

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Management from the Nova School of Business and Economics.

The Creation of the Value Creation Wheel Ecosystem at Nova School of Business and
Economics: How to Industrialize Innovation, Decision-making, and Problem-solving Within
an Organization?

Challenge 1: How to Improve Mass Public Transportation and Campus Accessibility?

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Abstract:

This work project explores the implementation of the Value Creation Wheel Ecosystem at Nova School of Business and Economics to industrialize innovation, decision-making, and problem-solving within the organization. Despite prior efforts to address internal challenges using the Value Creation Wheel framework, implementation barriers persisted. This research project applies the Value Creation Wheel methodology to three key challenges: Enhancing campus accessibility, reducing living expenses for students, and optimizing alumni database management. Through stakeholder engagement, workshops, and iterative refinement the study identifies actionable solutions and a systematic framework for sustainable innovation, contributing to both academic literature and practical institutional improvement.

Keywords: Value Creation Wheel, Innovation Ecosystem, Problem-solving, Decision-making

Abstracts of individual parts:

Challenge 1 (Maren Katrin Schopf): Challenge 1 focuses on improving mass public transportation and campus accessibility at Nova School of Business and Economics using the Value Creation Wheel methodology. Key barriers, including limited connectivity and low awareness of sustainable options, were identified through stakeholder engagement and root cause analysis. Two primary solutions, a real-time Mobility Screen and a Shuttle Bus Service, were developed, refined, and prioritized through workshops and surveys insights. Implementation efforts involve collaboration with local municipalities and public transport providers to enhance accessibility, reduce environmental impact, and improve the overall commuting experience for the Nova School of Business and Economics community.

Keywords: Campus Accessibility, Mass Public Transportation, Sustainable Transportation

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Abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
CPS	Creative Problem-Solving
DT	Design Thinking
GDPR	General Data Protection Regulation
KDM	Key Decision Maker
KPI	Key Performance Indicator
MCDA	Multi Criteria Decision Analysis
MVP	Minimum Viable Product
Nova SBE	Nova School of Business and Economics
SDGs	Sustainable Development Goals
VCF	Value Creation Funnel
VCW	Value Creation Wheel
VCW team	Value Creation Wheel team
WP team	Work project team

1 Introduction

The following section introduces the context and content of the work project, providing a detailed exploration of the motivation behind the study, the identified research gap, as well as the goals and objectives that guide the project and its intended outcomes.

1.1 Motivation for Writing the Thesis

In today's fast-paced environment, it is becoming increasingly difficult for both individuals and organizations to keep up the pace, make decisions and solve problems (Boyles 2022). One of the keyways to navigate these challenges is through innovation (Boyles 2022). The demand for innovation is accelerating across all industries, including traditional businesses and business schools, which must continuously innovate to stay competitive in the global education market (Boyles 2022). Nova School of Business and Economics (Nova SBE), one of the leading business schools in Europe, has experienced significant growth, and with that growth comes the challenge of maintaining internal agility (Aghina and De Smet 2015). Associated with this growth, many transformational challenges emerge that need to be addressed. To tackle these, it is crucial to establish a systematic approach for innovation, decision-making, and problem-solving.

In his June 19, 2024, welcome speech at the Value Creation Wheel (VCW) conference, Nova SBE's Dean, Pedro Oliveira, emphasized the critical role of innovation. He highlighted the school's dedication to fostering it through various initiatives, including collaborations with the VCW creator Luis Filipe Lages to address key internal challenges using the VCW methodology (Value Creation Wheel 2024a). It supports the internal decision-making and problem-solving process. The work project team (WP team) is dedicated to advancing the workshop initiative as a crucial step in laying the foundation for the development of a VCW Ecosystem at Nova SBE, supporting the school's "way to the top" (Nova SBE 2023a). The WP team's mission focuses

on exploring how to industrialize innovation, decision-making, and problem-solving within an organization. As part of this effort, the WP team addressed three highly significant internal challenges.

1.2 Research Gap

Research on innovation ecosystems highlights their evolution as a widely discussed concept in both academic and business domains, emphasizing their role in fostering collaboration, driving innovation, and sustaining competitive advantages. Studies have focused on defining the components of innovation ecosystems, like actors, activities, and artifacts as well as their interrelations, including collaboration and competition (Granstrand and Holgersson 2020). While innovation ecosystems are well-studied, the VCW Ecosystem remains underexplored. A pilot project at INCM-Portuguese Mint and Official Printing Office marked its initial application but lacked systematic academic analysis (Value Creation Wheel 2017). Comprehensive research on its implementation, scalability, long-term benefits, challenges, and outcomes is still absent. This work project seeks to address this gap by contributing to develop a VCW Ecosystem at Nova SBE, systematically implementing and analyzing its application. The study aims to contribute to both managerial practice and academic literature on innovation ecosystems and provide practical insights into using the VCW methodology to industrialize innovation, decision-making, and problem-solving. The findings will inform the adaptation of the VCW Ecosystem model for broader use in various institutions and industries, paving the way for future research and practice.

1.3 Inspiration from INCM

The INCM-Portuguese Mint and Official Printing Office has reinvented itself over 700 years. To sustain innovation, it partnered with consulting firm Everis and academic expert Luis Filipe Lages to industrialize its innovation process. An innovation ecosystem with three layers was

established. A Governance Model for managing innovation, an Innovation Framework based on Prof. Lages' VCW methodology, and a Network of Partners to enhance its impact. A pilot project tested the VCW framework by tackling the challenge of reducing costs while creating organizational value. (Value Creation Wheel 2017)

1.4 Goals and Objectives

The project goal is to explore how to industrialize innovation, decision-making, and problem-solving within an organization. To achieve this, the WP team is piloting a VCW Ecosystem at Nova SBE, applying the VCW Meta Framework (TIAGO – Tap, Induce, Analyse, Ground, Operate) (Lages et al. 2023) (see Appendix 1 for an illustration). It was used to simultaneously address three internal challenges: (1) “How to improve mass public transportation and campus accessibility?”, (2) “How can living expenses be made accessible and affordable for all students?”, and (3) “How can Nova SBE develop an efficient and sustainable system for continuously updating Nova SBE alumni databases?”. The outcomes will identify synergies and evaluate the VCW Ecosystem's potential. These insights are highly relevant not only to Nova SBE but also to other higher education institutions, as well as public and private organizations which desire to industrialize the innovation, decision-making, and problem-solving process.

2 Context and Company Background of Nova SBE

“A Nova way of being a school, based in Portugal, and open to the world.” (Nova SBE 2024h)

Nova SBE, established in 1978 as part of NOVA University Lisbon, is a leading institution recognized for its academic rigor, research focus, and internationalization in business, economics, and finance (Nova SBE 2024j). Consistently ranked among Europe's top 30 business schools, Nova SBE responded to the Bologna reform by enhancing its global competitiveness (CEMS 2024; Nova SBE 2024j). Notably, it became the first Portuguese

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business school with two Master's programs, Finance and Management, ranked in the global top 10 by the Financial Times, placing 7th and 8th respectively (Financial Times 2024a; 2024b; Nova SBE 2024f). The school is known for its collaborative and student-centered approach and has positioned itself as a leading educational institution within Europe (CEMS 2024; Nova SBE 2024p). Dean Pedro Oliveira attributes this success to the school's unwavering commitment to academic excellence and innovation (Nova SBE 2024f).

Since 2018 Nova SBE has been situated in Carcavelos, Cascais (located 16 kilometers from Lisbon), offering a unique coastal setting (Nova SBE 2024b; 2024p). Its international community includes approximately 21,000 alumni in over 60 countries and 3,000 students from more than 70 nations (Nova SBE 2024e; CEMS 2024). Its commitment to fostering a diverse, global community is key to maintaining strong ties with the business world (Nova SBE 2024p). International students make up 53% of the student body and 65% of the Master's cohort, highlighting its global appeal (Nova SBE 2024k; 2024p).

Nova SBE stands out with the prestigious "Triple Crown" (Nova SBE 2024p) accreditation from EQUIS, AMBA, and AACSB, a distinction held by less than 1% of business schools globally (Nova SBE 2024p). The school's mission, "to be a community dedicated to the development of talent and knowledge that impacts the world," (Nova SBE 2024j) is manifested in every aspect of the Nova experience. This commitment is demonstrated in initiatives, such as an extensive, international alumni network or the innovation ecosystem that foster continuous development and engagement within the global business community (Nova SBE 2024e; 2024a).

The opening quote underscores how Nova SBE, a leading Portuguese university, has evolved into a top European business school, embracing progress through innovation.

3 Analysis of Nova SBE's Internal and External Environment

A comprehensive assessment of Nova SBE's strategic position was conducted through PESTEL, SWOT, and TOWS analyses, complemented by an evaluation of its commitment to the SDGs. These frameworks connect internal strengths with external pressures, predicting challenges and resistance, which ensures evidence-based, adaptable recommendations for VCW projects (Carruthers 2009).

Nova SBE operates in a dynamic environment influenced by political strategies like Portugal 2030, economic goals for R&D investment, and social opportunities from Lisbon's startup ecosystem, which together enhance its funding and partnerships (Ferreira Gomes 2024; Portugal 2030 2024; 'Global Innovation Index' 2024; Foundation for Science and Technology 2024). Additionally, technological advances in Artificial Intelligence (AI) and blockchain, alongside sustainability initiatives and tax incentives, position Nova SBE to leverage emerging trends effectively (KPMG LLP 2023; Treat and Klein 2024). A detailed analysis of the PESTEL framework is provided in Appendix 2.

A SWOT analysis of Nova SBE highlights strengths such as its Triple Crown accreditation, international focus, modern campus, and strong research output, alongside weaknesses such as reliance on international student mobility, a relatively smaller alumni network, high tuition fees for Master's programs compared to average business schools (though significantly lower than top European institutions), and limited global brand visibility (Nova SBE 2024p; 2024e; 2024l; 2023b). Opportunities in sustainability and Lisbon's startup ecosystem contrast with threats such as intense competition and financial dependency, with further details provided in Appendix 3 (Nova SBE 2023b; 2024n; Unicorn Factory Lisboa 2024; Financial Times, n.d.; 2023; Ferreira Gomes 2024).

The TOWS matrix identifies strategic pathways for Nova SBE to “leverage strengths, address weaknesses, seize opportunities, and mitigate threats” (Wehrich 1982, p 55), emphasizing alignment with the UN Sustainable Development Goals and Portugal's 2030 Agenda to attract students, form partnerships, and enhance its global reputation (Portugal 2030 2024; Nova SBE 2024n; Nova SBE 2024c). Strategies include increasing visibility through international events, digital programs and reducing financial vulnerabilities by diversifying revenue streams and expanding scholarships, with further details provided in Appendix 3 (Ferreira Gomes 2024; Nova SBE 2024l; 2024b; 2023b).

Nova SBE's strong commitment to sustainability, aligned with its mission and institutional values, is a key differentiator, highlighted by its integration of the SDGs into academic programs and practices, including 100% SDG-related content in new courses since 2022 (Nova SBE 2022). Initiatives like the Estoril Conference further showcase this dedication, inspiring the Nova community to contribute to global sustainability efforts and amplifying the impact of projects like this work in alignment with the 2030 Agenda (Nova SBE 2024g). Nova SBE's strategic position integrates sustainability, innovation, and partnerships, enabling it to navigate challenges and reinforce its role as a globally competitive, socially responsible institution.

4 Theories and Schools of Thought Supporting the VCW

To gain a deeper understanding of the VCW concept, which is essential for implementing the VCW Ecosystem, a comprehensive literature review was conducted, focusing on the key theories that underpin its framework.

4.1 Stakeholder Theory

Stakeholder Theory, introduced by Freeman in 1984, represents a shift in strategic management by asserting that businesses are accountable not only to shareholders but to a broader group of stakeholders who influence or are affected by the organization's objectives (Freeman and

McVea 2001; Freeman 2010). Stakeholders include employees, customers, suppliers, and communities, all of whom play a critical role in the firm's ecosystem (Freeman and McVea 2001; Freeman 2010).

The theory highlights the importance of actively managing these relationships to balance diverse interests, fostering trust, and promoting shared goals (Freeman and McVea 2001). Unlike traditional approaches focused solely on the customers or on maximizing shareholder value, Stakeholder Theory emphasizes that long-term success and sustainable competitive advantage arise from addressing the needs of all stakeholders, especially in times of change (Freeman and McVea 2001; Lages et al. 2020).

4.2 Problem-solving

Everyone encounters problems daily, from minor challenges like finding lost keys to significant questions about life's meaning. Martinez (1998) defines problem-solving as, "the process of moving forward toward a goal when the path to that goal is uncertain" (605). Organizations today face increasingly complex challenges, prompting the development of problem-solving frameworks that combine structure and agility, leveraging collective intelligence, co-creation, and partnerships (Lages 2016). Examples include Design Thinking (DT), Creative Problem-Solving (CPS), and Lean (Lages et al. 2020).

DT, developed by David Kelley of IDEO and Stanford's d.school, focuses on human-centered design through creative methods like storytelling, prototyping, and experimentation (Brown 2010; Carlgren, Elmqvist, and Rauth 2014; Carlgren, Elmqvist, and Rauth 2016; Lages et al. 2020). It emphasizes user needs and uses a structured yet flexible process, Inspiration, Ideation, and Implementation, to refine solutions based on feedback (Brown 2010; Liedtka 2015; Lages et al. 2020). Despite its utility, DT's academic use is limited by its vague theoretical foundation (Johansson-Sköldberg, Woodilla, and Çetinkaya 2013; Liedtka 2015). CPS, rooted in Alex

Osborn's 1950s research on brainstorming, enhances creative thinking by embedding solutions into actionable plans with stakeholder involvement (Isaksen and Treffinger 2004; Lages et al. 2020; Puccio 1999). It evolved from a linear model to a flexible, cyclical process and is widely applied to innovation, collaboration, and organizational challenges (Lages et al. 2020). Lean, originating in manufacturing, aims to optimize efficiency and eliminate waste while maximizing stakeholder value (Alvarez 2015; Pullan, Bhasi, and Madhu 2013). Nowadays it extends to organizational processes, emphasizing experimentation, iterative design, and customer feedback to foster agility and faster development cycles (Blank 2013; Lages et al. 2020).

4.3 Value, Value Creation, Value Capture and Co-Creation Theory

Value is generally defined as something that is “worth spending money on” (Cambridge University Press & Assessment 2024) and more specifically the trade-off between benefits and sacrifice or the perceived benefit customers derive from their experiences with a company, its products, or services (Grönroos and Voima 2013, 134).

Value creation is subjective and varies by individual. It depends on the relative value perceived by a target user or buyer, whether an individual, organization, or society (Lepak, Smith, and Taylor 2007). A target's perception of value hinges on their subjective evaluation of an outcome's novelty and appropriateness. Greater perceived novelty and appropriateness increase the potential for value use and exchange (Lepak, Smith, and Taylor 2007). Value again can be created by an individual, an organization or a society (Lepak, Smith, and Taylor 2007). The source of value creation differs from that of value retention. Two approaches are key to long-term value capture. First, firms may share products or services with stakeholders, including competitors, especially when price competition reduces perceived value. Second, applying “isolating mechanisms” (Lepak, Smith, and Taylor 2007) helps firms retain value by protecting it from competitors and minimizing value loss (Lepak, Smith, and Taylor 2007).

Traditionally, companies created value internally, bundling resources and know-how to protect it from competition. However, with market complexities, emerging technologies, and increased competition, value creation has shifted to co-creation (Prahalad and Ramaswamy 2004). Consumers, companies, communities, and professionals now collaborate to define and create value, engaging through communication channels, social media, open innovation, or digital platforms (Prahalad and Ramaswamy 2004). Co-creation, as described by Ramaswamy (2011), expands mutual value through shared processes (195). An example is Nike's co-design initiative, allowing consumers to design their own shoes, unlocking new value sources (Ramaswamy 2008).

4.4 Innovation

Despite extensive research on the topic, there is no universally accepted definition of innovation (Kogabayev and Maziliauskas 2017). According to Kogabayev and Maziliauskas, some author describes innovation as the creation of a new idea and its implementation into a product, process, or service. The implementation leads to economic growth, higher employment rates, and profits for innovative businesses (Kogabayev and Maziliauskas 2017). When an invention is combined with successful commercialization, the result is innovation (Lages 2024). Different types of innovation can include new technologies, business models, processes, or positions in the market (Lages 2024). The three perennial issues of innovation are institutionalizing vs. de-institutionalizing innovation, technology-driven vs. market-driven innovation, and the balance between incremental improvements and radical changes (Tzeng 2009). Innovation opportunities can arise from four key areas within a company or industry. Those are unexpected occurrences, incongruities, process needs, and industry or market changes (Drucker 2002). Additionally, three external sources of opportunity include demographic changes, shifts in perception, and advancements in new knowledge (Drucker 2002). The economist Peter Drucker

highlights the need for leadership to prioritize innovation: “If an innovation does not aim at leadership from the beginning, it is unlikely to be innovative enough” (Drucker 2002, 8).

4.5 Decision-making

Decision-making is the intentional process of assessing various options and selecting the one that best aligns with achieving specific goals (Morelli, Casagrande, and Forte 2021). This process is shaped by an individual’s abilities, values, preferences, and beliefs, aiming to identify the most effective solution (Morelli, Casagrande, and Forte 2021). John von Neumann’s and Oskar Morgenstern’s game theory (1945) developed foundational work in the field of decision-making. This theory suggests that individuals make decisions to maximize personal benefit, a core principle of classical rationality. The model assumes that decision-makers are fully rational (Von Neumann and Morgenstern 1945). In contrast, Herbert A. Simon introduced the concept of bounded rationality. He states that decision-makers face limitations in terms of computational capabilities (Simon 1997). Due to this instead of seeking the optimal solution, decision-makers aim for a satisfactory one, known as “satisficing” (Simon 1997, 5). On the other hand, behavioural decision-making, significantly influenced by Kahneman and Tversky, offers an alternative perspective to rational theories. Their work offers a more refined understanding of how cognitive biases and heuristics impact the decision process (Tversky and Kahneman 1974). It sheds light on the ways people make choices, especially when faced with risk and uncertainty, highlighting the non-rational factors that often drive decisions (Kahneman and Tversky 1979). In *Thinking, Fast and Slow*, Daniel Kahneman describes System 1 as fast, automatic, and intuitive thinking, while System 2 is slow, deliberate, and analytical, with both systems shaping how we process information and make decisions (Kahneman 2011). However, decision-making is not just a theoretical concept but a daily practice crucial for individuals and organizations. For organizations, optimizing major decisions is vital for long-term success in a competitive market (Nelson 2023).

4.6 Linking Theoretical Foundations to the VCW

The theories supporting the VCW offer a robust foundation for its role as a framework to address organizational challenges and foster innovation. Stakeholder Theory underscores the importance of engaging diverse stakeholders and balancing their interests, aligning with the VCW's collaborative focus. Problem-solving methodologies, such as DT, CPS, and Lean, demonstrate structured approaches to address challenges, which the VCW enhances by acting as a meta-framework that integrates these tools (Lages et al. 2020). Value creation theories, particularly the concept of co-creation, emphasize the shared generation of value, a principle deeply embedded in the VCW. Decision-making frameworks add another layer, highlighting the VCW's ability to guide rational, informed choices through its structured breakdown of complex issues. Together, these theories illuminate the VCW's versatility and effectiveness.

5 Understanding the VCW

The VCW, developed by Luis Filipe Lages, is the product of 29 years of research and refinement. Since its inception in 1995 and its early active application at the beginning of the Millennium, it has been tailored to address the complexities of 21st-century business environments (Lages 2016; Lages et al. 2023). Unlike rigid frameworks that lead to linear decision-making, the VCW offers a flexible, adaptive approach to innovation and problem-solving, incorporating diverse perspectives and non-linear thinking (Lages 2016). Influenced by Darwinist principles, the VCW combines traditional and dynamic frameworks into a circular, interactive model, balancing flexibility with structure (Lages 2016). As Lages (2016) states, “we must think not only ‘within the box’ and ‘outside the box’ but also ‘with no boxes’.” (1). Lages continues to enhance the tool, leveraging his extensive consultancy expertise and ongoing research highly supported by companies and executive education inputs.

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The VCW addresses challenges identified by Key Decision Makers (KDMs) who have the 4Ms (Manpower, Minute, Money and Motivation) (Lages et al. 2023). It engages internal and external stakeholders through a five-phase framework: Defining challenges, identifying ideas and filters, assessing these ideas, and refining them into tangible value (Lages et al. 2023; Lages, Fonseca, and Toh 2024). This methodology fosters innovation, decision-making, and problem-solving (Lages et al. 2023; Lages, Fonseca, and Toh 2024). Both the KDMs and their challenges can be highly diverse. KDMs are ranging from CEOs to individuals navigating daily challenges, actively contribute essential resources (4Ms) and play a central role in the problem-solving process (Lages, Fonseca, and Toh 2024; Value Creation Wheel 2024d; 2024d). The VCW is adaptable to diverse fields, including aerospace, finance, healthcare, public administration, technology, and tourism (Lages 2016; Lages, Fonseca, and Toh 2024). It is implemented by individuals, startups, NGOs, SMEs, and Fortune 500 companies (Lages 2016; Lages, Fonseca, and Toh 2024). Challenges often stem from a lack of internal support, complexity, or limited perspectives (Lages, Fonseca, and Toh 2024). By engaging KDMs and emphasizing efficiency, the VCW facilitates effective decision-making with reduced efforts and resources, delivering solutions that create value for stakeholders (Lages, Fonseca, and Toh 2024).

The VCW consists of two main components, resulting in four frameworks tailored to users' needs: The DIANA Framework, which underpins the VCW Sprint, VCW Journey, and VCW Method, and the TIAGO Framework (Lages et al. 2023; Lages, Fonseca, and Toh 2024; Lages, Dias, and Reis-Marques 2025) (see Appendix 4 for an illustrative image). The VCW Funnel serves as an additional component, demonstrating the VCW in practice (Value Creation Wheel 2024b) (see chapter 7 for a comprehensive description of the VCW Funnel). The selection of the most suitable VCW framework depends on factors like resources (4Ms), challenge complexity, team size, and diversity (Lages, Dias, and Reis-Marques 2025). The DIANA

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Framework, focusing on “converting practice into theory,” (Lages 2016,2) supports the VCW phases: Define, Increase, Assess, Narrow, and Act (Lages et al. 2023). It is ideal for specific challenges with limited resources (Lages et al. 2023). In contrast, the TIAGO Framework emphasizes practical application, described as “converting theory into practice,” (Lages 2016, 2) with five phases: Tap, Induce, Analyse, Ground, and Operate (Lages 2016). TIAGO is highly adaptable and customizable for diverse challenges (Lages 2016, 2). Due to its high degree of complexity, customization, and co-creation sophistication, it requires more human resources, budget, and time to be implemented (Lages, Fonseca, and Toh 2024; Lages, Dias, and Reis-Marques 2025). See Appendix 6 for an illustrative image of the VCW frameworks.

The VCW Meta Framework, based on TIAGO, is the most complex and resource-intensive approach, suited for comprehensive challenges involving numerous stakeholders (Lages, Dias, and Reis-Marques 2025, 12). It integrates the 15Is of Innovation and adapts flexibly to each unique case, functioning as a “chameleon framework” (Lages 2016, 2-3; Lages, Fonseca, and Toh 2024, 24). Both DIANA and TIAGO frameworks are dynamic and circular, enabling responsive problem-solving and complementing existing tools across various fields (Lages 2016, 2-3).

The core elements of each of the five TIAGO phases are as follows: The first phase, **Tap** (3Is: Ignition, Idea, Intelligence), **focuses on “Discovering Value”** by defining the problem or challenge (Lages 2016; Lages, Dias, and Reis-Marques 2025). This phase involves a thorough diagnostic to uncover root causes, contextual nuances, and relevant trends, culminating in a well-defined vision, clear goals, and a precise research question (Lages 2016; Lages, Dias, and Reis-Marques 2025). The process duration varies based on complexity, from minutes to years (Lages 2016; Lages, Dias, and Reis-Marques 2025). Key outcomes include setting a baseline, establishing KPIs, and aligning progress measures with desired outcomes (Lages et al. 2023). The second phase, **Induce** (3Is: Imagination, Intuition, Intellect), **focuses on “Creating Value”**

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by generating two key components: Ideas (potential solutions) and filters (criteria for prioritization) (Lages 2016; Lages, Dias, and Reis-Marques 2025; Lages, Fonseca, and Paulino 2018). Teams collaborate with internal and external stakeholders to produce a wide range of ideas and filters, treating them separately to ensure creativity and avoid premature elimination (Lages 2016). Creative methods such as brainwriting, brainstorming, crowdsourcing, networking, and open innovation might be employed, alongside techniques like market-pull and tech-push exercises (Lages 2016). Filters, often developed by stakeholders not involved in idea generation, serve to refine and evaluate ideas based on acceptance / rejection criteria (Lages 2016). In phase three, **Analyse – focuses on “Validating Value”** (3Is: Interpretation, Insight, Integration). KDMs prioritize and rank the ideas and filters from phase two, evaluating them from most to least important (Lages 2016; Lages, Dias, and Reis-Marques 2025). Factors such as organizational hierarchy, control systems, and the number of stakeholders involved influence this evaluation (Lages 2016). The **POKER method** (Keep, Review, Multiply, or Kill), developed by Lages and Hartmann (2015), streamlines the process, focusing on refining filters and solutions to ensure only the most viable options move forward (Lages 2015; 2016; Luis Filipe Lages, Fonseca, and Paulino 2018; Value Creation Wheel 2024c) (see Appendix 7 for an illustrative image). The fourth phase, **Narrow – focuses on “Capturing Value”** (3Is: Inspiration, Illumination, Incubation). It involves building the Value Creation Funnel using the ideas and ranked filters from the previous phase to identify solutions with the highest potential (Lages 2016; Lages, Dias, and Reis-Marques 2025). Flexibility and openness are key as the team incorporates KDMs’ insights (Lages 2016). After narrowing down the list of ideas, the team develops detailed concepts and prototypes for the final solutions, preparing them for implementation (Lages 2016). The final phase, **Operate – focuses on “Consolidating Value”** (3Is: Impression, Introduction, Implementation). A business model is developed and, if viable, implemented, monitored, and controlled (Lages 2016; Lages, Dias, and Reis-Marques 2025).

The board evaluates the solution by reviewing the 4Ms and business model, deciding to “Go,” “No-Go,” or “Check.” (Lages 2016; Lages et al. 2023). A “Check” decision requires revisiting earlier TIAGO phases for refinement (Lages 2016; Lages et al. 2023). KPIs set during the Tap phase are also reviewed, and stakeholders may be engaged to create roadmaps or oversee implementation (Lages 2016; Lages et al. 2023).

6 The VCW Ecosystem

Just as natural ecosystems like prairies, rainforests, and oceans consist of diverse species that interact, adapt, and evolve, human-created systems such as innovation ecosystems mirror this complexity, with various stakeholders interconnecting and evolving, driving growth and interdependence (Zhe et al. 2024). An innovation ecosystem can be described as an evolving set of actors, activities, and artifacts, as well as the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors (Granstrand and Holgersson 2020). An innovation ecosystem can be established on a smaller scale, such as within a company (Singapore Management University 2018) or on a larger, global scale (MIT 2021). An example for an innovation ecosystem within the European Union is the European Institute of Innovation and Technology (EIT). It is a large-scale innovation ecosystem that connects businesses, universities, and research institutions across Europe to address societal challenges through cross-border collaboration and support for startups (EIT 2024). Regardless of the scale, what is always needed is a density of resources, talents, infrastructure, and demand.

Innovation ecosystems have been implemented in various organizations and business schools. A noticeable trend among European business schools is their strong emphasis on innovation and entrepreneurship through various impactful initiatives. For example, HEC Paris Innovation & Entrepreneurship Institute fosters a leading European ecosystem for innovation and corporate

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transformation, offering three centres that support entrepreneurial ideas at every stage of development to drive lasting positive impact in business and society (HEC Paris 2024b). However, similarly to the Innovation Ecosystem at Nova SBE, internal and external problem-solving and decision-making is not their primary focus. In contrast, UC Berkeley fosters stakeholder engagement through partnerships, connecting alumni, faculty, and staff, guiding alumni in innovation-focused research, building philanthropic and corporate ties, and strengthening its network creatively ('UC Berkeley Innovators' 2024). The framework of UC Berkeley's innovation ecosystem stands out due to its decentralized structure, which proves to be highly effective by empowering various academic units with autonomy. This approach fosters dynamic collaboration and innovation across different departments, leveraging the unique talents and expertise within the institution (Cohen 2016).

Nova SBE established an innovation ecosystem which is focusing on being a "meeting point to forge partnerships with a shared vision, blending generations, industries, cultures, and perspectives to breed new business models, products, and solutions" (Nova SBE 2024a). They focus on enhancing executive education at Nova SBE and managing partnerships with external partners. Nova SBE is a key innovator for Portugal (Lopes 2024). This is why, alongside external efforts, internal challenges and innovation processes must be systematically and efficiently managed to maintain agility despite recent growth and remain competitive with other business schools. The VCW Ecosystem serves to be this systemized process which continuously generates innovation (Value Creation Wheel 2017). The VCW Ecosystem has already been successfully implemented outside Nova SBE at INCM-the Portuguese Mint, showcasing its potential to foster innovation, make decisions, and solve challenges. At Nova SBE, internal stakeholders have emphasized the need to enhance internal problem-solving and decision-making. This need was highlighted through active participation in VCW workshops and insights from interviews with previous KDMs involved in three VCW student projects (see

Appendix 8). The KDMs observed that, as in many organizations, excellent ideas from the VCW process often fail in implementation. A key issue was poor communication among students, staff, and faculty. This highlights the need for a structured approach like the VCW to ensure ideas are effectively implemented and integrated. Therefore, the VCW Ecosystem project was launched to address challenges at Nova SBE. The goal is to industrialize decision-making and problem-solving at Nova SBE, ensuring that innovation is better structured and more visible. The existing innovation ecosystem like all the other internal and external stakeholders are important assets in the implementation process of the VCW Ecosystem. To make the VCW Ecosystem efficient and applicable it is built on three fundamental layers: The Governance Model, the Innovation Framework and the Network of Partners (see Appendix 9), similar to the project at INCM (Value Creation Wheel 2017).

The Governance Model establishes the main responsibilities for each of the components of the VCW Ecosystem (Value Creation Wheel 2017). The Governance Model consists of three separate but interconnected units. The board challenges, selects filters, prioritizes, decides, and implements. They primarily launch the challenges, although other stakeholders can also initiate them. The VCW team challenges, dynamizes, explores, and supports. Lastly, the departments and organic units suggest ideas and filters. They are also responsible for conceptualizing and prototyping the solutions for their specific challenges (Value Creation Wheel 2017). This structure provides clarity and accountability within the ecosystem. The underlying components of the Governance Model are resource allocation, standardized processes, and technology. Efficient distribution of financial, human, and physical resources is crucial for implementing the ecosystem. Streamlined operations require standardized processes and training to effectively use the VCW Ecosystem. Technology must support innovation, ensuring the tools align with the governance structure. (Lages et al. 2023)

The Innovation Framework is based on Luis Filipe Lages' VCW methodology for innovation, decision-making, and problem-solving (Value Creation Wheel 2017). It is a comprehensive framework designed to tackle innovation, collaboration, and change management challenges. The strength of the VCW lies in its adaptability and ability to capture insights from both internal and external stakeholders, which is particularly valuable in addressing the complexities of collaborative partnerships (Lages, Dias, and Reis-Marques 2025). Given that the framework was developed by a professor at Nova SBE, there is a heightened level of familiarity among staff and students, which facilitates comprehension, encourages engagement, and supports its seamless integration into institutional decision-making and problem-solving processes.

The Network of Partners is essential for enhancing the potential of the VCW methodology for innovation, decision-making, and problem-solving within the VCW Ecosystem (Value Creation Wheel 2017). The diversity of partnerships is crucial, encompassing a variety of internal but also external partners to bring different perspectives and resources to the table. The sustainability of these partnerships is vital, with a focus on long-term collaboration to create enduring, impactful connections .

7 Procedure and Methodology of the VCW Ecosystem Project

The VCW Ecosystem Project began with an exploratory phase focused on identifying Nova SBE's existing challenges. This stage involved the active participation of KDMs and numerous internal and external stakeholders, providing a diverse range of perspectives. During this diagnostic phase, over 80 potential challenges were identified. Subsequently, discussions were held with the Dean and the President of the Scientific Council to prioritize these challenges and identify the appropriate KDMs for each.

Once the priority challenges and KDMs were defined, the next phase, which centered on gathering potential solutions through idea and filter generation workshops, began. Conducted

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in June 2024 and September 2024, these workshops brought together various internal and external stakeholders, including staff and students, to solve real challenges while generating ideas and filters across multiple funnels. The workshop utilized the VCW Funnel, a stage-gate and agile methodology designed to energize and unify the co-creation team around a common objective and solution, enhancing engagement and motivation (Value Creation Wheel 2024b; Lages, Fonseca, and Toh 2024; Lages, Dias, and Reis-Marques 2025). The VCW Funnel begins by defining the Diagnostic, Challenge, Leaders / Key Decision Makers, Key Stakeholders, and the Scientific Team supervising the VCW Funnel (e.g., VCW Lab @ Nova SBE team). Ideas and filters are generated through methods such as brainwriting, brainstorming, and AI. Filters are then ranked from “must-have” to “nice to have”. Solutions pass through filters, followed by the development of the “4Ms” (Manpower, Minute, Money, Motivation), culminating in a concise pitch (summarizing the challenge, solution, and resource needs (4Ms)). VCW Funnels typically last two hours but can vary based on context from 90 minutes to 4 hours (e.g., number of people, number of challenges, number of VCW facilitators, presence of KDMs) (Value Creation Wheel 2024b).

During the workshops in June 2024 and September 2024 over 300 participants contributed, working together in teams of four to six people resulting in over 50 funnels. In October, additional workshops in the same format were held exclusively with Nova SBE Master’s students to gather more ideas and filters specifically for the three challenges addressed by the master thesis work project team. The WP team together with Luis Filipe Lages conducted four sessions in the mandatory “Marketing Management” class and two sessions in the elective “Decision Making”. During these sessions 235 students contributed to over 279 ideas and 254 filters (see Appendix 10). Following the workshops, further meetings with the KDMs to review and evaluate the proposed ideas and filters were held. This culminated in an official review meeting attended by the Dean of Nova SBE, the President of the Scientific Council, the three

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KDMs, Luis Filipe Lages representing the VCW Lab @ Nova SBE and the VCW Methodology, and the three Master's student's authors of this work project. The purpose of this meeting was to gather feedback on the ideas and filters and confirm their prioritization by the KDMs. With approval and endorsement from the Dean, the final funnel phase, where all ideas were assessed through the established filters was initiated. After developing an implementation plan for the respective solutions, the projects concluded with the implementation phase, where the KDMs were tasked with overseeing the integration and monitoring of the selected solutions. The three challenges addressed during the VCW Ecosystem Project are:

1. How to improve mass public transportation and campus accessibility?
2. How can living expenses be made accessible and affordable for all students?
3. How can Nova SBE develop an efficient and sustainable system for continuously updating its alumni databases?

In the following the process from defining the challenge to the implementation of the solution is described for each challenge in detail. The overarching mission of solving the challenges is to solidify the implementation of the VCW Ecosystem at Nova SBE, to industrialize innovation, decision-making, and problem-solving and offer implications for other organizations. To track the success of the project, the WP team set five overarching objectives with underlying KPIs to monitor the process and measure the results at the end of the project (see Appendix 11).

8 Challenge 1: How to Improve Mass Public Transportation and Campus Accessibility?

In the following, the VCW methodology is applied to solve challenge 1.

8.1 VCW Phase 1 – Discover Value (Tap)

Improving mass public transportation and campus accessibility is an essential challenge viewed through multiple perspectives. Well-designed transportation systems influence not only the ease and safety of daily travel but also play a significant role in advancing environmental sustainability, resilience and efficiency (United Nations 2021). The diagnosis of campus accessibility at Nova SBE is straightforward yet challenging to resolve: the campus is located far from major population centers and transportation hubs.

The Dean of Nova SBE, Pedro Oliveira, emphasized the importance of this challenge during the alignment meeting on November 4th, placing strong emphasis on solving it. Additionally, sustainability is a core concern not only for Nova SBE but also for Portugal and the global community (Nova SBE 2024i). This was emphasized by KDM Luís Veiga Martins in the initial meeting, where he expressed his support for the project and welcomed the valuable perspective that students bring to the sustainability department. An overview of all KDM meetings can be found in Appendix 12. The sustainability department is working on three pillars concerning the topic of mobility: Commuting, Business Trips and Carbon Footprint of International Student Mobility. The shared goal across all three pillars is to reduce Nova SBEs CO₂ emissions. The WP team is specifically committed to addressing the first pillar, commuting, under which the challenge is categorized. Luís Veiga Martins, with his expertise in sustainability and circular economy, serves as Chief Sustainability Officer at Nova SBE and Managing Director at CELPA. Previously, he led SPV, Portugal's entity for packaging waste recovery, where he was instrumental in advancing circular economy practices (Martins 2024). This positions him as a

KDM with the **4 Ms** (Minute, Manpower, Motivation, and Money). Regarding Minute, the sustainability team at Nova SBE dedicates 30 to 60 minutes daily to mobility projects, focusing on short-term quick wins and planning for long-term solutions, expected to be implemented by the end of 2025. These insights serve as two critical filters for the project. Concerning Manpower, the sustainability department consists of four full-time employees, with significant involvement of the Dean and Luís Veiga Martins, whose expertise and authority are pivotal in addressing the challenge. Motivation is exceptionally high, as sustainability is a top priority and strategic goal for the school. Concerning the last M, Money, the Dean has the authority to allocate resources toward sustainability and transportation projects, and Nova SBE has strong bargaining power in discussions with local municipalities and public transport providers. The benefits should exceed the costs for the long-term solution. For a quick win a budget of 30.000€ should be realistic according to Luís Veiga Martins (see Appendix 12; Meeting 19.11.2024).

As Master students of Nova SBE, the WP team has personally experienced the challenges of commuting to the school. A **root cause analysis** was conducted to gain a deeper understanding of the underlying problems (Guevara 2024). The data for this analysis was initially gathered from a survey conducted in April 2024 by the sustainability department. However, with a student response rate of only 2%, an additional survey was launched during the work project (see Appendix 14). The overall satisfaction score of the transportation to Nova SBE was 3 out of 5 points (see Appendix 14). Engaging with over 230 students in workshops provided valuable insights for a deeper understanding of the issues. Six root causes were identified, each accompanied by data insights to find an appropriate solution for the challenge. Ideas to address these issues were gathered in Phase 2, with the implementation plan set in Phase 5.

1. Preference for commuting by car: Faculty, staff, and students favor cars due to limited public transport options, prioritizing convenience and flexibility. Data Insight: Cars

dominate as the preferred mode, accounting for 54% of total mobility emissions (Questionnaire Appendix 13).

2. Limited public transport connectivity: The campus's remote location, limited direct connections, and unreliable transfers make public transportation access difficult, requiring long travel times, including a 20-minute walk. Data Insight: 54% of respondents emphasized the need for improved connectivity between the campus and public transport hubs (Questionnaire Appendix 13).
3. Lack of sustainable alternatives: The insufficient infrastructure to support sustainable transport options like biking and walking combined with safety, convenience, and weather-related concerns, discourages their use. Data Insight: 39% of respondents called for covered bike parking and accessible paths (Questionnaire Appendix 13).
4. Cost and time disadvantages of public transport: The belief that public transport is costly and slow, coupled with cheap Uber and Bolt options, deters its use. Data Insight: 24% of respondents expressed interest in reducing public transport costs through partnerships with operators (Questionnaire Appendix 13) / Stated in workshops)
5. Limited awareness of existing (sustainable) transport programs: Lack of awareness about sustainable options, like intermodal schedules and bike routes, leads students and staff to default to car use. Data Insight: 50% of the community lacks awareness about intermodal transport options (Questionnaire Appendix 13).
6. Challenges with carpooling programs: Logistical barriers like low app awareness, incompatible schedules, and lack of dedicated parking hinder carpooling adoption despite interest. Data Insight: 72% of respondents are interested in carpooling if specific conditions (such as matching schedules and reserved parking) are met (Questionnaire Appendix 13).

The KDM highlights the need to shift stakeholders' mindsets toward valuing mass public transportation. While the survey shows interest in sustainable mobility among students,

faculty, and staff, a gap remains in implementing these solutions (see Questionnaire Appendix 13). The insights from the Root Cause Analysis show that numerous stakeholders are essential to solve the challenge, adding complexity to it. To better address these stakeholders, a **stakeholder analysis** was conducted. A stakeholder analysis identifies key stakeholders, their interests, and how they are impacted by the project, helping to plan effective communication on project progress and priorities (Hoory, Bottorff, and Watts 2024). For this challenge external partners, such as the government, public transportation providers, and mobility services, are crucial as they control the infrastructure, funding, and regulatory support needed for effective transportation solutions. Understanding the needs, interests, and satisfaction levels of internal stakeholders is key to enhancing Nova SBE's reputation both within and beyond the organization. The stakeholder analysis categorizes key groups by their interest and level of power (Hoory, Bottorff, and Watts 2024), allowing them to be plotted on a graph. A detailed analysis of each stakeholder's position, along with a brief description, is included in Appendix 15. To achieve the shared goal of enhancing mass public transportation and campus accessibility, all stakeholders must align and collaborate effectively (Hoory, Bottorff, and Watts 2024). The university administration, leadership team, and public transport providers, identified as key stakeholders due to their strategic positioning in the graph, require close management. At the same time, due to their positioning, faculty, staff, and students must remain satisfied, as suggested by the literature, to ensure their continued support and engagement in the initiative (Hoory, Bottorff, and Watts 2024). Through active communication and engagement, the goal is to increase the interest of public transportation providers and to enhance both the interest and, consequently, the power of potential funding partners and private mobility services.

It is important to analyse not only the immediate environment but also the competitive landscape. For this reason, a **competitor analysis** was conducted, focusing on top European business schools (Financial Times 2023) that are located far away from the main population center. The primary objective is to generate ideas and solutions while identifying potential partner universities for collaboration and knowledge exchange to address mobility challenges. One aspect to be highlighted includes the initiative to have shuttle bus services to campus. Both HEC Paris and INSEAD offer shuttle bus services to enhance campus accessibility. They work together with public transportation providers. INSEAD operates a shuttle bus service through Cars Moreau, connecting the Fontainebleau campus to the Fontainebleau-Avon train station (INSEAD 2024). HEC Paris collaborates with SAVAC to provide regular shuttle services connecting the campus to various locations (HEC Paris 2024a). Another initiative of HEC Paris is their collaboration with the bike rental service ZOOV, with bike rentals available at the entrance of the campus. E-bikes are also available for free use (HEC Paris 2024a). Another initiative worth mentioning is that ESSEC commits to reduce its carbon footprint for its students travel by 25% by 2025 (ESSEC Business School 2022). The detailed competitor analysis can be found in Appendix 16.

Before moving to Phase 2, the actual generation of ideas and solutions, objectives such as enhanced campus accessibility, environmental impact and affordability have been set. Each objective is paired with specific **KPIs** to measure progress. As an example, the WP team aims to achieve a 25% reduction in CO₂ emissions by increasing the adoption of eco-friendly commuting options like carpooling, biking, and electric vehicles. Additionally, stakeholder satisfaction is prioritized, with goals to reach 80% satisfaction through improved transit options such as additional bus routes. To align the project with institutional goals, the KDM is expected to rate the work project at least 4 out of 5 in terms of added value and implementation feasibility. The comprehensive list of KPIs can be found in Appendix 17.

8.2 VCW Phase 2 – Create Value (Induce)

Phase 2 is designed to create value through the generation of ideas and filters (Luis Filipe Lages, Fonseca, and Toh 2024). This phase was highly valued by all stakeholders engaged during the project. The value generation started in the workshops held in June and September 2024, where participants brainstormed 33 ideas and 20 filters. These served as the starting point. In the following weeks the WP team used a range of creative and data-driven methods to gather and refine ideas and filters. The process began with brainwriting and brainstorming sessions, which generated an array of primary ideas. The WP team presented these initial ideas to the KDM to gain deeper insights, understand current projects, and identify the key areas of focus like sustainable initiatives. Following this, interviews with students drew on their first-hand experiences to inspire new insights. To gain more student insights further workshop sessions in October 2024 with Nova SBE students from the Master's in Management generated an additional 65 ideas and 78 filters. A survey was provided to the WP team by the sustainability department. To address the low response rate of the initial survey, an additional student survey designed to complement the existing one was launched (see Appendix 14). This survey gathered further ideas directly from the student body, enriching our insights. To support these findings with substantial evidence, a detailed literature review was conducted, focusing on key topics such as “sustainable mass public transportation” and “campus accessibility.” Additionally, the competitor analysis conducted during Phase 1 provided best practices that helped generate innovative ideas relevant to Nova SBE. AI tools, including ChatGPT, Perplexity, Microsoft Copilot and Gemini, were utilized to diversify the pool of ideas. Consistent prompts, as well as variations were used across all AI tools to explore a wide array of solutions. We concluded the idea and filter generation process upon reaching a point of saturation. This became evident after analysing the outputs from the 30 October 2024 workshop, as no new ideas or filters were emerging anymore. This indicated that all creative possibilities for this phase had been

thoroughly explored. After eliminating all duplicates. The final number of ideas and filters adds up to 134 and 110. A complete list of all ideas and filters is provided in the Appendix 18 and 19.

8.3 VCW Phase 3 – Validate Value (Analyse)

The goal of Phase 3 is to validate the value generated during Phase 2 by building upon the ideas and filters developed in that phase. Filters are selected, clustered and ranked by the KDM. Ideas are analysed by using the POKER-Method. In collaboration with Luís Veiga Martins, 18 top-priority filters were identified during the KDM meeting on 22. of October 2024. These filters were selected based on their frequency of mention and the insights gained from the WP team's research. These filters were then categorized into two groups, "must-have" filters and "nice-to-have" filters. Nine must-have filters were prioritized, followed by nine nice-to-have filters. Within these two clusters, the filters were ranked according to their importance. These 18 filters served as the baseline for finding the best solution to solve the challenge and formed the foundation for further refinement. The additional 92 filters were then integrated into the original 18 clusters to make the filters more precise and layered, providing a deeper level of detail. This thorough approach ensures that the chosen filters align with departmental priorities as well as the university's overarching mission, vision and values. The WP team reviewed the ideas and presented them in a structured format during the meeting with Luís Veiga Martins on 22. of October 2024. They were evaluated using the POKER Method. The four categories of the POKER Method are keep, revise, multiply and kill. As a result, 60 ideas were assigned to the cluster keep. Five ideas were later revised during the alignment meeting on November 5th 2024. Two ideas were multiplied, while 67 were killed. This iterative process ensured that only the most relevant and promising ideas moved forward. During the alignment meeting with the Dean on November 4th 2024. this process was approved, and the project was green-lighted to proceed

to the next phase, the final Value Creation Funnel. This structured process helped to streamline and manage the number of ideas and filters, setting the stage for narrowing them down.

8.4 VCW Phase 4 – Capture Value (Ground)

67 ideas went through the must-have funnel in the beginning of Phase 4. Although some ideas did not progress through the funnel, the complete list of ideas offers valuable “food for thought” for future consideration and serves as an important source of data and insights from students. After passing through the Value Creation Funnel, 35 ideas advanced to the next stage (see Appendix 20). In this step, a MCDA process was applied to evaluate these ideas further (see Appendix 21). The final ideas with the highest score in the MCDA are listed in the table below. Additionally, the KDM added the idea of a carbon budget and CO₂ trading to the list.

1	Public transportation connections displayed on a screen at the entrance	7	Campus Commuter Challenge
2	Talk to municipalities & public transportation providers	8	Increase sustainability & public transport awareness
3	Campus dedicated shuttles from main population centers	9	Sustainable mobility events
4	Car Sharing Map for students, faculty, and staff	10	Mobility budget for staff
5	Shuttles from Oeiras to Campus	11	Carbon budget for business trip
6	Uber Transit for higher education	12	Internal Emissions Trading

Table 1, Final ideas that passed the MCDA

In a final alignment meeting on November 19th the decision was made to work on a solution that solves the challenge at its heart, hence to improve public mass transportation and campus accessibility. Idea 1, 4 and 8 were clustered into **Solution 1 “The Mobility Screen”**. Ideas 2,3,5 and 6 into the **Solution 2 “Shuttle Bus”**. The other ideas were deprioritized as the other solutions more directly address the core of the challenge. However, they will be kept in consideration.

The goal of **Solution 1** is to create awareness through one or several screens located at Nova SBE, where all available transportation options, including departure and travel times, are displayed in real time. This will include buses, carpooling options, bike and scooter rentals. The need for this solution is supported by the fact that a significant portion of the NOVA SBE population remains unaware of key aspects of public transportation, with 50% uninformed about intermodal conditions, 34% unaware of schedules, 28% lacking knowledge of associated costs (see Questionnaire Appendix 13), and real-time data is lacking. Furthermore, the interviews with students revealed a significant lack of awareness about buses, including when they arrive and where they go. Additionally, many students proposed the idea of a carpooling app during the workshops. However, such an app already exists, indicating that the issue lies in raising awareness. This solution can serve as a quick win, as it would allow existing solutions to be utilized more effectively.

Moving forward, **Solution 2** focuses on enhancing mass public transportation to Nova SBE through a Shuttle Bus service. Key questions to address include determining the transportation route and deciding who should operate the shuttle. A Shuttle Bus is essential as it was the most frequently suggested solution in student workshops, interviews, as well as the student survey (see Appendix 14). The survey of the sustainability department highlights key issues with current options, including inadequate schedules, long travel times, and poor connections, while 54% emphasized the importance of linking Nova SBE to public transport hubs and 69% expressed interest in shared transportation programs like vanpooling (see Questionnaire Appendix 13). Through in-depth research and alignment meetings with the KDM, the questions of the transportation route and operator for Solution 2 were systematically addressed by the WP team.

Concerning the **transportation route**, the survey shows that most students and staff live in Lisbon, followed by Cascais, Sintra, and nearby areas like Oeiras and Carcavelos. To suggest

better transportation routes, a collaboratively developed “Spider Map” with the Cascais municipality and Luís Veiga Martins was initiated during the project to pinpoint where students and staff commute from. As soon as it is available it helps to reveal where exactly the shuttle bus should stop. While Carcavelos station already has a direct bus service, increasing awareness, and improving frequency could enhance its effectiveness. Adding a direct bus from Oeiras station would provide significant added value. An intermunicipal solution is required, as Nova SBE is situated on the Cascais-Oeiras border (see Appendix 22). The Spider Map, the insights from this work project and survey will serve as a basis for planned negotiations.

Three viable options exist for **operating the Shuttle Bus**: Nova SBE, existing public transportation providers, and private mobility providers. While the option of **Nova SBE as the provider** might require significant resources, Luís Veiga Martins stated that “being carbon neutral is not free of charge” (see Appendix 12; Meeting 19.11.24). Therefore, it is worth investigating this idea in depth. The most straightforward solution is to have the Shuttle Bus operated by **public transportation providers**. CT, but especially Carris Metropolitana serve as the strategic partners of choice. Close collaboration with these providers and the municipalities is crucial for implementing Solution 2 but also 1, as their input is essential for supplying the data displayed on the Mobility Screen. **Private mobility providers** can serve as the third option. Uber Transit is an initiative by Uber. According to their website “with Uber Transit, colleges and universities can offer subsidized, stress-free on-demand transportation alternatives to students and faculty” (Uber 2024). Especially the option of completing the “campus shuttle services with flexible transportation options” (Uber 2024) and creating “Guaranteed Rides Home programs for when unexpected situations arise” (Uber 2024) can be a great and flexible add on option for improving campus accessibility at Nova SBE. To find out more about the initiative a contact form was filled out, however no answer was received until the submission of the thesis.

What makes both solutions **feasible** is its alignment with the strategy of Cascais municipality ('Cascais Operations Centre - C2' 2024). As stated on the website, Cascais' smart city strategy integrates technology into public services, centralizing real-time data through the Cascais Operations Centre (C2) for efficient resource allocation and decision-making. The MobiCascais platform connects transport services, offering real-time information on public transport, bike sharing, parking, and more to promote sustainable mobility and reduce the municipality's carbon footprint. Cascais, recognized as one of the 100 most energy-sustainable cities globally, uses 73% renewable energy and prioritizes decarbonizing fleets and energy efficiency. Key challenges include ensuring stakeholder engagement for smooth adoption of new processes ('Cascais Operations Centre - C2' 2024) which can be overcome by working together on the key questions concerning this challenge.

The WP team created a **prototype and implementation** for both solutions. The prototype of the Mobility Screen shows the features suggested in Appendix 23. The implementation of **Solution 1, the Mobility Screen** at Nova SBE involves a focus on location setup, data integration, software development, and hardware procurement. The decision to proceed with the project must be made internally. The WP team suggests installing the screens at the two main entrances of the campus and potentially at the library to maximize visibility. Furthermore, an online application on the Nova SBE website would bring added value. Real-time data from providers like Carris Metropolitana and CP is crucial. The WP team estimates that integration is possible within three months and the data will be free of charge through partnerships. The software can be developed through internal programmers like professors or students in form of a Hackathon. Otherwise, there is the potential to assign a freelancer. With an estimated cost of €10,000 (Strehlow 2021) and an expected timeline by the WP team of eight weeks. For the hardware, digital signage screens or interactive kiosks are suggested, as they provide a professional look, are easy to manage with software, and can display real-time data effectively.

The WP team suggests a size of approximately 55 inches which come along with costs of around 3000\$ ('Digital Buying Guide: Top 4 Touch Screen Kiosks' 2023) with potential for cost-sharing through partnerships.

For **Solution 2, the Shuttle Bus** an analysis of the current and planned situation and schedule has been done (see Appendix 24 and 25). The implementation of the Shuttle Bus service involves careful decision-making regarding the route and the provider. The WP team proposes the following implementation steps. First a decision must be made internally among the stakeholders to determine which route offers the most value and which provider will operate the shuttle. Second, the implementation steps by provider differ. For Nova SBE as the provider a detailed business case needs to be calculated, outlining the costs, resources required, and expected value of operating the shuttle service directly under Nova SBE's management. One of the aspects to be considered is by how much Nova SBE could reduce CO2 emissions and increase stakeholder satisfaction. This can be measured by surveys or counting the reduced number of cars in the parking lot. The implementation process, including planning, procurement, and operations setup, is estimated to take one year, until the end of 2025. For the solution that depends on the public transportation provider and municipalities collaborative discussions with public transportation providers and municipalities (Cascais and Oeiras) are essential. The strategy of Nova SBE should include leveraging insights gathered from student surveys to demonstrate the demand among stakeholders about the need for a shuttle service. Involving the Dean, Luís Veiga Martins, and the student union to strengthens negotiation power. The implementation timeline is estimated to include a three-month negotiation period followed by a nine-month implementation phase. For the Uber Transit solution, a kick-off meeting needs to be conducted to determine if Uber Transit's solutions are feasible and align with Nova SBE's goals. Key options to explore include complementing campus shuttle services, event shuttles and guaranteed rides home for unexpected situations (Uber 2024). If the

solution is viable, implementation is expected to take three to five months. Third, it is essential to ensure that the shuttle service is synchronized with existing train schedules to maximize convenience for students, staff, and faculty. Before full-scale implementation, pilot testing will be conducted to gather feedback and refine operations. Regular evaluations will ensure the service meets user expectations and adapts to evolving needs.

A clear concept and value proposition ensures the solutions address the initial pain points and deliver tangible value (see Appendix 26 for concept and value proposition).

8.5 VCW Phase 5 – Consolidate Value (Operate)

The **implementation of the project** has already made progress, especially by raising awareness of the topic from students' perspective. Moving forward, the next steps include finalizing decisions on the Mobility Screen implementation and defining the long-term strategy for the shuttle service. Additionally, discussions with municipalities and public transportation providers are planned, along with a kick-off meeting with Uber to assess potential collaboration.

The **business model canvas** for the Mobility Screen and Shuttle Bus highlights their strengths and synergies in improving campus accessibility and sustainability at Nova SBE (see Appendix 27 and 28). The screen focuses on real-time public transport updates, raising awareness and enabling informed commuting. By integrating QR codes and partnerships with providers like Carris and CP, it ensures visibility and engagement, while its low-cost structure and potential revenue streams from ads make it a practical solution. The Shuttle Bus directly addresses accessibility challenges by offering reliable transport, reducing travel time and emissions, and enhancing satisfaction. Partnerships with operators like Uber Transit provide flexibility and funding opportunities. Synergies emerge when the two solutions are integrated. The Mobility Screen can serve as a critical communication channel for the shuttle service, displaying routes, schedules, and updates in real time. This integration amplifies awareness and facilitates

seamless user experiences. While the screen is a cost-effective short-term initiative, the shuttle offers a robust long-term strategy, together creating a comprehensive ecosystem for sustainable mobility at Nova SBE. Therefore, the project outcome aligns with the **4Ms** set at the beginning of the project. The implementation timeline for the long-term shuttle solution is feasible by the end of 2025, with quick wins achievable through the Mobility Screen. Manpower for the screen and partnerships is manageable within the sustainability department, though planning for Nova SBE as the provider would require additional resources. Motivation remains high throughout the team and stakeholders. Regarding Money, the €30,000 budget allocated for the screen is sufficient, while the budget for the long-term solution will require further negotiation.

The **KPIs** established at the start of the project were reassessed at its conclusion. Some KPIs were successfully achieved and measured, such as the KDM's acknowledgment of the project's added value, which he rated with a five out of five, due to the fact that the WP team as the users are conducting the project (see Appendix 12; Meeting 03.12.24). The solutions potential to be implemented was rated with a five out of five for the Mobility Screen. The Shuttle Bus solution relies too much on high investments. Therefore, its potential for implementation is difficult to assess for the KDM. Other KPIs, like the reduction in CO₂ emissions following the implementation of the Mobility Screen and Shuttle Bus, require long-term evaluation. The comprehensive list of objectives, KPIs, measures, and goals continues to serve as a valuable reference for the KDM and his team moving forward.

The proposed solutions have the potential to significantly enhance campus accessibility and improve mass public transportation at Nova SBE. Both solutions are feasible, effectively raise awareness, and have secured the motivation of internal and external stakeholders. By combining immediate impact with strategic foresight, these solutions embody a scalable model for addressing the challenge. Moving forward, the implementation will be led by Luís Veiga Martins and his team.

9 Outcomes

The following section presents a detailed analysis of the outcomes of this work project, highlights identified synergies, and explores how the findings can inform future research and be applied effectively in other institutional contexts.

9.1 Consolidation of Outcomes and Synergies Across the Three Challenges

The mobility, living expenses, and alumni challenge are distinct in nature, yet the WP team observed several overarching **trends across all three challenges**. First, sustainability emerged as a key priority for both the school and the KDMs, not only in the environmental sense but also in the form of finding long-lasting solutions. Second, communication with students was highlighted as an essential yet underutilized resource. Many stakeholders mentioned that they rarely interact with students, despite greatly valuing their input, perspectives, and insights. As outlined in the value creation concept, this leads to better outcomes and valuable learning opportunities. Third, KDMs consistently encouraged the WP team to propose digitalization ideas, emphasizing solutions that integrate seamlessly into existing systems rather than relying on entirely new technologies, which aligns with Nova SBE's mission of making a sustainable impact. Finally, all measures are ultimately aimed at enhancing Nova SBE's reputation and increasing its appeal to prospective students, driving the school closer to its ambition of becoming a top-tier institution under the motto: "On Our Way to the Top." (Nova SBE 2023a).

Throughout the research, the WP team observed **significant similarities between challenges, ideas, and solutions** within the organization, uncovering interconnected opportunities to address issues strategically. For instance, while addressing the living expenses challenge, the WP team recognized its multifaceted nature and broke it down into various aspects, including a transport and mobility part. Ideas such as promoting carpooling, improving public transportation efficiency, and implementing campus shuttles emerged as top solutions. Interestingly, these ideas also feature among the final solutions for the mobility challenge. By

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leveraging this overlap, resources can be optimized, leading to more efficient and sustainable processes. Similarly, the alumni challenge, though seemingly unrelated to the others at first glance, revealed shared methodologies and connections. The alumni challenge serves as an overarching baseline for the other two challenges, as alumni play a crucial role as stakeholders in both the living expenses and mobility challenges. For example, alumni insights are critical for initiatives such as the alumni tuition support program or the campus shuttle, where their experiences and opinions help shape viable solutions. Alumni also directly contribute to the success of these challenges. A notable example is the prioritization of alumni during Nova SBE's fundraising efforts for the new campus, highlighting their essential role in the school's growth and development (Meeting with Madalena 21.11.2024). Besides that, the WP team utilized the Hackathon concept, originally proposed within the alumni challenge, to develop at least parts of the programming components for all three final solutions. This demonstrates the potential for leveraging creative ideas from one area to create impactful solutions in others. These findings highlight the deep interconnectedness of the three challenges, offering complementary insights and emphasizing the importance of strategic thinking in addressing organizational challenges holistically.

Certain **commonly applicable filters**, with generalized importance and usability, were used across all three challenges. During our meeting with Dean Pedro Oliveira, the WP team discussed the most crucial filters for evaluating solutions, and he highlighted cost, cost-benefit analysis, resources, and sustainability as key priorities. These filters are likely reflective of the challenges faced by many organizations, which must operate within constraints, not only financially but also in terms of available FTEs and other resources. This underscores the importance of the resource-based view of the organization and developing practical, resource-efficient solutions. On the topic of cost, Dean Pedro Oliveira emphasized: "Keeping in mind that cost is a challenge will help us in the end with the implementation, if the cost is too high,

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we might not be able to accommodate it in the end.” (Meeting 04.11.24). This statement illustrates that cost considerations are vital filters by many KDMs and lead to the feasibility of implementing most projects. The SWOT analysis highlights Nova SBE’s reliance on tuition fees and government funding, suggesting less financial flexibility than other organizations. The cost-benefit analysis further underscores the importance of aligning budgets with the scope of solutions. For example for the living expenses challenge, building social student dorms demands a significantly higher budget compared to implementing a food waste agreement with Pingo Doce and campus restaurants. Tailored budgeting is essential to ensure projects are viable and proportionate to their scale. Regarding resources, Dean Pedro Oliveira stressed the need to align proposed solutions with the limited resources available to ensure they remain practical and feasible. This includes not just financial resources but also human and operational capacity. Sustainability is a critical priority, as Nova SBE is deeply committed to the Paris Agreement and the 17 United Nations Sustainable Development Goals (SDGs) (Nova SBE 2021). To recognize the SDGs critical role in fostering a sustainable future, proposed solutions must align with these expectations, focusing on long-term impact and fostering sustainable success. The emphasis is on creating solutions that are not only effective but also enduring. Beyond these primary filters, the WP team, through its research and analysis of the project funnels, identified additional filters that are broadly applicable across challenges and organizations. These include reach of the solution (number of people impacted), implementation time (feasibility within a reasonable timeframe), alignment with Nova SBE’s vision (reflecting strategic goals), maintenance (long-term sustainability and support), (technological) feasibility (realistic execution with available resources), and scalability (ability to grow and adapt to future needs). These filters provide a comprehensive framework for evaluating and prioritizing solutions, ensuring they are impactful, feasible, and aligned with Nova SBE’s vision for sustainable and strategic development.

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Throughout the VCW process, the **WP team learned many lessons**. For instance, the importance of effective communication and structured collaboration. In-person meetings proved significantly more efficient than email exchanges, helping to prevent misunderstandings and streamline decision-making. Fixed meeting schedules with clear agendas were crucial, as was being specific about next steps, expectations, and deadlines for KDMs. Persistent follow-ups ensured progress and accountability. This is particularly important, as developing collaborative capabilities is a fundamental requirement for an ecosystem to function effectively. The role of the KDM emerged as critical. A successful project requires a KDM who possesses both the authority to make decisions and the availability to engage actively at all stages, particularly during critical phases and final implementation steps. Supporting KDMs with detailed explanations of processes, especially for complex tasks like ranking the filters and helping to guide the ideas through the VCF and MCDA, was essential to their effective participation. The WP team also recognized the importance of carefully formulating and adhering to the defined challenge. For example, when addressing the mobility challenge, some compelling ideas emerged but required refocusing to align with the core objective. Flexibility was vital as well. While the framework provided structure, projects often took unpredictable turns. Stakeholder unavailability, infeasible ideas, or the need to revisit earlier stages, such as in the alumni challenge, required adaptability. Collaboration with multiple internal and external stakeholders enriched the process by providing diverse insights, while creative methods like brainwriting generated innovative ideas. Listening to the three decades of VCW expertise and feedback of Luis Filipe Lages and KDMs further strengthened the project. Finally, the most important lesson was that the success of any project relies heavily on strong communication and a well-coordinated, functioning team. A unified and collaborative approach, fully aligned with the VCW methodology, proved to be the foundation for achieving impactful outcomes.

9.2 Analysis of the VCW Ecosystem Project and Implications for the Future

To demonstrate the need, value and feasibility of the VCW Ecosystem the WP team analysed previous student-led VCW projects through interviews with the project KDMs (see Appendix 8). Susana Lopes, Chief Librarian at Nova SBE, emphasized the importance of long-lasting support for effective implementation, highlighting her preference for engagement and feedback-driven collaboration with students. Vanda Verissimo highlighted a gap in project implementation due to a transition lapse. This issue, identified during VCW monitoring, has been resolved with Rogério Marchante assuming responsibility. Susana Santos praised the phased approach for its clarity and ease of use, demonstrating the value of the VCW methodology. All KDMs from this work project were highly engaged, appreciated stakeholders and Master students' input, and valued the outcomes of the three challenges, reflecting a shared enthusiasm for ongoing collaboration with the VCW team. Similarly, students in workshops showed significant interest in solving the challenges, showcasing the feasibility of the VCW Ecosystem and the value of including “customers” in the ecosystem to co-create and achieve better outcomes.

The VCW Ecosystem is essential for capitalizing on the abundance of numerous challenges and creative ideas at Nova SBE, by providing the structure necessary for industrializing the innovation, decision making, and problem-solving process. The VCW and the VCW Ecosystem foster open innovation, address resource constraints (human, financial and temporal), and resolve inconsistencies in stakeholder alignment and communication. By improving collaboration and establishing clear processes and responsibilities, the VCW Ecosystem ensures that implementation is actionable. Adopting the VCW Ecosystem aligns with Nova SBE's strategy and long-term goals, such as sustainability and digital transformation, positioning the institution as an European leader in innovation (Nova SBE 2024i). It helps Nova SBE to create a competitive edge among universities, improves stakeholder satisfaction, and reinforces its

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reputation for excellence. To summarize, the VCW Ecosystem fulfils two primary needs: improving communication and collaboration between departments, students, professors, partners and other internal and external stakeholders, and establishing structured processes to ensure effective industrialization and implementation of innovative solutions.

The VCW Ecosystem is structured as a centralized model, with individual departments granted autonomy to address their specific challenges in a decentralized manner, similar to Berkeley's approach. By embedding the VCW Ecosystem within the Dean's purview, the initiative ensures strategic oversight, institutional buy-in, and long-term success. Statements from KDMs, such as Sofia Cilia, underscore the importance of centralized authority to drive the process (Dean meeting 04.11.2024). This proves the point made by Peter Drucker emphasising the need for leadership to prioritize innovation (Drucker 2002).

The 4 Ms, money, Manpower, Minute and Motivation are hurdles to overcome. Therefore, the WP team suggests implementing a **Governance Model** that is aligned with the available resources. The VCW Ecosystem is anchored by strong leadership, starting with **the Board** that consists of the Dean and the President of the Scientific Council, who are already aware of the 80+ challenges faced by Nova SBE. They play a pivotal role in launching these challenges without requiring additional resources. Beyond this, other stakeholders can also propose and initiate challenges, broadening the scope and impact of the ecosystem. This is especially the case for the **Departments and Organic Units** that support the process with their expertise. They act as the KDMs for respective challenges and need to have the 4 Ms. At the core of the VCW Ecosystem is a dedicated **VCW team** led by Luis Filipe Lages, supported by a growing number of employees and students that support the KDMs. Master's students act as consultants on courses, theses, or projects, gaining experience while enhancing job opportunities at the school. As Luis Filipe Lages explained in the alignment meeting on November 04, 2024 "The power of building the VCW Ecosystem lies precisely in engaging students to identify problems

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and develop solutions because these challenges are directly relevant to them”. This approach ensures creating value by maximizing existing resources and minimizing costs.

The VCW framework proofed itself as a powerful and versatile tool, designed to foster co-creation, innovation, decision making, and problem solving. By integrating stakeholder insights, it engages KDMs to deliver practical, actionable solutions (Luis Filipe Lages 2016). All KDMs involved in the project were familiar with the tool and found it easy to work with, demonstrating its accessibility and effectiveness. Especially Phase 2, the generation of ideas and filters, was highly appreciated. To scale the VCW Ecosystem, the VCW Lab at Nova SBE will launch a Certification in January 2025, training over 150 participants from diverse industries to use the VCW methodology.

As an improvement area for the VCW, the WP team identified the difficulty KDMs face in ranking numerous filters during Phase 4 (VCF and MCDA). To address this, the team conducted a structured analysis of the filters, using criteria such as how frequently each was mentioned in workshops to create a shortlist, which KDMs found helpful for simplifying decisions. To further tackle this aspect in future projects, the WP team proposes several solutions. The VCW team can preselect filters and use AI to cluster and reduce their number, streamlining the process. Additionally, during brainstorming sessions, filters can be classified as “must-have” or “nice-to-have” from the outset, making revisions easier for the KDMs. A library of frequently used filters, supported by both software solutions already developed by the VCW team, might become critical to provide quick and consistent references, showcasing the VCW framework’s adaptability and commitment to improvement.

The dynamic **Network of Partners** is built on internal stakeholders such as students, staff, and faculty, whose motivation to address internal challenges was activated through workshops and this work project. External partners, including UberTransit, public transport providers, other

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universities and CampusGround were engaged during the project. The network has potential for further expansion since market complexities, emerging technologies and increased competition, shifted value creation to co-creation. Consumers, companies, communities, and professionals now collaborate to define and create value, engaging through communication channels, social media, open innovation, or digital platforms (Prahalad and Ramaswamy 2004).

Industrializing innovation, decision-making, and problem-solving within Nova SBE requires a **structured approach for implementation**. The WP team identified solutions for successful implementation which differ in their degree of complexity and resources needed. A key strategy is to engage teams interested in solving internal challenges, whether by forming diverse new groups or involving existing student clubs, through targeted advertising and LinkedIn outreach. Offering incentives for voluntary student participation and hosting regular VCW Funnels, VCW Sprints and VCW Open Innovation Workshops with diverse stakeholders will foster active involvement. Additionally, promoting the VCW course and allowing students to tackle internal challenges will further boost engagement and hands-on learning. On a medium complexity level, creating a webpage where challenges, ideas, and filters can be posted and shared would encourage transparency and collaboration. For long-term scalability, more advanced initiatives like the engagement of the board are necessary. Enhancing the VCW software solution to support project work could streamline operations but would require additional funding. Successful implementation will depend on the integration of technology, targeted training, and fostering motivation through increased awareness and organizational alignment. Ultimately, the most important step is turning ideas into action, therefore a kick-off event for the VCW Ecosystem, to be held during the VCW Journey Certification Workshop in January 2025 serves as a valuable catalyst and marketing tool to raise awareness.

The success of the VCW Ecosystem relies on strong support from the Dean, President of Scientific Council, KDMs, organizational visibility, and clear accountability with dedicated

project leaders. An obstacle commonly discussed in the literature is the resistance to change within organizations, which can significantly hinder the adoption of new processes or systems. “This resistance is the outcome of change recipients’ cognitive and reactions towards change” (Wah Khaw et al. 2022, 19137). To address this challenge, it is essential to have strong leadership support (Wunker 2024). A **change of mindset** is crucial not only for implementing the VCW Ecosystem but also for addressing each individual challenge, as emphasized by Luís Veiga Martins. To support this, the WP team has consolidated the outcomes and insights from the VCW Ecosystem Project into Kotter’s 8 Steps for Leading Change, with specific measures assigned to each step (Kotter 2024).

Create a Sense of Urgency: By implementing the VCW at the Dean’s level and addressing unfulfilled challenges alongside ambitious goals, the VCW Ecosystem highlights the immediate need for action. **Build a Guiding Coalition:** The Governance Model ensures leadership alignment and collaborative oversight. **Form a Strategic Vision:** The VCW Ecosystem fosters exchange among internal and external stakeholders, solving challenges together as a united community striving for innovativeness and excellence. **Enlist a Volunteer Army:** The VCW team mobilizes stakeholders like students, staff and professors to lead and support. Certified and trained people will become multipliers of the VCW methodology. **Enable Action by Removing Barriers:** Breaking silos and creating a structured process through the VCW methodology ensures no idea is lost. **Generate Short-Term Wins:** Workshops and student projects act as tangible starting points to showcase early success. **Sustain Acceleration:** Building on initial wins, the scale of the projects increases. They integrate technological solutions and enhance professionalism. **Institute Change:** The VCW Ecosystem initiates new behaviours into the organization’s culture, linking them to lasting success until they become second nature (Kotter 2024).

9.3 Analysed Project Objectives and KPIs

The assessment of Nova SBE's VCW Ecosystem project highlights strengths and areas for improvement. KPIs established at the outset measure progress in teamwork, decision-making, and reputation (see Appendix 11 for objectives, KPIs, and their status). Short-term goals, crucial for laying a strong foundation, have been largely achieved. Teamwork and stakeholder satisfaction scored five out of five, reflecting improved communication, collaboration, and alignment with expectations. Timely stakeholder meetings and biweekly feedback sessions ensured consistent progress. Medium- and long-term KPIs, such as interdepartmental ties, leadership communication, and reputation, remain unmeasured pending full implementation of the VCW Ecosystem (see Appendix 11). While early results are strong, sustained focus on stakeholder engagement and collaboration and co-creation is essential to fully realize the ecosystem's potential for innovation and institutional growth. The VCW Certification will help to achieve this medium- and long-term goals.

9.4 Future Directions on Scaling the VCW Ecosystem

The work project explores how Nova SBE can industrialize innovation, decision-making, and problem-solving within its organization by implementing the VCW Ecosystem. By addressing three internal challenges using the VCW methodology, the project demonstrates how the structured ecosystem approach integrates governance, a robust network of partners, and a dynamic VCW team as well as organizational units to drive actionable solutions.

The project underscores the critical role of motivation and an innovative mindset in implementing the structure organization-wide. Motivation and innovation are deeply embedded in Nova SBE's culture, however like in any organization, challenges are inevitable. This became evident early in the project, as the initial brainstorming session produced a comprehensive list of issues to address. However, as Sofia Cilia emphasized during the final

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alignment meeting on December 9th, “the solutions are within the community”. The VCW Ecosystem provides a structured approach to uncovering the solutions to address these challenges. Until now, student insights and involvement in the process have been underutilized, presenting an opportunity for greater engagement moving forward. The WP team enriched the problem solving by applying a meta-framework, incorporating various tools and methodologies across the VCW phases. This approach ensured engagement of internal and external stakeholders. These partnerships leverage existing infrastructures, create collaborative capabilities, and creating mutual value. The findings affirm that a well-structured and standardized ecosystem like the VCW Ecosystem not only resolves immediate challenges but also fosters long-term organizational innovation, collaboration, decision-making, and problem solving.

The WP team explored the potential to industrialize the VCW Ecosystem at Nova SBE, laying the foundation for further research, implementation, and scaling of this system for innovation, decision-making, and problem-solving. Nevertheless, the team identified specific limitations that need to be addressed for broader applicability. While the methodology proved effective at Nova SBE, their adaptability and scalability in other contexts needs to be tackled in a structured way. The VCW Ecosystem’s implementation demands significant resources, financial, temporal, and expertise, that may not be universally available. Currently, the project primarily focuses on internal challenges involving only Nova SBE Master students in the project and the workshops, leaving its integration into a broader ecosystem unexplored. This aspect requires further development as the VCW Ecosystem is rolled out. Tailoring solutions to Nova SBEs specific internal context restricts their adaptability to different environments or institutional changes. Moreover, an initial adoption in other industries and institutions requires VCW consultants, workshops and VCW Certifications introducing the methodology and the tool, adding another layer of dependency during the introductory phase.

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To scale the VCW Ecosystem beyond Nova SBE requires transitioning from a tool-centric to a holistic ecosystem approach, supported by dedicated resources and well-defined strategies for successful scalability. Training materials such as workshop videos, detailed guides, the VCW Certification, and digital platforms can facilitate adoption without direct involvement from the VCW team or its founder, Luis Fillipe Lages. Understanding and addressing the unique challenges of other institutions and industries is crucial. For instance, universities often face resource limitations, while corporates may have financial capacity but lack human resources for implementation. Further research must explore these differences to adapt the VCW Ecosystem effectively for diverse contexts. Therefore, a key research question emerges from this expansion: How does the application of the VCW Ecosystem differ across universities and corporates, and what specific resources or strategies are needed to ensure its success in these varied environments? While the framework works effectively within Nova SBE, scaling it to broader contexts requires industrialization across countries and industries, emphasizing standardization across the globe. Standardizing and automating the VCW Ecosystem can address its current limitations and serve as first suggestions to make it adaptable on a global scale. As discussed before, digital platforms, customizable templates, Certification, and comprehensive standardized implementation guides are essential for scalability. Furthermore, participation in summits, conferences, and collaborative projects can also elevate the VCW Ecosystem's global recognition and foster its adoption across industries. The continuation of connections with all the schools at Nova University of Lisbon, various Portuguese Universities and leading institutions across different countries (e.g., MIT, Babson College, City University of Hong Kong, Vienna University) keeps enhancing its credibility in global academic and business circles. The continuation of partnerships with Fortune 500 and integrating into larger innovation hubs and networks provides additional opportunities to leverage resources and expertise. Lisbon, as a leading European innovation hub, offers fertile ground for collaboration

through entities like Unicorn Factory Lisboa (2024) and Web Summit (2024), where the VCW was on the grand stage. These platforms connect the VCW Lab @ Nova SBE with startups, entrepreneurs, and transformative ideas, aligning the VCW Ecosystem with cutting-edge trends and challenges. Such partnerships expand the Ecosystem's network and relevance while positioning it as a benchmark for innovation excellence. By actively participating in these networks, the VCW Ecosystem can bridge academia and industry, addressing complex global challenges and enhancing its scalability and reputation.

Emerging technological trends indicated in the Gartner Hype Cycle 2024, such as spatial computing and digital twins, further enhance the framework's potential (Gartner Inc. 2024). For instance, immersive AR and VR technologies can transform VCW workshops, enabling interactive problem-solving and multidimensional data exploration (Gartner Inc. and Resnick 2024). By integrating these technologies, the VCW Ecosystem can align with the demands of modern, creativity-driven organizations.

While these advancements present exciting opportunities, they also require careful implementation and analysis. Longitudinal studies will be critical to assess the long-term efficacy, while comparative research will help evaluate the Ecosystems adaptability in different contexts. As the VCW Ecosystem evolves, it must remain attuned to technological and organizational trends to sustain its relevance and impact.

10 Conclusion

Reflecting on the project, Nova SBE's Dean emphasizes the value of involving students into the project and problem solving, a practice that underscores the importance of following the customer journey and listening deeply to customers. This approach ensures the creation of mutual value and yields solutions tailored to real needs. The VCW Ecosystem's success at Nova SBE serves as a model for innovation, decision-making, and problem-solving that integrates

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diverse perspectives and adapts to complex challenges. Its future lies in scaling its impact, standardizing its application, and embracing emerging technologies to become a globally recognized system for fostering innovation, decision-making, and problem solving.

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Group part

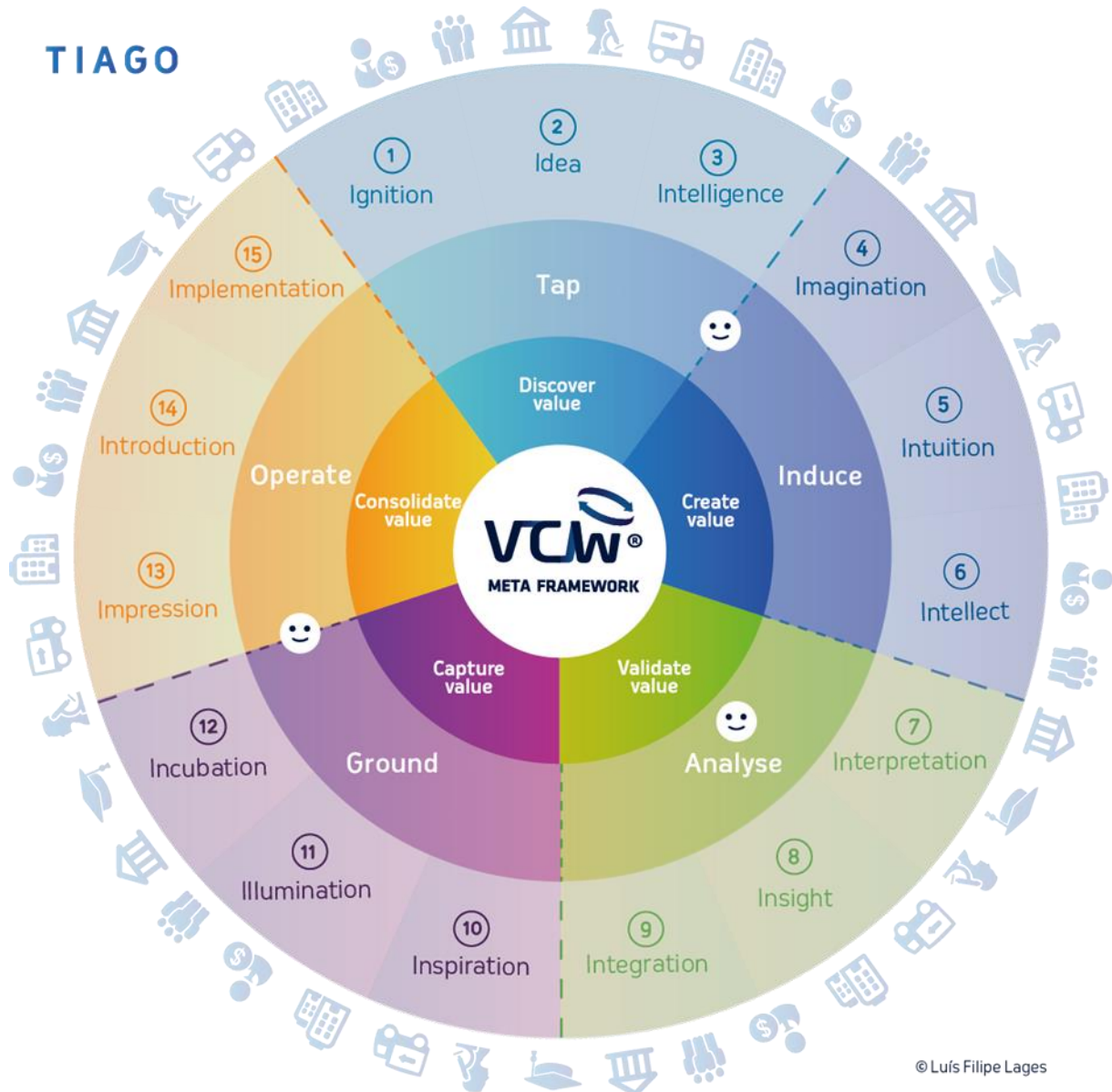
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Group part

Appendix

A – Group part

Appendix 1: VCW Meta Framework (TIAGO)



Source: Value Creation Wheel, 2024d

Appendix 2: PESTEL analysis

Political	Economical	Social
1. Portuguese government funding and policies significantly influence Nova SBE's budget, shaping its	1. Portugal's ranking in the Global Innovation Index 2024 ranks only 20 th among the 39 economies in Europe	1. Nova SBE has a strong network of partners (e.g., alumni, industry) that are key assets in creating an

ability to implement internal innovations and process improvements (Ferreira Gomes 2024).	indicates room for improvement, motivating Nova SBE to be a leader in innovation ('Global Innovation Index' 2024).	VCW Ecosystem (Nova SBE 2024p).
2. The Portugal 2030 strategy emphasizes innovation, competitiveness, and energy transition, encouraging organizational changes that align with government priorities for sustainable development (Portugal 2030 2024).	2. R&D investment program foresees reaching 3% of GDP by 2030: The national R&D investment goal of reaching 3% of GDP by 2030 provides significant funding opportunities for research and development. Nova SBE can tap into this increased funding to drive innovation initiatives, attract talent, and collaborate with industries, thereby strengthening its role as a hub for innovation within the broader national strategy (Foundation for Science and Technology 2024).	2. Portugal is home to a thriving entrepreneurial ecosystem, supported by progressive policies that attract significant international investment. The country's startup landscape is highly dynamic, with innovative ventures emerging across diverse sectors, including Fintech, Tourism, Renewable Energy, and Agri-tech. This robust growth positions Portugal as a leading hub for innovation and entrepreneurship in Europe (Financial Times, n.d.).
3. As member of the EU, Portugal can make use of the EU's research and innovation programs, also Nova SBE as a public university benefit (European Union 2024).	3. Lisbon, close to Nova SBE, is an emerging as a European hub for startups, attracting tech companies and investors. The proximity to this growing entrepreneurial scene could enhance the VCW Ecosystem at Nova SBE (Financial Times, n.d.).	3. Portugal is facing an aging population and talent shortage, therefore Nova SBE has to attract national and international students (The Portugal News 2022).
	4. Portugal has a growing pool of highly educated young professionals. Nova SBE's ecosystem could benefit from the availability of a skilled workforce and the problem of brain drain (talented individuals leaving the country) it tackled by	

	the Prime Minister in 2024 (Financial Times 2024c).	
Technological	Ecological	Legal
1. The Lisbon region, where Nova SBE is located, is growing into a tech hub with numerous startups and technology companies. Collaborating with this ecosystem can foster innovation (Euronews 2023).	1. Portugal incorporates the 2030 Agenda into its national strategies, plans and policies around the ‘5ps’ (people, planet, prosperity, peace, partnership). It identifies its priorities for SDG action with an environmental dimension as climate change (SDG 13) and life below water (SDG 14). Green innovative solutions are welcome (European Environment Agency 2020).	1. Data Protection Laws (GDPR): As part of the EU, Portugal enforces strict data protection regulations under the General Data Protection Regulation (GDPR). This could affect how Nova SBE and its innovation ecosystem handle data in research and development (Intersoft Consulting 2024).
2. Technologies like AI, blockchain, and data science are gaining traction in Portugal. Nova SBE’s innovation ecosystem could leverage these trends to create cutting-edge solutions (World Economic Forum 2024).	2. The university’s commitment to environmental responsibility and its impact on internal decisions (Nova SBE 2024n).	2. In 2023 Portugal introduced a new tax and legal regimes for startups and scaleups which encourages innovation (KPMG LLP 2023).
3. NOVA FCT strengthened its links with industry by signing a cooperation protocol with NOS, one of Portugal’s most prestigious telecommunications companies. Nova SBE has the possibility to be part of partnerships with the other Nova schools and industry partners (Nova FCT 2024).	3. As environmental concerns grow globally, there’s increasing pressure on institutions to integrate sustainability into their strategies. Nova SBE’s VCW Ecosystem could emphasize green tech, sustainable business practices, and environmental responsibility to align with these trends (Anitha 2024).	3. Nova SBE’s VCW Ecosystem has to adhere to the university’s guidelines.

Source: Created by WP team

Appendix 3: SWOT and TOWS analysis

Strengths	Weaknesses
Nova SBE has an ambition to grow and improve as a university with a focus on “the development and co-creation of innovative projects and top talent” (Nova SBE 2024j).	A significant portion (53%) of the students is international which makes Nova dependent on international students and vulnerable to global events that can disrupt student mobility such as visa regulations, and health crises like COVID-19 (Nova SBE 2024p).
The school achieved rankings and accreditations like the Triple Crown (AACSB, EQUIS, and AMBA) and is ranked among the top 10 business schools worldwide (Nova SBE 2024m).	Due to being a young school and only be founded in 1978, Nova SBE has still a small alumni network size with 20.000 members in the Alumni Club. Therefore, Nova’s scale and influence globally may be less extensive than older, established institutions in the U.S. and U.K (Nova SBE 2024e).
Another strength is the international focus of teaching as all courses are taught in English, the school offers exchange programs and 50% of master students find jobs abroad (Nova SBE 2024p).	Due to high tuition fees for students, the access is limited to many. This may hinder diversity in socioeconomic representation (Nova SBE 2024l).
The modern campus, Nova’s facilities and services enhances students learning and the overall experience – “The Nova Way of Life” (Nova SBE 2024h).	Nova is competing with Europe’s best business schools and globally with other renowned institutions. Attracting and retaining top-tier faculty members is challenging, as well as getting the attention of talented students (Financial Times 2023).
Strong cooperate partnerships in Portugal and international with huge companies and institutions represent another strength of Nova and provides companies with “collaboration opportunities, from on and off-campus events to online activities or work projects” (Nova SBE 2024c).	The limited global brand recognition outside Europe especially compared to elite business schools in US and UK is another weakness. Despite the business school ranking Nova does not appear in university rankings for business studies outside Europe. Besides, students are mainly coming from Portugal, Germany and Italy and almost no students are coming from USA to study at Nova (Nova SBE 2023b).
Nova’s strong focus on research and innovation lead to 591 publications in the last 5 years (Nova SBE 2024p).	
Opportunities	Threats
With an increase of around 25% in the number of applications compared to the previous year 2022 and an increasing number	Increasing competition with other established business schools often leads to competing for

Group part

of incoming students, more revenue can be generated, and Nova's reputation improves (Nova SBE 2023b).	the same pool of students and faculty (Financial Times 2023).
The rising interest and importance in sustainability and social responsibility among students, applicants and staff could be further enhanced by positioning Nova SBE as a leader in sustainable business research and practices (follow ESG's and established the impact model, community engagement projects) (Nova SBE 2024n).	Economic instabilities and political uncertainties could decrease the number of incoming international students which affects revenue and reputation of Nova.
Another opportunity could be using the increasing publicity and brand recognition to expand in new markets outside Europe and emerging markets. Nova SBE could thereby broaden its influence, increase student intake, increase revenues, and create new research collaborations in these rapidly developing economies (Financial Times 2023).	A dependency on tuition fees and funding as revenue stream could threaten the financial stability of the school (Ferreira Gomes 2024).
Lisbon has been awarded as the European Capital of Innovation by the European Union with the launch of the Unicorn Factory and has been ranked top 10 of European's leading startup hubs by the Financial Times. This represents an opportunity for Nova SBE to attract students and faculty interested in entrepreneurship and innovation, and could collaborate with local tech firms and startups (Unicorn Factory Lisboa 2024; Financial Times, n.d.).	

Source: Created by WP team

Strengths / Opportunities How can the strength be used to take advantage of the opportunities? What actions do we need to take to make use of the strengths?	Strengths / Threats How can these strengths reduce or remove these threats? What do we need to do to remove or reduce these threats?
Foster leadership in sustainability, research, and innovation by staying at the forefront of sustainability trends, which brings significant value to both students and faculty. Additionally, Nova has a strong	Strengthen and further grow the international alumni connections to improve networking and job placement, especially outside Europe (Nova SBE 2024e).

foundation in this field, demonstrated by its commitment to the UN Sustainable Development Goals (SDGs) and its established impact model. This foundation also attracts students and partnerships that share these values (Portugal 2030 2024; Nova SBE 2024n).	
Strengthen connections with companies in emerging economies outside Europe to tap into new markets and further expand Nova's global reputation (Nova SBE 2024m).	Diversify the revenue streams to reduce the dependency on tuition fees and government fundings. This can be done through further corporate partnerships, grants, and sponsored research to improve Nova's financial resilience (Ferreira Gomes 2024).
Use Nova's modern campus, attractive offerings and unique learning experience as well as the increasing awareness and brand reputation to further attract international students also beyond Europe (Nova SBE 2024h). Additionally, use this strength to further tap into the opportunity of establishing corporate collaborations (Nova SBE 2024c).	Nova can offer more scholarships to attract diverse students from different socioeconomic backgrounds and mitigate the impact of high tuition fees (Nova SBE 2024l).
Moreover, this strength can be used to leverage the opportunity of Lisbon being among the top 10 startup hubs in Europe by collaborating with tech firms, startups and talented people to Nova's innovation practices, research activities and learning experience (Financial Times, n.d.).	
Weaknesses / Opportunities Do these weaknesses prevent or risk these opportunities? Should we address the weaknesses? What actions do we need to take to remove the weakness?	Weaknesses / Threats Which relate to each other? Are there weaknesses that result in threats? Which elements should be addressed?
Enhance the global presence by partnering with international firms, offer the campus facilities as a place for events and conferences and establish digital programs accessible worldwide. Use Lisbon's image as a global startup hub to raise awareness for Nova as a school (Nova SBE 2023b).	Nova's limited brand recognition outside Europe can be severe when competing with other well established business schools. Nova needs to invest in competitive salaries and professional development to attract and retain top faculty members and resist competition (Financial Times 2023).

Source: Created by WP team

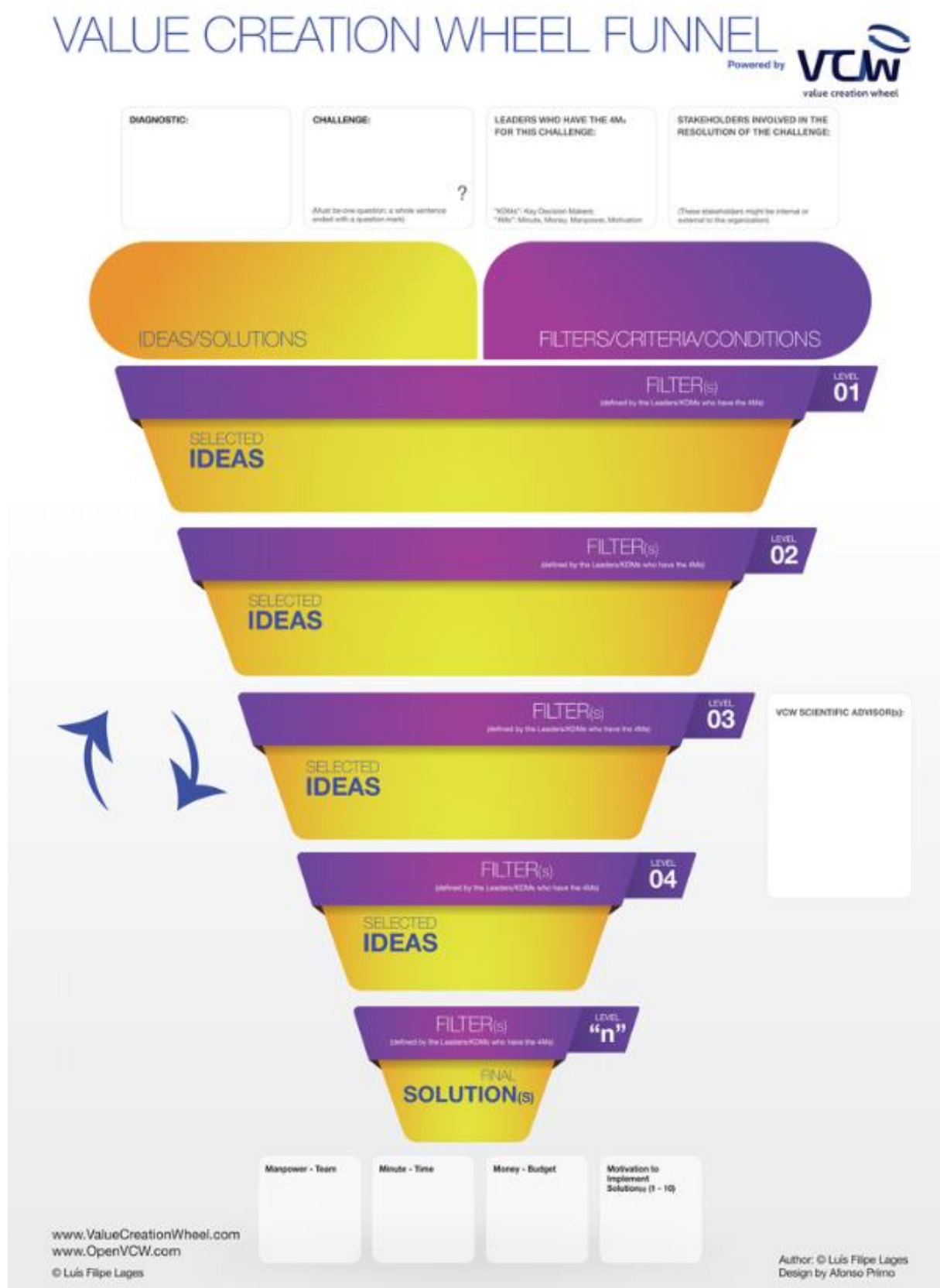
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Appendix 4: The VCW framework



Source: Lages, 2024

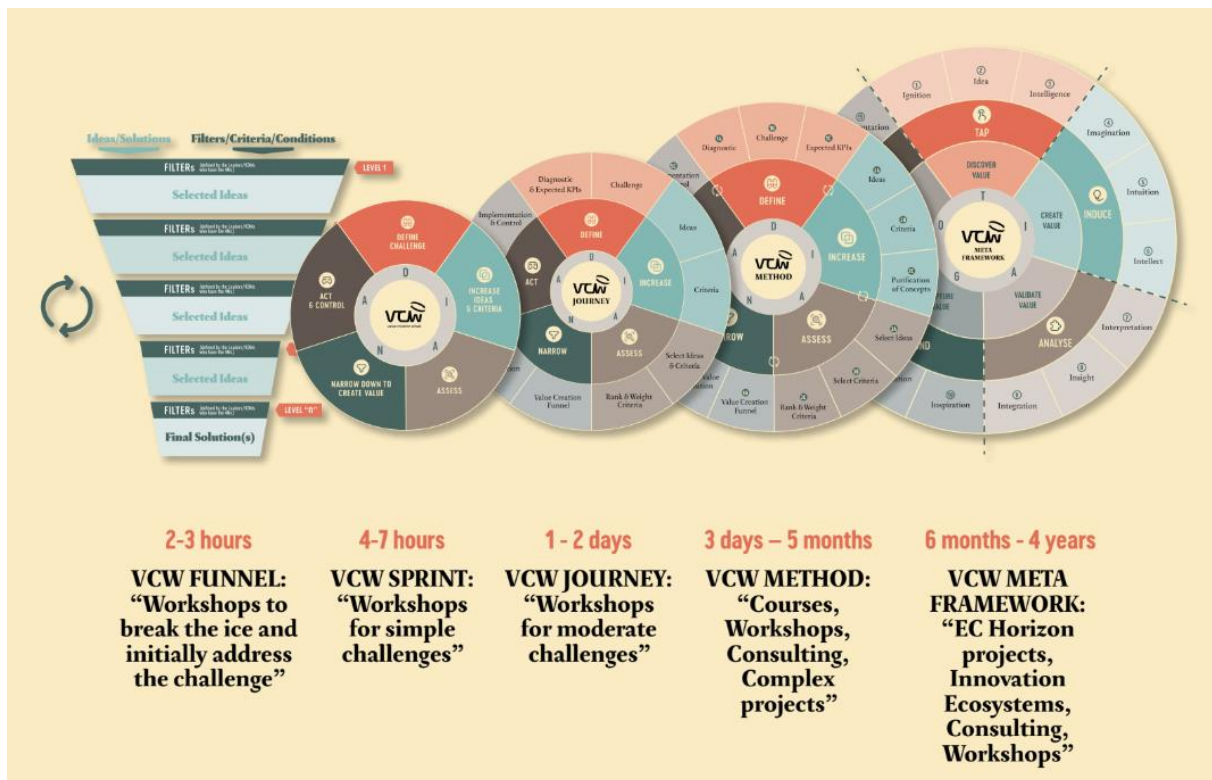
Appendix 5: The VCW funnel



Source: Value Creation Wheel, 2024b

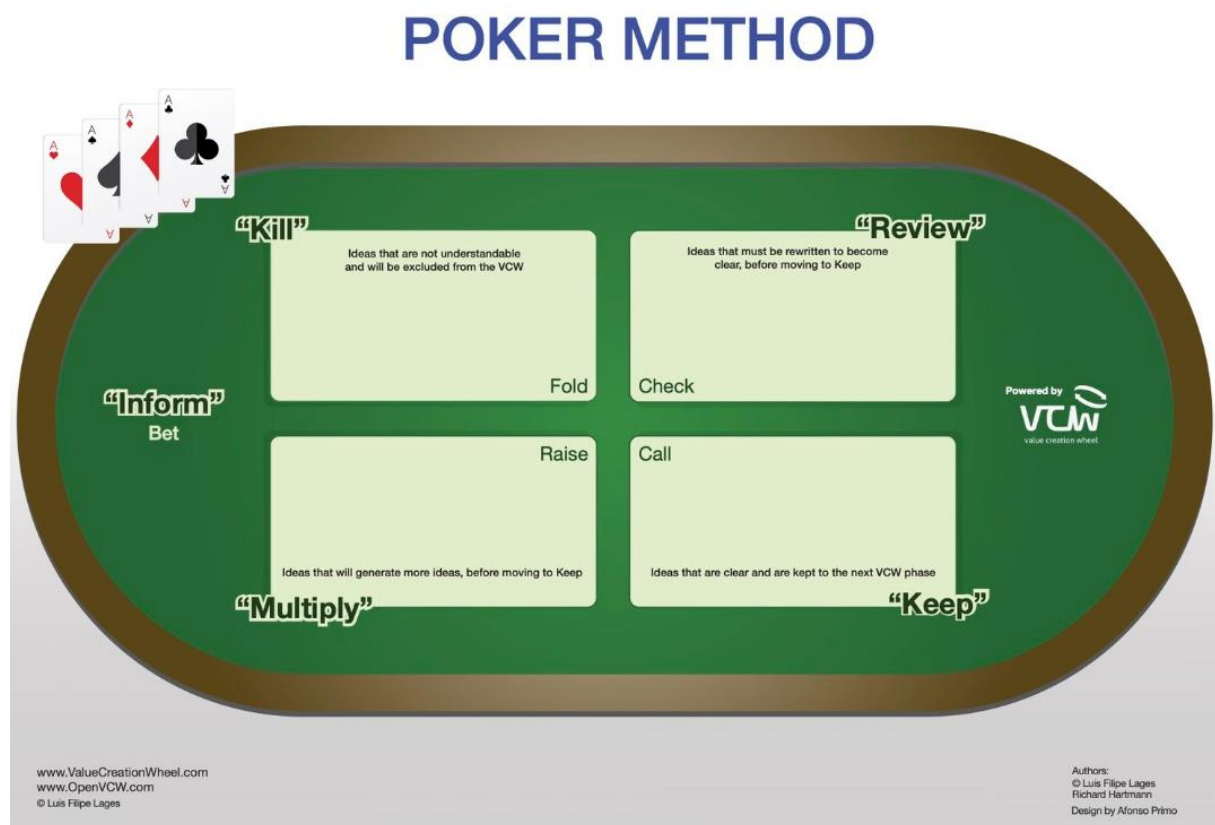
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Appendix 6: The VCW funnel and the four VCW frameworks



Source: Lages, 2024

Appendix 7: POKER method



Source: Value Creation Wheel, 2024c

Appendix 8: Meetings with KDMs from previous projects

Date	Participants	Topic	Project Details	Meeting Topics
17.10.2024	Susana Lopes, WP team	Insights on previous project for the library	The final solution proposed to the library team was the following: Adoption of a mobile application, incorporating the Skedda software (Value Creation Wheel 2023) (see video under the reference for more details of the project). According to Susana Lopes, the solution was not implemented because it was not deemed the right fit for their needs. Additionally, she lacked the authority to	What went good / what went bad? Did implementation take place? Is there a need for the VCW Ecosystem Insights on the project and KDM experience

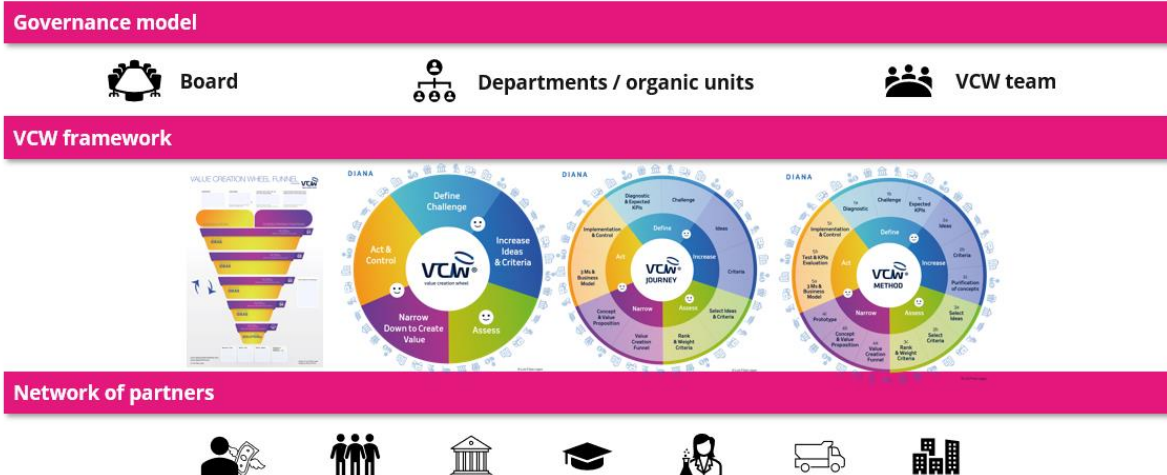
			proceed independently, as she reports to higher-level KDMs who were not actively engaged in the process. Susana Lopes also explained that there is a lack in communication with students (to understand their needs) and across the departments (to understand and support each other).	
28.10.24	Vanda Verissimo, WP team	Insights on previous project for the procurement department	Custom-designed dashboard solution which combines different supplier management components to ensure comprehensive supplier evaluation and two-way communication.	What went good / what went bad? Did implementation take place? Is there a need for the VCW Ecosystem Insights on the project and KDM experience
13.11.24	Susanna Santos, WP Team	Insights on previous project for the sustainability department	The final solution was about providing incoming students reusable products such as reusable coffee cups and lunchboxes in their welcome bag to make a commitment to sustainability. Susanna as the KDM reported that she was satisfied with the project and using the VCW methodology, and many student projects are implemented in the department. For more details on this project see the video (Value Creation Wheel 2024d).	What went good / what went bad? Did implementation take place? Is there a need for the VCW Ecosystem Insights on the project and KDM experience

Source: Created by WP team

Group part

Appendix 9: VCW Ecosystem

The VCW Ecosystem at Nova SBE



Source: Created by WP team

Appendix 10: Photo from workshop held in October



Appendix 11: Evaluated KPI's

Objective / KPI	Measure	Timeframe	Evaluation
1. Successful Project work on VCW Ecosystem			
Teamwork and internal collaboration on thesis will be evaluated as a 5 out of 5.	Scale from 1-5	short-term	Reached 5 on a scale from 1 to 5.
Implementation of VCW innovation ecosystem: At the end of master thesis work project a decision whether to proceed with the ecosystem or not can be made.	Decision made?	Medium-term	Successful pilot projects show that Nova should proceed with ecosystem – decision made.
The proposed VCW Ecosystem is actually implemented one year after the thesis submission.	Implemented?	Long-term	Not fulfilled yet, needs to be measured again after ecosystem implementation.
The following questions can be answered at the end of the master thesis work project: How to industrialize innovation, decision making, and problem-solving inside an organization?	Question answered?	Short-term	Question answered.
Ensure solutions of challenges are implemented 1 year after WP team submitted thesis.	Implementation after project end successful?	Medium-term	Can first be measured in 1 year from now.
Initial research, theoretical background and literature review is completed within six weeks.	Yes or no	short-term	Done in 6 weeks.
Initial meetings are held with KDMs and challenge is defined within the first six weeks.	Yes or no	short-term	Done in 6 weeks.
2. Enhance Communication and Collaboration at Nova SBE			
Improve exchange between internal stakeholders by at least two new social connections per department.	Number of social connections to other stakeholders	medium-term	Not fulfilled yet, needs to be measured again after ecosystem implementation.
Make the KDMs familiar with the successful application of the VCW framework.	KDM and WP team perception	short-term	KDM's were actively involved and are now familiar with VCW.
Increase communication between departments and with leadership team.	KDM perception	medium-term	Not fulfilled yet, needs to be measured again after ecosystem implementation.

3. Data Collection and Analysis for Decision-Making			
Collecting sufficient quantitative and qualitative data for analyses until point of saturation is reached.	Saturation of ideas and filters achieved	short-term	Saturation was achieved.
Having a biweekly exchange with supervising professor and KDM's to implement feedback.	Did meetings take place biweekly? Yes or no	short-term	Biweekly meetings were held with both KDM's and supervisor.
4. KDM Satisfaction			
Satisfaction of all stakeholders involved in the work project will be evaluated as 5 out of 5.	Scale from 1-5 by KDMs	short-term	Stakeholders were satisfied with the work project and gave a 5 out of 5.
KDM personal perceived satisfaction with project work and team will be evaluated 5 out of 5.	Scale from 1-5 by KDMs	short-term	KDM's were satisfied with collaboration with work project team and gave a 5 out of 5.
5. Enhance Nova SBE's Reputation, Quality of Life and Operational Efficiency			
Efforts made support Nova SBE on the way to the top.	KDM, Dean and Defense Jury impression	short-term	Can be measured only upon receiving feedback in thesis defense.
Solution is suitable for the whole organization.	Perception of Jury & feedback KDM	short-term	Can be measured only upon receiving feedback in thesis defense.
Increase Nova SBEs reputation.	Dean, KDM perception	medium-term / long-term	Not fulfilled yet, needs to be measured again after solution- and ecosystem implementation.
Increase time and cost efficiency of the innovation and problem-solving process.	Dean, KDM perception	medium-term / long-term	Not fulfilled yet, needs to be measured again after ecosystem implementation.
Increasing quality of life for students and staff at Nova SBE.	Survey	medium-term / long-term	Not fulfilled yet, needs to be measured again after ecosystem implementation.

Source: Created by WP team

B – Mobility Challenge

Appendix Challenge 1

Appendix 12: KDM meetings

Date	Participants	Topic	Description
08.10.2024	Luís Veiga Martins, WP team	Introduction to thesis	Introduced ourselves, the topic of the master thesis & the challenge. Aligned on a biweekly meeting and gained first insights into the departments work and background of the challenge.
22.10.2024	Luís Veiga Martins, WP team	Ranking of the filters	KDM ranked the must-have and nice-to-have filters. Applied the POKER method and receive first feedback on first generated ideas.
05.11.2024	Luís Veiga Martins, Susana Santos, WP team	Idea discussion	Presentation and discussion on the most promising ideas that went through the VCW Funnel. Additional feedback was sent to the thesis team in form of an excel file.
19.11.2024	Luís Veiga Martins, WP team	Final idea discussion	Aligned on the final idea, expectations for the implementation and prototype. Gained deeper insights on relevant information concerning the final solution
03.12.2024	Luís Veiga Martins, WP team	Final meeting	Presentation and discussion on implementation plan and prototype. KPI evaluation

Source: Created by WP team

Appendix Phase 1:

Appendix 13: Survey Sustainability Department

Please click on this link to view the survey results:

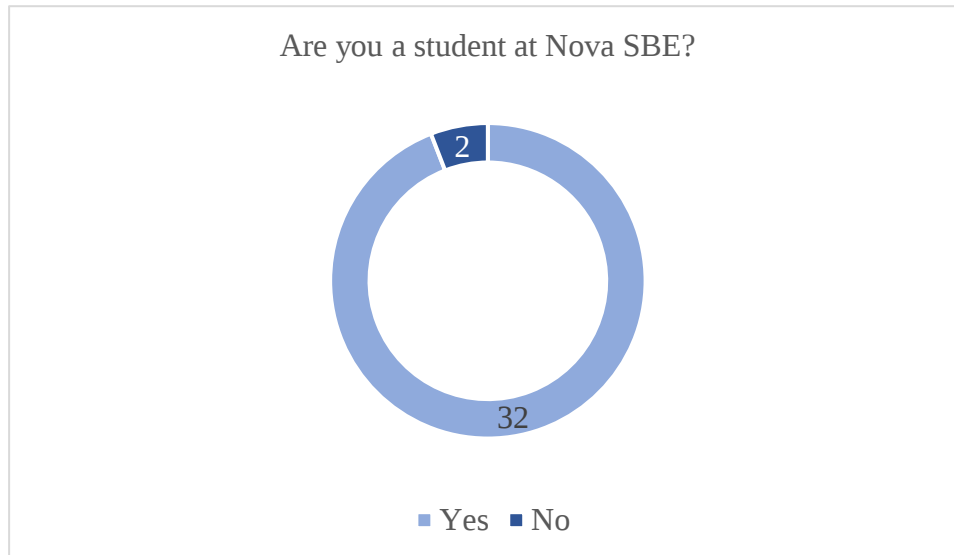
https://www.dropbox.com/scl/fi/w4eodgy3xxmbf2ao5f8tq/Question-rio-2023_24.pdf?rlkey=c1ix3zg0tabr5c07nbgk3t28s&st=e8rllyhm&dl=0

In case of difficulties please contact the WP team or Sustainability Department of Nova SBE

Appendix 14: Survey WP team

Participants: 34

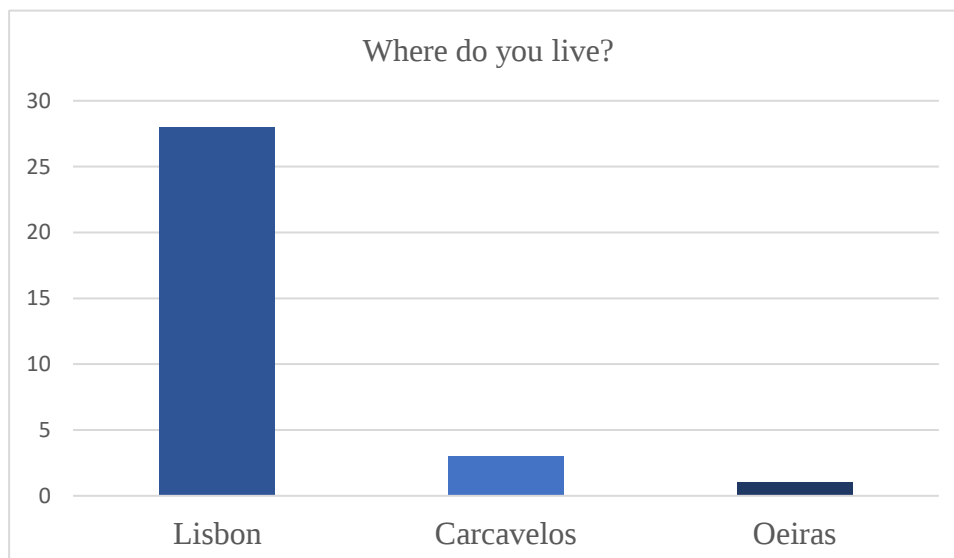
Question 1:



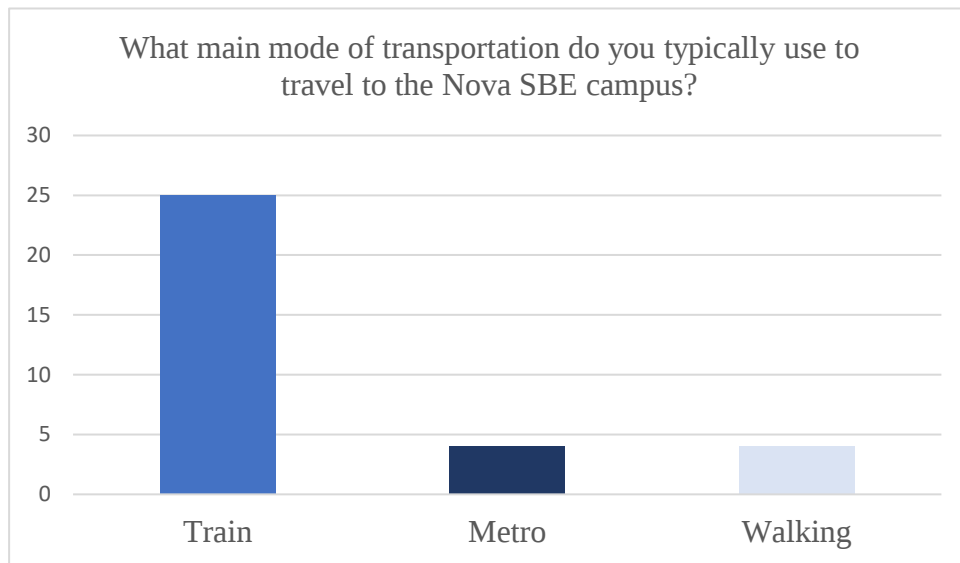
Question 2:

How satisfied are you with public transportation and campus accessibility at Nova?
3.21 average rating

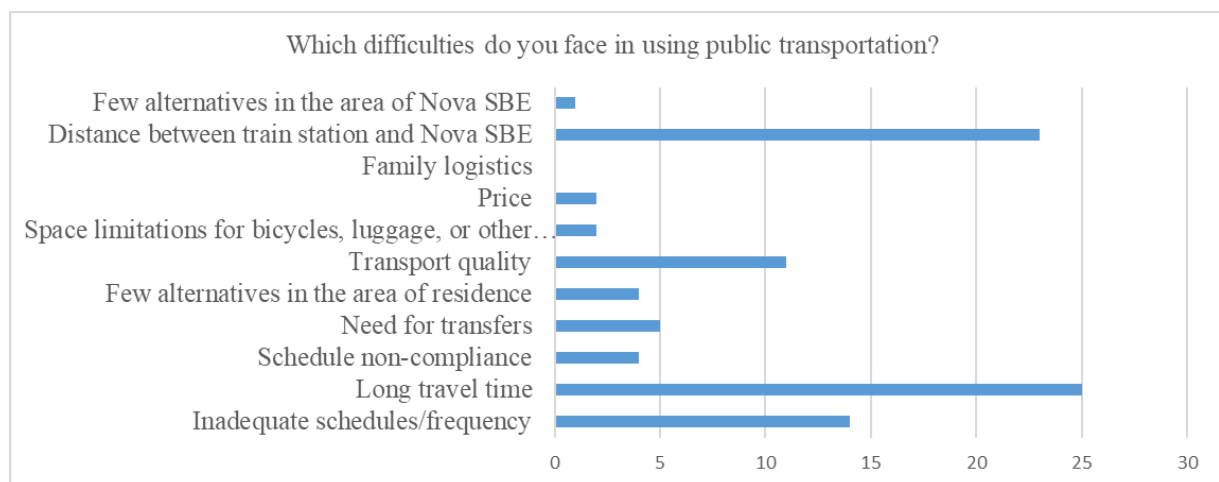
Question 3:



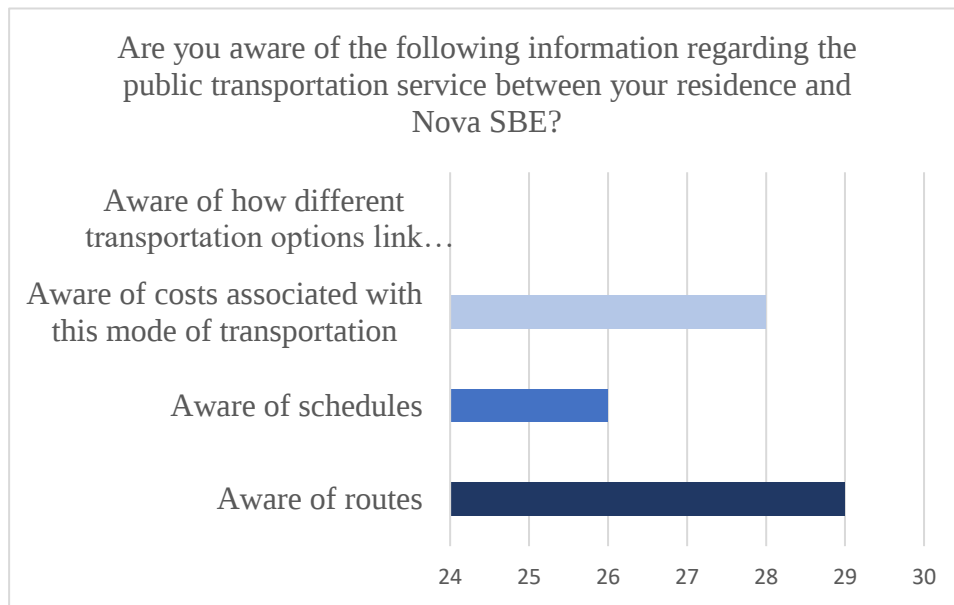
Question 4:



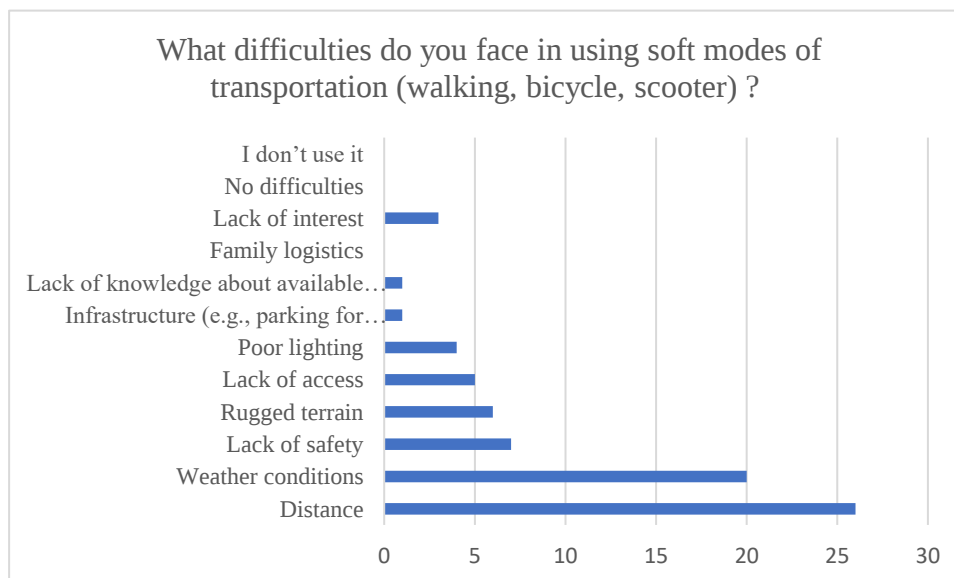
Question 5:



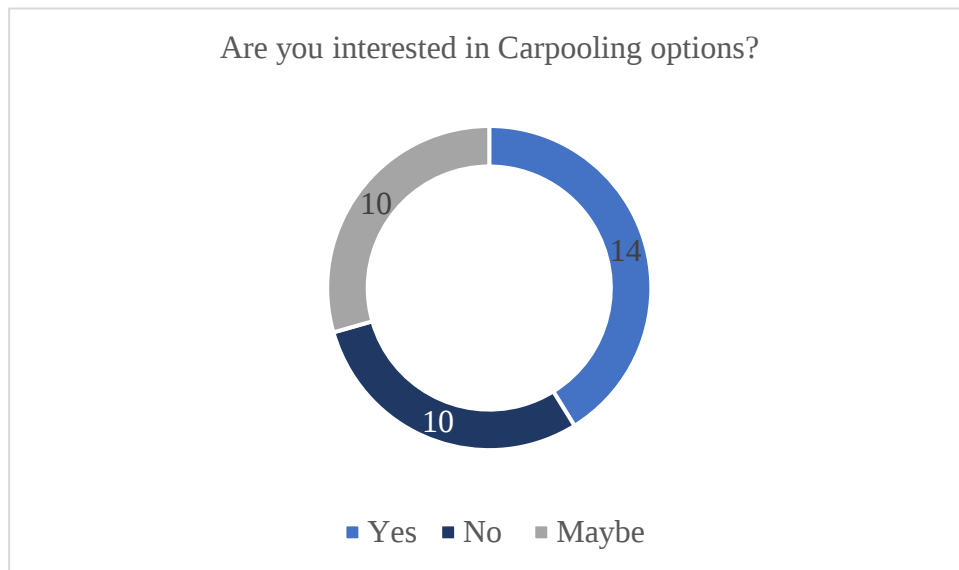
Question 6:



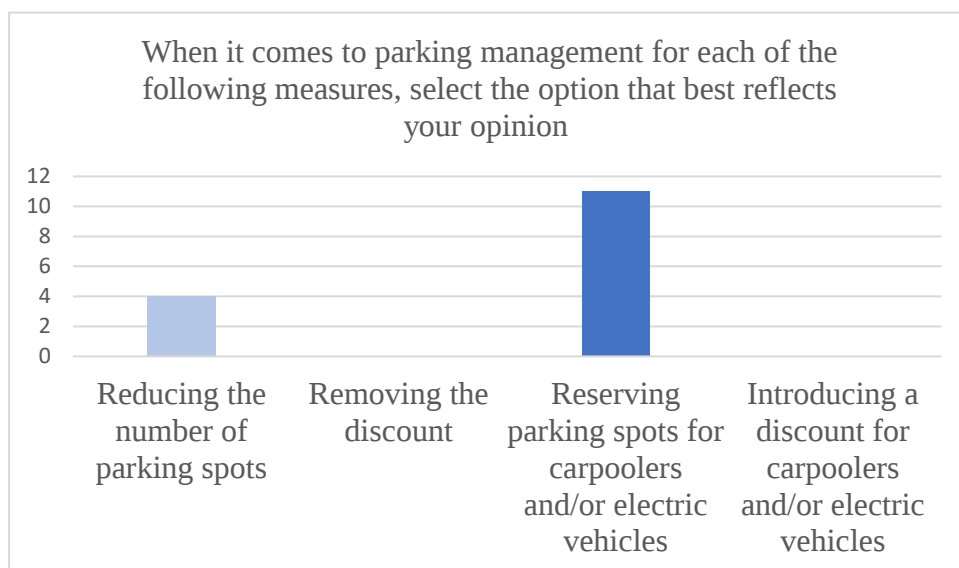
Question 7:



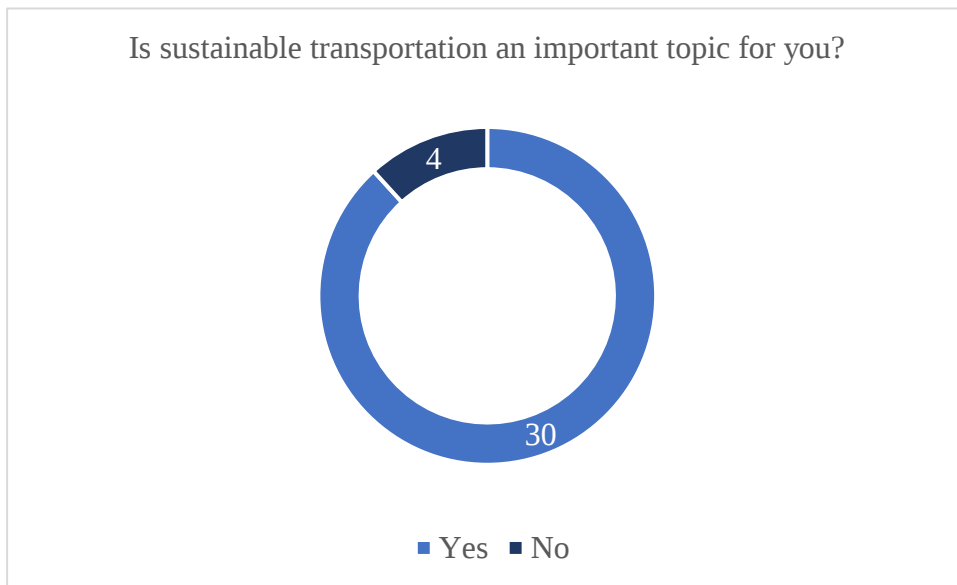
Question 8:



Question 9:



Question 10:



Question 11:

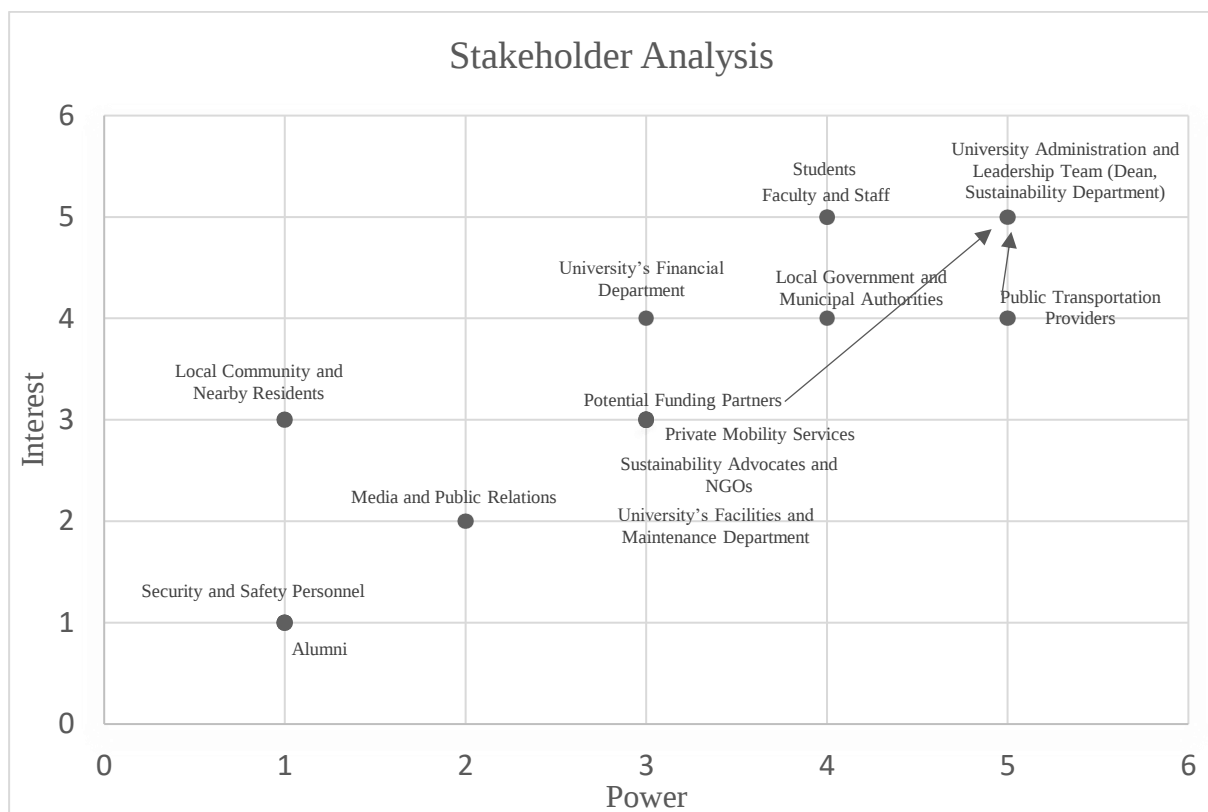
What would improve public transportation and campus accessibility for you? – you can be creative ;)

A bus from Cais to Nova directly	.	I think the most annoying part especially in rain is the muddy trail on the way to NOVA. It would help a lot of that was a proper walk way
Nova Shuttle	better interconnectedness in Lisbon city	Higher Train frequencies, reimplement fast train, access to easy transportation between campus and Oeiras station
a better network (carpooling, expansion of metro,...)	pick-up service at oeiras station for nova students	bike renting
Shuttle from trainstation or bike to rent / use	Continuous train or metro from Lisbon to campus	Less walking from train to uni
Direct Bus	Frequent and easy transportation between the train and Nova SBE, more car sharing opportunities	If there was a train station stop in front of Nova
Nova SBE busses either from Lisbon to campus or from oeiras	Having a bus / car that frequently drives between the train station and Nova SBE (no other stops & not only in the evening)	More regular options from Nova to the train station Oeiras

Creating a bicycle station on campus exit	Bring Back the fast Train	Bus
If Nova's shuttle would be coordinated with the trains. A little more out of the box idea could be a system of nova exclusive scooters that a student could use for 15-20 minute a day for free	Increase train frequency and bring back fast trains	Bus
A regular and frequent shuttle bus between nova and Oeiras train station. A faster train with less stops from Oeiras to Cais.	Shuttle	Bike lane
more spacious trains	Well-placed signs	-
Regular bus from Oeiras to Nova SBE. Bus from Cais do Sodre to campus.	Bus connection from the train station to the campus	
Faster way to go from Oeiras station to nova sbe.	Bus	

Source: Created with Microsoft Forms

Appendix 15: Stakeholder analysis



Source: Created by WP team

Description and Reasoning
Internal stakeholders, such as students, faculty and staff, and university administration, hold high interest, with the administration showing the greatest power due to their strategic role.
External stakeholders, including local government and public transportation providers, are also significant and high in interest, with transportation providers displaying a strong power in the initiative.
The external local community and nearby residents show moderate interest in the project as it may impact them through changes in traffic patterns, noise levels, or environmental factors. However, they hold low power in influencing decision-making.
External stakeholders like potential funding partners, private mobility services, sustainability advocates and NGOs, but also internal ones like the university's facilities and maintenance department display moderate levels of both interest and power. Their interest stems from the alignment of the project's goals with their objectives, such as sustainability, infrastructure improvements, or funding opportunities.
The media and public relations team, alumni, and security and safety personnel show minimal interest and power. Their involvement in the project is relatively low, as the project has limited direct relevance to their responsibilities or concerns.

Appendix 16: Competitor analysis

University	Location	Accessibility	Transportation Options	Source
Nova School of Business and Economics (Nova SBE)	Carcavelos, Portugal	Approximately 20 km from Lisbon city center. Accessible via the Cascais train line, with Carcavelos station about a 20 -minute walk from campus and Oeiras station 17 minutes walk.	Train: Regular services between Lisbon and Cascais, stopping at Carcavelos and Oeiras.	(Nova SBE 2024d) Master Thesis team experience as students of Nova SBE
			Bus: Local buses connect the campus to surrounding areas.	
			Bicycle: Dedicated bike lanes and parking facilities.	
			Carpooling: Initiatives to encourage shared rides among students and staff.	
University of St. Gallen	St. Gallen, Switzerland	Located near the city center, approximately 1.5 km from the main train station.	Bus: Local buses connect the train station to the campus.	(Universität St.Gallen 2021)
			Walking: The campus is within walking distance from central St. Gallen.	
			Bicycle: Bike-friendly infrastructure with parking facilities.	
			Creative ideas: Relaxation rooms, obstacle-free access routes, institute for mobility	(University of St.Gallen 2024)
HEC Paris	Jouy-en-Josas, France	Situated 20 km southwest of Paris. Accessible via train line, followed by a shuttle or bus to campus.	Train: RER B and REC C line connects to central Paris.	(HEC Paris 2024a)
			Shuttle: Campus shuttles operate between the station and campus.	
			Bus: Local bus services are available.	
			Carpooling: Platforms are available but not	

			from the university itself.	
			Bike: “ZOOV station at the entrance of the Campus – E-bikes in free use.”	
INSEAD	Fontainebleau, France	Approximately 65 km south of Paris. Accessible via train to Fontainebleau-Avon station, followed by a bus or taxi.	Train: Regular services from Paris	(INSEAD 2024)
			Taxi: “You can book a taxi in advance from the taxi list or catch one at the station.”	
			Bus: Local buses connect the station to campus.	
			Shuttle: INSEAD provides shuttle services during peak times operated by Cars Moreau bus	
			Other solution: On campus accomodation	
EDHEC Business School	Lille, France	“The campus is located 45 minutes away by public transportation from Lille city center.”	Metro: “Mairie de Croix (red line) It takes about 40 minutes to reach EDHEC campus from Lille City center.”	(EDHEC Business School 2024)
			Tram: “Villa Cavrois or Parc Barbieux (green line) And then 10 minutes walk to reach the campus.”	
EMLYON Business School	Écully, France	Approximately 7 km from Lyon city center.	Bus: Direct routes to campus.	(emlyon business school 2024)
			Bicycle: Bike paths and parking available. Self-service bike renting system in the city. The bicycle rental service (Velo’v) is free for the first 30 minutes,	

			which provides over 3000 bicycles, is available in over 300 stations located all around Lyon and Villeurbanne. Train: About ten minutes away from the TGV train stations of Perrache and Part-Dieu. “The agora is 15 minutes away from the city hyper-center, just as close from the life center of the Peninsula (Presqu’île), than from the business center of the Lyon Part-Dieu area. The city public transports (tramway T1 and T6, metro B, bus) canvas the Gerland district where the agora is nestled. Five minutes away, walking distance, the Jean Macé station distributes the East and West flows of people and the Raymond Barre bridge, crossing over the Rhône river and opening onto the Confluence area.”	
ESSEC Business School	Cergy-Pontoise, France	“Located just 35 minutes from the center of Paris and a few minutes from the Cergy-Préfecture RER station, ESSEC’s Paris	Train: “Transilien lines H or J, Cergy-Préfecture station RER A, destination: Cergy Le Haut – Cergy-Préfecture station” Bus: Bus lines: 95-19, 95-20, N150 Shuttle: ESSEC students can hop in	(ESSEC Business School 2024)

		Cergy Campus is a 'lace specifically designed for student life."	ESSEC shuttles in evenings for free to return to ESSEC residences or such nearby residences as well as the Cergy-Préfecture train station	
			Initiative: "ESSEC commits to reducing its carbon footprint for its students' travel by 25% by 2025"	(ESSEC Business School 2022)
Warwick Business School	Coventry, UK	Warwick Business School (WBS) is situated on the University of Warwick's main campus in Coventry, UK, approximately 5 kilometers southwest of Coventry city center and 40 km from Birmingham	Train: "The University of Warwick is located in the centre of England and is highly accessible by public transport. There are various rail stations that are easily accessed from the campus and they offer excellent links to Birmingham, London and many other major UK cities."	(The University of Warwick 2024)
			Local Busses: "Local buses offer a frequent and convenient way of travelling to and from campus. There are regular bus services to the University campus from Coventry City Centre and Coventry Rail Station."	

Source: Created by WP team

Appendix 17: Objectives & KPIs

Objective	Measure	Timeframe	Target	Assessment (Phase 5)
1. Objective: Enhance the accessibility and convenience of public transportation for students, staff and faculty to Nova SBE.				
KPI: Average travel time to campus for students and staff.	Decrease of travel time for stakeholders commuting from main population centers (Lisbon – Nova SBE)	medium-term	Reduce average travel time by 20% for main commuting routes.	Note: Only the objective of KDM satisfaction can be measured
KPI: Percentage of students and staff who report satisfaction with campus transportation options.	% change in survey	medium-term	Achieve 80% satisfaction rate in transportation surveys.	
KPI: Number of mass public transportation options available (bus routes, shuttles, bike-sharing stations, etc.).	Increase in number of options and frequency	medium-term	Increase the number of public transportation options by 30% within 2 years.	
2. Objective: Reduce the environmental impact of transportation of commuting to Nova SBE.				
KPI: Reduction in greenhouse gas emissions associated with commuting and business trips.	Tons of CO ₂ equivalent per year through survey or audit	long-term	Decrease CO ₂ emissions by 25% within 5 years.	
KPI: Percentage of campus population using eco-friendly transportation options.	% change through survey	medium-term	Achieve 50% usage of eco-friendly transportation options within 3 years.	
KPI: Number of charging stations for electric vehicles on or near campus.	Count number	short-term	Install at least 10 additional charging stations within 1 year.	
3. Objective: Increase the affordability of transportation options for students, staff and faculty.				

KPI: Average cost of transportation per student, staff and faculty member.	Estimate of reduction through decreased public transportation prices / Carpooling / bike rental options etc.	medium-term	Reduce transportation costs by 15% through subsidies or shared transport options.	
KPI: Percentage of students and staff who find campus transportation options affordable.	% change through survey	medium-term	Achieve 75% satisfaction rate in affordability surveys.	
KPI: Number of partnerships or subsidies established with local transit providers to reduce costs.	Analyse partnerships and depth	short-term	Establish 3 formal partnerships with transit providers within 1 year.	
4. Objective: Improve safety and reliability of transportation options to and from campus.				
KPI: Number of reported incidents related to transportation.	Decrease in number reported to Nova SBE	short-term	Reduce reported incidents by 50% within 6 months.	
KPI: Percentage of on-time arrivals / departures for public transportation serving the campus.	Satisfaction Survey / audit	short-term	Ensure 90% of transportation services are on time.	
KPI: Percentage of users who report feeling safe using campus transportation options.	% change through survey	short-term	Increase perceived safety by 25% based on survey feedback.	
5. Objective: Promote sustainable transportation practices and a sustainability mindset among the campus community.				
KPI: Percentage increase in public transit, biking, walking, and	% change through survey	short-term	Increase sustainable commuting practices by	

carpooling over single-occupancy vehicle use.			30% within 2 years.	
KPI: Enrollment rate in carpooling programs and other sustainable transport options.	% change in Hoop Carpool App / survey	short-term	Achieve 50% enrollment in carpooling programs within 1 year.	
KPI: Number of informational campaigns or workshops focused on sustainability and eco-friendly commuting.	Increase in number of events	short-term	Organize 5 workshops or campaigns annually.	
6. Objective: Enhance collaboration with local government and transit authorities for improved services.				
KPI: Number of formal agreements or partnerships with local transit providers or government bodies.	Amount / Analyse partnerships and depth	short-term	Establish 5 formal agreements within 1 year.	
KPI: Frequency of collaborative sessions with government and transit officials.	Increase in frequency	short-term	Conduct quarterly collaborative sessions with key stakeholders.	
KPI: Amount of funding or grants received from local or national government for transportation improvements.	Amount	medium-term	Secure at least €100,000 in funding within 3 years.	
7. Objective: Gain insights into students' pain points and needs regarding campus accessibility.				
KPI: Number of workshops, interviews, and surveys conducted with students on transportation needs.	Increase of number and participation	short-term	Conduct 10 workshops and surveys annually.	
KPI: Key pain points and needs identified	Perception of sustainability	short-term	Address 80% of key	

from student feedback.	departments insights gained		concerns identified through feedback within 1 year.	
8. Objective: Optimize parking situation and reduce congestion on campus.				
KPI: Decision on parking lot strategy taken	Decision taken / Satisfaction Survey	medium-term	Finalize and implement a parking strategy within 1 year.	
KPI: Reduction in congestion times on roads surrounding campus.	Satisfaction Survey	long-term	Decrease average congestion times by 20% within 3 years.	
9. Objective: Improve digital access to transportation information for ease of planning and usage.				
KPI: Usage rate of campus transit apps or tools.	% change	short-term	Achieve 60% usage of transportation apps within 1 year.	
KPI: User satisfaction rate with digital transit information platforms.	Satisfaction Survey	short-term	Increase user satisfaction to 85% within 1 year.	
10. KDM satisfaction				
KPI: KDM states that project added value	Scale from 1-5	short-term	Achieve a score of 4 or higher (out of 5) on value-added feedback.	5
KPI: KDM states that solution can be implemented	Scale from 1-5	short-term	Achieve a score of 4 or higher (out of 5) on implementation feasibility.	5 for Mobility Screen Cannot be assessed for the bus shuttle

KPI: Frequency of meeting	Did biweekly meetings took place	short-term	Conduct biweekly meetings consistently throughout the project duration.	Took place
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Source: Created by WP team

Appendix Phase 2:

Appendix 18: List of all ideas

Individual Car	Innovative Ideas
Carpool (Volvo electric cars)	Library in Lisbon
Car leasing rates negotiated by Nova	Fast boat
Car sharing between students	Individual Bus Stops
Carpooling	Flexible, demand-based transportation service
Car Sharing Map for staff and students / internal car sharing	Access for People with Reduced Mobility / Shuttles on Demand
Ride-Sharing Program	Increase Passenger Comfort and Safety
Car sharing Lisbon-Nova	Combined Integration / Passes
	Creating a public origin-destination placard (real-time demand)
Public Transport	On-demand shuttle
Electric busses from Cais do Sodre directly to Nova	Technology car tools
More flexible / optimized schedules	Remote learning options
Nova Shuttle to Oeiras with life shuttle tracker	Discount for electric bikes and scooter
Discount for public transport	Flying taxis
Increase the frequency of trains	Flexible work schedule
Direct buses from areas with higher populations of young people	Jetpacks
Campus-dedicated Shuttles (similar to the ones from Nova Campolide Campus to Nova FCSH)	Help to get subscription and NIF

Increase the capacity of buses available in the region.	Monthly card for Uber / Bolt
Longer trains	Autonomous vehicles
Faster trains	Job opportunities on campus
Higher train frequency	Napping rooms
More bus connections from station	Institute in the city centre for some classes
Free transportation card for students	Development of campus specific transport applications
More direct / fast buses	Receiving the transportation card at Nova
Train line that only stops in specific places	Nova boat departing from Cais do Sodre
Expanding coverage of bus routes	Mobility budget for staff
AC in summer	Higher parking prices
Sub 23 also accessible without NIF	Carbon budget (business trip)
	Emissions Trading
Infrastructure	
Connected metro system	
Improve Bike Lanes	Technical Solutions
Subway	Car sharing App Nova internally
Pedestrian Path / Widening of the Seafront Walkway	Connections displayed at screen
More facilities at the train station	Website Integration
Bigger stations	Mobile app for real-time transport tracking
Campus accessibility plans	Gamification App
Inclusive Design	Crowdsourced Accessibility Improvement Platform
More on campus accommodations	Develop an app that centralizes information on schedules, routes, connections, and fares for all local public transportation systems
Green path for people and bicycles connecting Lisbon to Nova	Smart apps
Build another campus	Digital mapping solution
Improvement of cycling facilities	On-demand public shuttle with an app
Subway from train station to Nova	Mobility options in a real-time tracking app
Extending routes	App similar to library booking system for carpooling and seats availability
Underground	Leverage data enrichment tools

Optimize transportation routes	Carpool app
Move to a new campus	
Create a student village	Incentives
Park and ride system	Incentive program
Flat horizontal moving walks like on airport	Bike to campus
New train station close to Oeiras	
	Parking
Micro-Mobility Solutions	Parking for free only available for electric cars
Launch e-bikes from Cais do Sodre	Possibility to charge cars for free
E-scooters	More electric charging stations
Bicycle leasing (like German Jobrad)	More parking spots on campus
Pedelec sharing	Free parking at Nova
Exclusive “Bike” System for Nova (CP-Nova)	Implement higher parking prices
Gira (bicycles in both train stations)	
Bike sharing	Collaboration
Golf carts from Station to Nova	Collaboration with other schools like Catolica or military base etc.
	Support local urban planning
Awareness & Communication	Uber Agreement to Connect the Train Station to Nova
Create a student survey	Connection with Other Nova Schools
Find out where staff and portuguese students mostly live	Identify incentives to encourage municipalities to contribute
Sustainable mobility events	Talk to the municipalities of Cascais and Oeiras
Campus accessibility audit	Create a transportation network with support from the municipality
Focus groups	Uber carpool
Campus Commuter Challenge	Meetings with Cascais municipality
Surveys for Nova SBE staff	“Uber transport program for Higher Education (USA)” (develop a pilot for Nova/ Portugal): https://www.uber.com/us/en/transit/higher-education/
Understand the different types of transportation available	Agreement with the Taxis of Carcavelos & Oeiras (see also app mytaxi)
Develop a plan for the most important schedules	Uber for business (& students)

Tracking system with rewards for using public transport	Shared travel system in collaboration with companies like Uber, Bolt, and other similar entities
Launch campaigns to create more awareness	Stronger partnership with Lisbon transportation system
Sustainability & public transport awareness	Uber / Bolt partnership discounts for students
	Strengthen cooperation between school and transportation companies
	Partner with EV companies
	Talk to municipal / public transport provider

Appendix 19: List of all filters

Must have filters

Number of People Covered by the Measure
Capacity
Can carry amount of people
Different origin locations
Customer segment consideration
Impact & effectiveness
Financial Feasibility
Financial feasibility
Price for students
Affordability for users
Investment Cost vs. CO2 Benefit
Sustainability
Environmental impact
CO ₂ savings potential
Ethical / environmental (due to its link with CO ₂ and sustainability)
Cost vs. Benefit
Costs
Workforce
Budget
Efficiency
Cost-effectiveness

Real market need
Number of people involved
Time efficiency (Is it faster?)
Not waste of manpower
Quick-Wins
Quick implementation opportunities
Easy-to-create partnerships
Could someone have a veto (since quick decisions or barriers can influence quick wins)
Impact on students, stakeholders, and the community
Impact on students and staff
Stakeholder inclusion
Support from municipalities (e.g., Cascais, Lisbon, Sintra)
Community acceptance
Internal support
Students' opinion
Impact on neighbourhood
Sustainable solution
Alignment with SDGs
Longevity
Weather resilience
Low environmental impact
Not causing heavy traffic
Implementation / Construction Time
Time to implement
Administrative burden
Bureaucracy
Design complexity
Easy to raise funding
Planning
Maintenance
Maintenance costs
Durability
Long-term upkeep needs
Resources needed for maintenance

Long term success and improvement

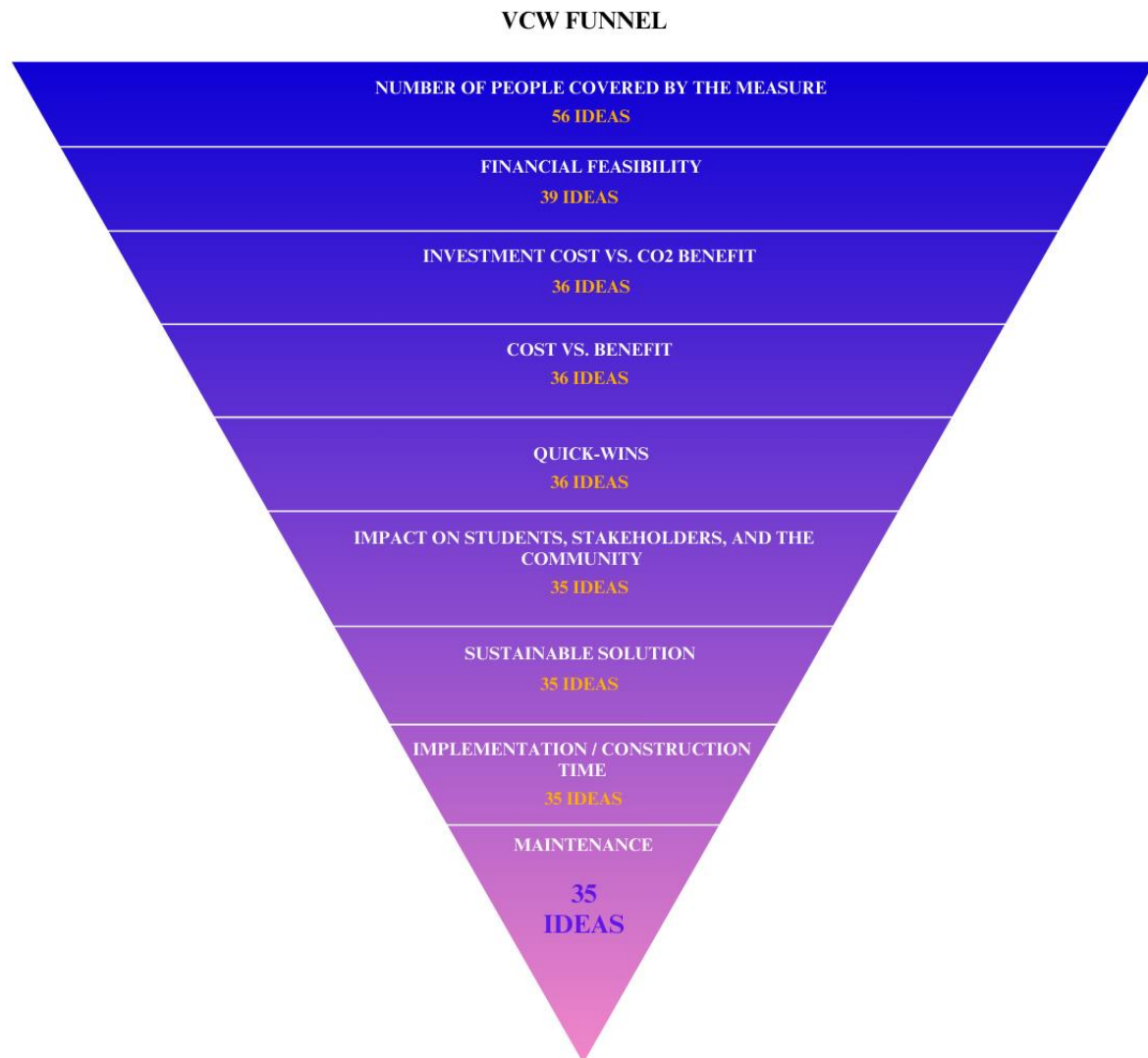
Nice to have filters

Technical feasibility
Technical requirements
Smart technology
Feasibility of technology implementation
Timeline until implementation
Project duration (How long will it last)
Feasibility
Strategic timing
Resources needed
Human resources
Infrastructure and land requirements
Availability of resources
Collaboration needs
Administrative resources
Infrastructure needed
Impact on parking
User experience (Safety, Comfort)
Safety
Comfort
User convenience
Reliability
User experience
Pedestrian-friendly design
Ease of use
Accessibility
Distance
Noise
Decreases travel time
Travel time reduction
Shortest route

Faster journey time
Replicability (Adaptability, Flexibility)
Scalability
Adherence
Cultural acceptance
Flexibility
Ability to pilot
Short term vs. Long term fix
Increases Nova's image
Image
Marketing visibility
Attractiveness
Usable for staff, teachers, and students
Motivation (if connected to employee or student satisfaction)
Inclusivity and Coverage
Inclusivity
Accessibility for all
No language barriers
Inclusivity in design
Legal feasibility
Regulatory feasibility
Authorizations required
Legal and compliance checks
Approachable governance model

Appendix Phase 4:

Appendix 20: VCF



Source: Value Creation Funnel, own illustration by WP team with canvas.com

Appendix 21: MCDA

Nice-to-have filters from rank 1-10	Technical feasibility	Time-line until implementation	Resources needed	User experience (Safety, Comfort)	Decreases Travel Time	Repliability (Adaptability, Flexibility)	Increases Nova's image	Inclusivity and Coverage	Legal feasibility	Rating*	Comments
Ideas											
Carpooling	1	1	0	1	0	1	1	0	1	6	
Car Sharing Map for staff and students / internal car sharing	1	1	1	1	0	1	1	1	1	8	
Nova Shuttle to Oeiras with life shuttle tracker	1	1	1	1	1	1	1	1	1	9	
Campus-dedicated Shuttles (similar to the ones from Nova Campolide Campus to Nova FCSH)	1	1	1	1	1	1	1	1	1	9	
Campus Commuter Challenge	1	1	1	0	0	1	1	1	1	7	
Mobility budget for staff	1	1	1	0	0	1	1	0	1	6	Request of KDM
Higher parking prices	1	1	1	0	0	1	0	0	1	5	
Carbon budget (business trip)	1	1	1	0	0	1	1	0	1	6	Request of KDM
Emissions Trading	1	1	1	0	0	1	1	0	1	6	Request of KDM
Connections displayed at screen	1	1	1	1	1	1	1	1	1	9	

“Uber transport program for Higher Education (USA)” (develop a pilot for Nova/ Portugal): https://www.uber.com/us/en/transit/higher-education/	1	1	1	1	1	1	1	1	1	9	
More on campus accomodations	0	0	0	1	1	1	1	0	1	5	
Library in Lisbon	1	0	0	1	1	1	1	0	1	6	
Sustainability & public transport awareness	1	1	1	1	0	1	1	1	1	8	
More flexible / optimized schedules	1	1	0	1	1	1	1	1	1	8	Included in solution & plan for “Talk to the municipalities of Cascais and Oeiras & Campus dedicated Shuttle”
Green path for people and bikecycles connecting Lisbon to Nova	1	0	0	1	0	1	1	1	1	6	
Exclusive “Bike” System for Nova (CP-Nova)	1	1	0	1	0	1	1	0	1	6	

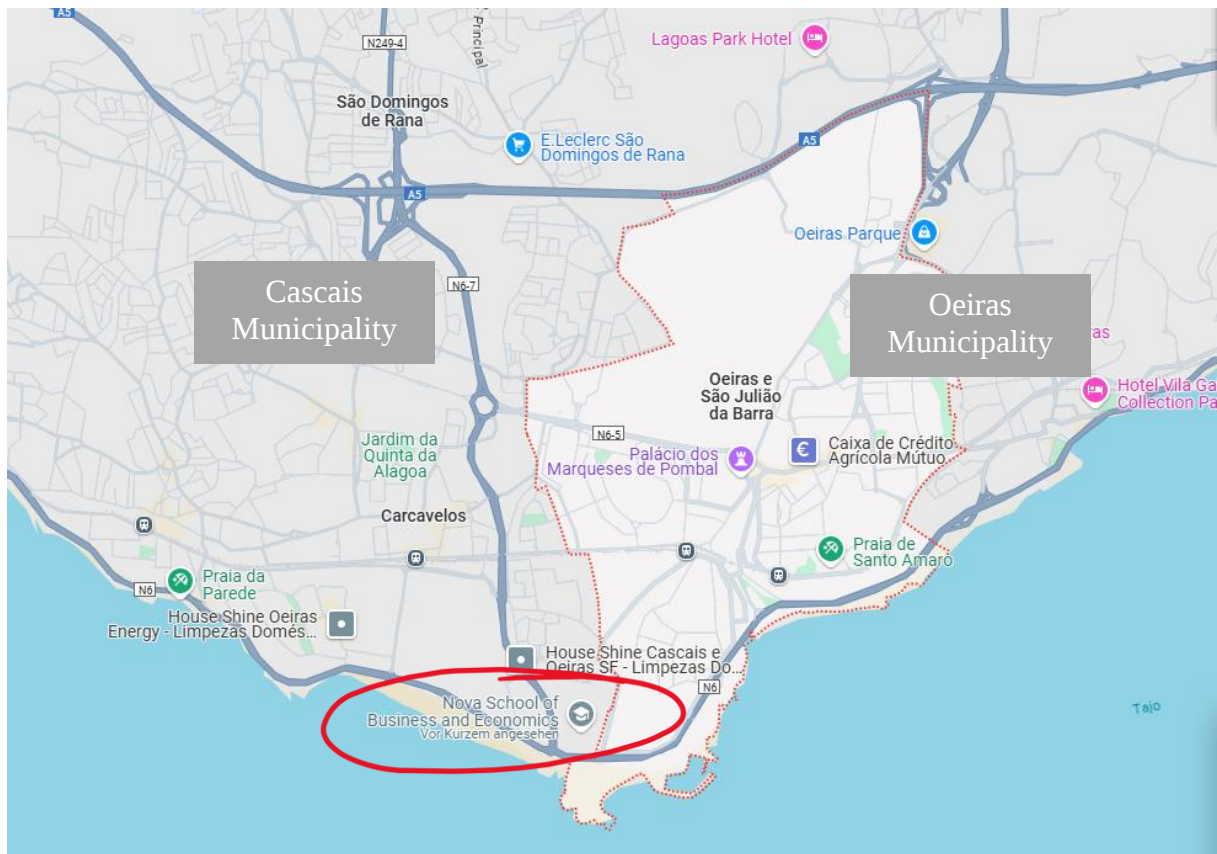
Individual Bus Stopps	0	0	0	1	1	1	1	1	1	6	
Uber Agreement to Connect the Train Station to Nova	1	1	1	1	1	1	0	0	1	7	Included in Uber Transit solution
Talk to the municipalities of Cascais and Oeiras	1	1	1	1	0	1	1	1	1	8	
Increase the frequency of trains	0	1	0	1	0	0	0	1	1	4	
Increase the capacity of buses available in the region.	1	1	1	1	1	1	1	1	1	9	Included in solution “Campus dedicated Shuttle”
Longer trains	0	0	0	1	0	1	0	1	1	4	
Faster trains	0	0	0	1	1	0	0	1	0	3	
Higher train frequency	0	1	0	1	1	1	0	1	1	6	
Campus accessibility plans	1	1	1	0	0	1	0	0	1	5	
Sustainable mobility events	1	1	1	1	0	1	1	1	1	8	
Flexible, demand-based transportation service	0	0	0	1	1	1	1	1	1	6	
Receiving the transportation card at Nova	0	0	0	1	0	0	1	1	1	4	
Discount for electric bikes and scooter	1	1	0	1	0	1	1	1	1	7	Displayed on Mobility Screen

Mobile app for real-time transport tracking	1	1	1	1	0	1	1	1	1	8	Included in Mobility Screen solution
Gamification App	1	1	0	0	0	1	1	1	1	6	
Uber for business (& students)	1	1	1	1	1	1	0	0	1	7	Included in Uber Transit solution
Stronger partnership with Lisbon transportation system	1	1	1	1	0	1	1	1	1	8	Merged with solution “Talk to municipalities”
Parking situation	1	1	1	1	0	1	0	0	1	6	

* (all solution with a score >6 were analysed in depth with KDM / for reasoning see comment column)

Source: Created by WP team

Appendix 22: Location Nova SBE



Source: Google Maps, created by WP team

Appendix 23: Prototype Mobility Screen



Source: Created by WP team with uizard.io

Appendix 24: Current Shuttle Bus Status

Bus Nr.	Provider	Stop	Route	Frequency
M16	Carris Metropolitana	Campus	Carcavelos train station	No information
1601, 1604, 1612, 1613, 1614, 1615, and 1622	Carris Metropolitana	Avenida de Portugal	Oeiras or Carcavelos train station	Every 10 minutes
1605, 1606	Carris Metropolitana	Bus stop in front of the main entrance of the campus	Oeiras or Carcavelos train station	Every 10 minutes

Source: NovaSBE Webpage: Getting started, Google Maps, Created by WP team

Appendix 25: Planned Shuttle Bus Shuttle Status

Bus Nr.	Provider	Stop	Route	Frequency
In additionally to current options				
N01	Nova SBE or Public Transport Provider	Nova SBE Campus	Oeiras train station and / or Carcavleos train station	Every 20 minutes
N02	Nova SBE or Public Transport Provider	Nova SBE Campus	Lisbon	Every 20 minutes
N03	Nova SBE or Public Transport Provider	Nova SBE Campus	Sintra and / or Cascais	Every 20 minutes
Uber Transit	Uber Transit or other private mobility provider	Nova SBE Campus on demand	Flexible	On demand

Source: Created by WP team

Appendix 26: Pain points and value proposition

Pain Point	Prototype Feature	Value Proposition
Preference for commuting by car	Screen with public transportation and car sharing options	Increases awareness of public transport and carsharing options
	Improved bus connection	Improved connection makes commuting with public transportation more attractive
Limited connectivity with public transport	Increased connectivity through new bus line	Reduces travel time and increases the convenience of using public transport
	Improved bus service to increase accessibility	Encourages a shift from private cars to more sustainable options

Lack of sustainable alternatives	Visibility of car sharing and bike renting services on screen	Promotes multimodal transport solutions
Cost and time disadvantages of public transport	Bus schedules aligned with train timings	Minimizes waiting time, making public transport a time-competitive alternative to cars, especially due to traffic in Lisbon
	Collaboration with public transport operators for discounts and adjustment to students and staff needs	Reduces the (cost) barrier, making public transport more appealing also financially
Limited awareness of existing (sustainable) transport programs	Centralized screen displaying all transport options and schedules	Empowers users with real-time information to choose sustainable transport options
	Active promotion of sustainable alternatives via campaigns	Improves engagement and encourages behaviour change toward sustainable choices
Challenges with carpooling programs	More visibility on screen, more participants	Facilitates connection between potential carpoolers, increasing participation
	Incentives for carpooling highlighted on the screen	Encourages adoption by showcasing benefits like cost savings and priority parking etc.

Source: Created by WP team

Appendix Phase 5:

Appendix 27: Business model canvas for the Mobility Screen

Key Partners	Cost Structure	Customer Relationship
- Nova SBE stakeholders: decision-makers (e.g. the Dean) but also users (e.g. students), the responsible person for the maintenance - Transport providers (Carris, CP, bike /	- Data: For free through partnerships with Google Maps, Carris, CP - Hardware: Screens (available, purchase or partnership)	- Informative and automated service - Incentive-driven engagement (e.g., promoting car-sharing) - Feedback through surveys and interviews

scooter sharing companies) • Software / hardware providers • Internal developer or freelancers or Hackathon participants for software development	• Software: Internal resources or external providers • Human Resources: Internal resource, freelancer, Hackathon cost • Marketing: Incentives for carpooling and sustainability campaigns	
Key Activities • Data integration and real-time updates • Development and installation of screen including its software • Partnerships with data providers • Awareness campaigns and incentives promotion	Value Proposition • Real-time transportation updates • Increased awareness of available transportation options • Convenience in planning trips • Promotion of eco-friendly transport alternatives • (Carbon footprint tracking for sustainable choices)	Channels • Digital screen at Nova SBE entrance • Promotion on Nova SBE webpage • QR codes linking to apps • Word-of-mouth • Institutional partnerships
Key Resources • Data providers: (Google Maps), Carris, CP • Hardware: Digital screens • Software: Display management system • Human resources: Internal developer, freelancer, or Hackathon participants, internal maintenance	Revenue Streams • Decreasing the CO2 emissions helps to improve the schools ranking and image • Partnerships with transport providers can lead to cost savings • Advertising revenue from apps and services displayed on the screen	Customer Segments • Nova SBE students, staff and faculty • Visitors • Commuters near Nova SBE or on transportation route • (Eco-conscious individuals)

Appendix 28: Business model canvas for the Shuttle Bus

Key Partners • Public Transportation Providers • Municipalities • Privat Mobility providers • Nova SBE decision-makers	Cost Structure • Depends on solution • Nova SBE: High investments for busses, staff etc. • Uber: tbd. • Public transport: maybe no costs, only negotiation strategy for partnership and collaboration needed	Customer Relationship • Regular surveys • Incentives for using car sharing app • Regular evaluations and pilot testing to ensure alignment with user needs
Key Activities • Make decision on route and provider • Negotiations • Implementation, continuous improvement • Awareness campaigns	Value Proposition • Convenient, reliable transportation to Nova SBE • Reduced travel time through optimized routes • Increased awareness and accessibility of public transport options • Eco-friendly, carbon-neutral commuting solutions • Flexibility through partnerships with private providers like Uber Transit • Better integration with existing train and bus schedules	Channels • Communication through Nova SBE website • Visibility of shuttle on new screen • Collaborations create visibility • Displaying live connections
Key Resources • Survey results, Spider Map analysis, and feedback from KDM • Partnerships	Revenue Streams • Decreasing the CO2 emissions helps to improve the schools ranking and image	Customer Segments • Nova SBE students, staff and faculty • Visitors to Nova SBE campus

• Nova SBE as operator: Busses, staff, project manager	• Increase in satisfaction of stakeholders • Co-funding opportunities with public transportation providers or private operators like Uber	• Eco-conscious commuters from nearby areas (Carcavelos, Oeiras, Lisbon, Sintra) • Municipalities (Cascais, Oeiras) as stakeholders
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