driven (Lean Startup, WCM, AGILE). Thus, the projects are normally realized with a plethora of tools and methods that makes difficult to replicate, measure and compare the different projects (Cantamessa et al., 2018). In particular, the literature on mobility and Smart City is focused on operational aspects, disregarding the managerial considerations and links among the main players (Bruni et al, 2023b, Perboli, 2020; Perboli & Rosano, 2020).

To overcome this gap the GUEST methodology was adopted (The GUEST Initiative, 2017). It is a Lean Business approach that arises from the works by Osterwalder & Pigneur 2010 and other lean startup frameworks, adapted to cope with multi-actor complex systems (MACSSs), such as urban freight transportation (Perboli et al., 2017; 2018b; 2018c), blockchain (Perboli et al., 2018a, Bruni et al., 2023a), and last mile delivery (Perboli et al, 2021). The GUEST methodology is used to analyse the actors and stakeholders' requirements from the beginning of the solution design and considering them throughout the overall implementation. The result is a higher commitment from the different actors and market acceptance of the outputs, generating network effect

vital for the new collaborative business models.

The SINFONICA Project

The SINFONICA project, financially supported by the European Union through the Horizon Europe Research and Innovation program (Grant Agreement N° 101064988), envisions crafting functional, efficient, and pioneering approaches, methodologies, and instruments to engage CCAM (Connected, Cooperative, and Automated Mobility) users, providers, and diverse stakeholders. This encompasses citizens, including vulnerable demographics, transport operators, public administrations, service providers, researchers, vehicle and technology suppliers. The primary objective of SINFONICA is to systematically capture, comprehend, and organize the users and stakeholders' needs, preferences, and concerns regarding CCAM in an actionable manner.

The project's core ambition is to harness this amassed knowledge to collaboratively devise decision-making tools for designers and policymakers. These tools aim to facilitate the seamless and sustainable implementation of CCAM, ensuring inclusivity and equity for all citizens.

Central to SINFONICA is the rigorous testing and validation of its initiatives across Europe's diverse community of stakeholders, establishing a solid foundation for widespread adoption and empowerment at local levels.

Critical to this endeavour is fostering early, extensive collaboration, knowledge exchange, and co-design/co-creation among private and public sectors, industries, research entities, regulators, policymakers, and end-users. This collaborative approach seeks to align efforts and optimize investments, delivering impactful CCAM solutions that meet societal expectations and needs, both socially and economically.

Recognizing the importance of a robust, egalitarian, and inclusive foundation, the SINFONICA project prioritizes the establishment of a theoretical framework delineating the mobility requirements of various vulnerable groups, alongside the expectations and demands of citizens and pertinent stakeholders. This theoretical framework serves as the cornerstone for defining four SINFONICA "groups of interest" located in Trikala, Hamburg, the West Midlands region, and the Nord-Brabant province. Each of this group of interest engages in a participatory process involving a broad spectrum of stakeholders pertinent to the project's field. SINFONICA's ultimate goal is to yield tangible value for diverse stakeholder groups, enabling them to leverage the project's outcomes and knowledge.

Ensuring that the project's recommendations and conclusions resonate with the intended audience and decision-makers necessitates close consultation and validation with them. Furthermore, it's essential to involve a wider network of cities, regions, and associations—comprising the SINFONICA group of followers—to ensure the project's messages cater to their needs and aspirations.

New GUEST Methodology applied to the SINFONICA project

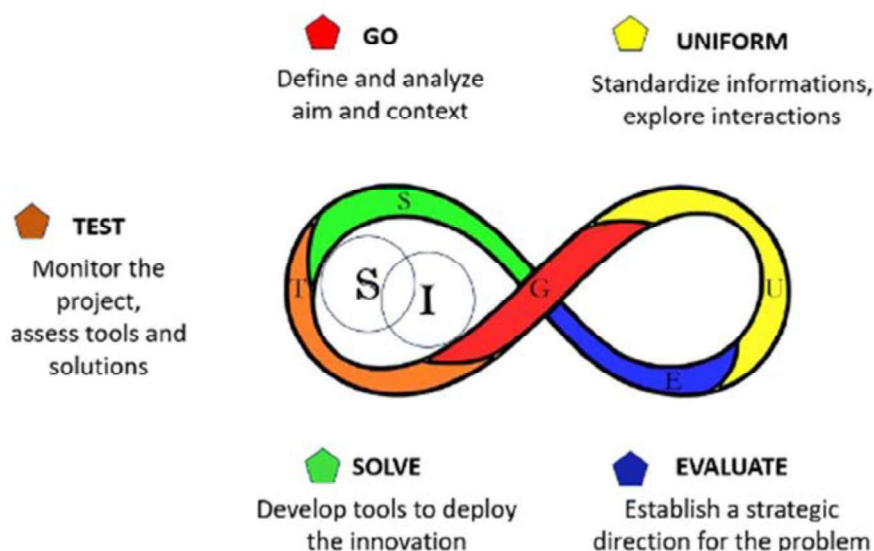


Figure 1- The main phases of the GUEST-SI

In this section we introduce a customized version of the GUEST methodology, specifically tailored for social innovation and referred to as GUEST-SI, and its application to a real case project, Sinfonica,

This adaptation mainly focuses on its implementation in social innovation contexts, where it is necessary to accurately define the target user segments, specifying their needs and requirements, and to formulate strategies for effective engagement. These tasks are crucial to ensure the successful achievement of the project's ultimate objectives.

The main goal of the GUEST-SI is to offer a wide perspective on how emerging technologies can produce value for every stakeholder and all the necessary resources and activities required to develop the proposed solutions, while also identifying potential partnerships with external collaborators.

The methodology will also identify potential challenges or opportunities that were not previously recognized and will provide a repeatable and measurable process for managing the projects.

The five phases of the GUEST-SI methodology are presented in the following sections.

GO

This phase has several key objectives:

- Clearly define the project's underlying concept and the desired value it aims to achieve.
- Analyse and formally delineate the innovation's operating environment to provide a comprehensive overview of the system into which the innovation will be introduced.
- Establish a knowledge base for the development of the subsequent phases of the project.

The initial step to a successful project involves gaining a deep understanding of the project's context and establishing well-defined objectives. This is imperative for ensuring clarity, focus, and purpose throughout the project. By aligning tasks and decisions with these goals, team members can mitigate the risk of being distracted by irrelevant activities.

A formal description of the innovation environment is achieved through the adoption of a common vocabulary, fostering improved communication among team members and all project stakeholders.

Such a vocabulary will contain terms related to the ecosystem or to the specific project and an abbreviation list. Identifying the stakeholders and end users of the innovation is pivotal for assessing their needs and requirements, which, in turn, is essential for identifying the gaps the innovation is intended to address. Various tools, such as literature research, surveys, and interviews, will be employed to gather pertinent information, that will serve as a guide for shaping how the developed solutions can enhance the user experience, simplify access, and facilitate interaction with new technologies.

In SINFONICA, the identification of the needs and requirements of potential stakeholders and final users, as well as the definition of the gaps that CCAM-based products and services are asked to fill, are the basis to identify the potential market segments for the innovative solutions developed and to set the engagement strategies for each one of them. A comprehensive vocabulary related to CCAM has been created based on the literature and project review aiming to create a common understanding between all stakeholders involved in the Sinfonica project or interested in CCAM as well as to act as a reference point for future projects.

Within the GUEST-SI methodology, the GO phase culminates in the creation of the "Actor ID Card" for each potential actor and stakeholder. This visual tool serves to identify the characteristics of each actor, along with their most impactful needs and requirements, and highlights the added value that innovative products and services can bring to the table.

UNIFORM

The data gathered during the GO phase undergoes detailed elaboration and is structured into standardized information with significance and coherence. This consistent information serves as a valuable resource,

providing insights into the innovation's value and the underlying logic by which it will generate and deliver value to stakeholders. It forms a knowledge base guiding subsequent project steps.

To prioritize the most critical needs of each actor segment, the Value Ring is created as an agile tool. This tool highlights essential factors influencing the relationship between actor types and the solutions provided. The Value Ring aids in understanding perceived value for both end users of the innovation and the governing bodies or organizations set to utilize it, whether presently or in the future.

Exploration of connections between various actors in the chosen environment is facilitated through the Social Business Network. This aims to fully comprehend how these actors interact and mutually influence each other. Social Business Networks visually represent stakeholder and end user interactions, identifying interdependencies and relational links symbolically.

Once the main actors and stakeholder segments (Value Ring) and their interactions (Social Business Network) are defined, the relationships between innovation-based products/services and potential stakeholders and end users are elucidated through the Business Model Canvas. This visual tool encapsulates both the "market side" (how added value is delivered to potential users) and the "internal development side" (how innovative products and services will be developed in terms of activities, resources, and potential partnerships).

In Sinfonica, the Business Model Canvas will provide insights into the sustainability of proposed CCAM solutions and the potential for future exploitation activities related to the proposed innovations.

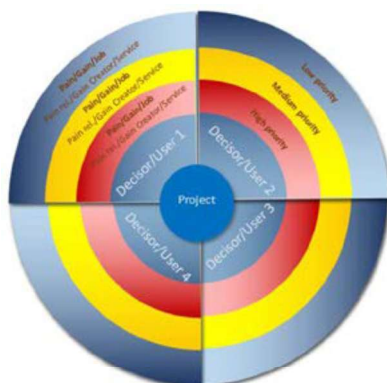


Figure 2- The Value Ring Template

EVALUATE

The EVALUATION stage within the GUEST-SI methodology aims to establish the strategic direction for innovation. This requires a precise description of the actions required to effectively develop solutions, a development timeline, and a set of Key Performance Indicators (KPIs) for monitoring during the implementation phase. These KPIs will play a crucial role in the subsequent testing phase.

During this stage, information derived from the Value Ring, Social Business Network, and Business Models will enable to develop key considerations for implementing the proposed solutions. The overarching goal is to eliminate or mitigate risks and capitalize on opportunities.

SOLVE

The main aim of the SOLVE phase is to develop tools needed to drive the innovation.

The Solution Canvas (SC) is an analytical diagram that outlines the chosen solution and all its relevant detail.

In the SC we can identify decision makers, constraints, needed resources, users and their interaction with the solution, but also how to engage and inform stakeholders and the goals to be achieved. All the positive and negative implications of the proposed solution are detected before its implementation.

The SC will allow to define the most appropriate strategy to adopt, with a focus on increasing value for stakeholders, achieving objectives, alleviating constraints, and optimizing resources and costs.

The final deliverable of this phase will be a sequence of actions and tools (such as software or databases) that will guide the societal deployment of innovation in a socio-centric manner and support decision making before and during its implementation.

In Sinfonica, the primary deliverable will be the Knowledge Map Explorer. This tool will enable users to query an ontology map, created by importing all data collected in the previous phases. It will highlight harmful and beneficial interactions that might otherwise go undetected, allowing for informed decisions regarding the adoption of CCAM technologies based on different types of end users.

TEST

This phase has 2 main objectives:

- monitor the progress of the project.
- assess the developed solution.

The initial goal is accomplished by consistently monitoring and updating the Key Performance Indicators (KPIs) established in the EVALUATE phase throughout the entirety of the project. This involves a particular emphasis on refining both engagement strategies and the collected data incrementally during various project rounds.

The second objective involves testing the tools created in the SOLVE phase within a real-world setting, evaluating their practical functionality and user experience design. Following the initial testing, an iterative improvement process will enhance the tool to precisely align with users' needs.

The goals of SINFONICA will be developed through 4 pillars which define the strategic objectives (SO) of the project. All the SO are measurable and verifiable, and for each strategic objective, the work is organized with a specific evaluation process for each step. During this phase we will test, validate and verify the Sinfonica Knowledge Map Explorer, its functionalities, outputs, user experience and acceptance.

Conclusions

The path to innovations often encounters obstacles that can delay or even halt new technologies. Neglecting the needs and expectations of stakeholders may breed scepticisms, resistance, and outright rejection of the proposed solutions. The deployment of new technologies must address the vulnerable user's needs to avoid discriminations.

To facilitate the successful implementation of innovative solutions, we introduce the "GUEST Social Innovation methodology", a socio-centric approach designed to guide innovation projects. This methodology ensures not only commercial success but also meaningful responses to societal needs.

GUEST-SI will provide strategic direction and investment certainty and help envision future scenarios related to innovation deployment and uptake.

We also illustrated its application in the CCAM context, through a European project (Sinfonica). This project aims to create tools that will be invaluable for public administrations seeking to incorporate CCAM into public transport and develop a high-level framework for the design, development, and operations of CCAM services across Europe. This framework will prove beneficial for regulatory bodies, organizations such as government agencies, research institutions, and industry players alike.

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