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DEVELOPING A BALANCED SCORECARD FOR CASCAIS SMART CITY: THE PROCESSES PERSPECTIVE WITH A FOCUS ON SOCIETY & EDUCATION AND ECONOMY & INNOVATION

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Abstract

The concept of Smart City has become known globally, as cities realized that advanced technology would foster citizens' quality of life, by being able to provide data exchange between public infrastructures.

Cascais has followed the trend, by creating a specified division within Cascais Municipal Council (CMC) in 2015. As a result, the topics of managing data and innovative systems became relevant to the local council, to achieve its ultimate goal of improving quality of life for both citizens and visitors.

Over the years, CMC felt the need to monitor its strategy success by using specific measures. This Work Project appears as supportive research to help CMC understand if it is on the right path to continuously evolve as a Smart City.

This thesis will explore a perspective of the Balanced Scorecard created specifically for the Cascais Smart City: The Processes perspective, with a focus on the areas of Society and Education, and Economy and Innovation. This perspective will serve as an intermediary between other perspectives to achieve a better quality of life for Cascais citizens.

Keywords: Management, Strategy, Balanced Scorecard, Public Sector, Strategy Map, Smart City, Cascais

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Contents

A. Introduction

The rapid urbanization has leveraged the challenges faced by cities, from overcrowded spaces and infrastructure to environmental degradation (Macomber 2013, 4), creating an urgent and inevitable need for cities to manage those challenges in a smarter way (Alawadhi et al. 2012, 40). Competition among cities has emerged, forcing the development of the existent infrastructure to be more attractive for people and industries, supporting economic competitiveness, guaranteeing social cohesion, environmental sustainability and quality of life.

Meanwhile, Information and Communication Technology (ICT) has played a key role in addressing urban challenges. The internet and the digitization of city information have made life more convenient for citizens while providing a foundation for cities to evolve and address urbanization problems. As cities grow and ICT advances, the concept of "Smart Cities" has emerged as a way to manage these challenges (Yin et al. 2015).

Although there is no universally accepted definition of Smart Cities, several common elements can be found across various descriptions. For Moura and Silva (2019), typically these factors include leveraging technology to enhance the quality of life and emphasizing the key role of ICT in addressing urban challenges.

The CMC is committed to this vision. Under the motto “A better place to live for a day or a lifetime,” the local council aims to offer high-quality services that promote health, mobility, sustainability, and leisure. Cascais encourages citizens to stay, grow, and meet their needs locally. By working together with residents, businesses, organizations, and universities, CMC builds a culture of innovation and cooperation to improve the community.

Over the years, CMC has implemented many Smart City projects aligned with its strategy for Cascais 2030, which is designed to meet the United Nations’ 17 Sustainable Development Goals. This agenda focuses on ensuring environmental transition and sustainable development

while addressing residents' needs (Câmara Municipal de Cascais n.d.a). However, a crucial question arises: how can the council measure its ongoing progress as a Smart City and ensure it is moving in the right direction to promote a better quality of life?

To address this challenge, this Work Project proposes a performance monitoring model for CMC, adapted from the Balanced Scorecard (BSC), a strategic management tool introduced by Kaplan and Norton in 1992. Traditionally used by businesses to achieve strategic goals, the BSC measures performance in alignment with its strategic objectives through four perspectives: Financial, Customer, Internal Processes, and Learning and Growth, with financial goals being the primary focus (Kaplan 2009).

For this Work Project, the BSC has been adapted to reflect the local council's strategy and initiatives, focusing on their influence in developing a Smart City and improving quality of life. Unlike businesses, public entities such as CMC operate with different priorities, requiring metrics that account for social and environmental dynamics. This adaptation was developed through extensive research, meetings with the local council, and careful consideration of CMC's goals.

The following sections will outline the key concepts of Smart Cities and the BSC, as well as the methodology used to adapt this management tool for Cascais. This will be followed by an overview of the CMC, including its organizational structure, strategic approach, areas of intervention, and a SWOT analysis. We will present the four perspectives of the adapted BSC, the proposed measures, and the initiatives for the local council to adopt to achieve its strategic objectives. Finally, the challenges faced during this process will be discussed and recommendations for the CMC will be provided.

B. Literature Review

1) Smart City

1.1) Smart City Conception

Being hubs of human activity, cities are where economic, environmental, and social issues intensify, leading to significant challenges that affect social, economic, and demographic aspects of life.

In response to these challenges, the concept of the Smart City has emerged. It can be stated that the concept had its origins in the 90s with the rise of ICT (Albino, Berardi, and Dangelico 2015, 4). The California Institute for Smart Communities was concerned with modernizing city infrastructures and turning them smart. It was recognized the importance of technology in improving the efficiency of operations, and, consequently, the quality of life of citizens (Harrison et al. 2010, 1). The diffusion of Smart City concept in the early 2000's was considered an "urban labelling" phenomenon (Albino, Berardi, and Dangelico 2015, 4).

Harrison et al. (2010, 2) defended that instrumented, interconnected and intelligent were the foundational principles of Smart Cities concept. Instrumented due to quick capture of real-world data from both physical and virtual sensors. Interconnected since it is possible to integrate that data in a computing platform and communicate it among the various city services. It is intelligent in a sense that involves complex analytics, modeling, optimization, and visualization that allows to improve operational decision-making.

The term "Smart City" gained significant attention in 2008, particularly after IBM launched its Smarter Planet initiative. Since then, the idea of Smart Cities has continued to grow and change (Yin et al. 2015, 2). However, there is no single, widely accepted definition of what a Smart City is. Many Smart City projects have emerged from local efforts to solve specific problems, which makes it hard to create a general definition (Moura and Silva 2019, 4).

However, according to Yin et al. (2015, 6), there are also common elements between several definitions. These include the presence of technical infrastructure, which refers to the integration of a city's physical, ICT, social, and business infrastructures. Another common aspect is domain application, which involves six key characteristics used to define and evaluate Smart Cities: economy, people, governance, mobility, environment, and living. System integration is also commonly present, since *"the technical infrastructure and field application of a smart city can be considered as a set of interconnected and integrated systems and subsystems"* (Yin et al. 2015, 6). Finally, data processing is considered an essential key, as the exchange of data forms the foundation for monitoring and controlling the operational framework needed for the efficient management of city networks.

Therefore, while the use of technology is recognized as essential in addressing the challenges of urbanization, there is no single definition of what makes a Smart City, although key elements consistently emerge. This may be because a Smart City encompasses several dimensions, making it a complex and multifaceted concept.

1.2) European Smart City Model

In an attempt to clarify the concept of a Smart City, the European Smart City Model was introduced by Rudolf Giffinger, together with his European Smart Cities research group at the Centre of Regional Science of Vienna University of Technology, and with the cooperation of TU Delft, Netherlands, and the University of Ljubljana, in 2007.

The model considered medium-sized European cities and their advantages, disadvantages, differences, and similarities to implement a ranking approach. In that sense, indicators were chosen to compare the diverse cities and evaluate their smartness degree. For cities to achieve a strong position in the ranking, they need to focus on identifying the strengths that give competitive advantage in key resources, compared to cities in the same level.

Giffinger et al. (2007) highlighted that different cities cannot be compared in general terms since each one has its specificities in different areas, which led to the necessity of analysing each city in different dimensions, to further be able to compare them accurately. Based on this, the team considered six specific dimensions: Smart Governance, Smart Economy, Smart Environment, Smart Living, Smart Mobility, and Smart People (Giffinger et al. 2007). These dimensions were chosen by the authors based on the main aspects they believe a city needs to comply with and are crucial to be considered a Smart City.

Smart Governance focuses on political participation and transparency (Smart City Institute 2021). The Smart City acts with transparency regarding the context and process around the delivery of public services (Giffinger et al. 2007). Smart Cities benefit from successful governance when integrating public, private, and civil groups in decision-making, fostering effective collaboration (Silva et al. 2018 cited in Sharif and Pokharel 2022, 4).

Smart Economy, according to Giffinger et al. (2007), lies in competitiveness and incorporating the (inter-)national market. The Smart City Institute (2021) mentions that it is common that cities transform and innovate their business models to respond to current trends and necessities.

Smart Environment is about sustainable management and the attractiveness of natural resources (Giffinger et al. 2007). The goal is to foster an efficient usage of the existing natural resources, by implementing sustainable practices and projects to raise citizens awareness.

Smart Mobility works on local and international accessibility to move better and differently, by improving the connectivity between different types of transport, making it more efficient with the usage of innovative technology. The city invests in ICT-infrastructures, which includes information and communication systems, and in a sustainable, innovative and safe transportation system (Smart City Institute 2021; Giffinger et al. 2007). Appio, Lima, and Paroutis (2019), cited in Sharif and Pokharel (2022, 4), identified the common issue in cities being traffic problems, concerning efficiency and the citizens safety. An important tool to

mitigate the problem is Internet of Things (IoT), as it is commonly used to collect real-time data of roads.

Smart People, the citizens which a Smart City depends on, are looking for socially sustainable living (Sharif and Pokharel 2022, 2). This dimension is at the center of becoming a Smart City and can be divided into human and social capital. Human capital refers to the abilities of individuals, and social capital refers to the number and quality of relations amongst social organizations (Sharif and Pokharel 2022, 5). Elaborating on this thought, it focuses on higher education and quality of social interactions (Giffinger et al. 2007). Therefore, it needs to continuously educate the citizens and give them equal opportunities, to foster a more inclusive society (Smart City Institute 2021). According to Giffinger et al. (2007), a Smart City wants its citizens to be open-minded to the new trends and innovations. Moreover, the city needs to encourage the citizens to participate in public life by taking advantage of the public services available and by eventually creating or supporting initiatives, which will foster a more united front towards an improved Smart City.

Smart Living relates to the quality of life. The goal of Smart Cities is to improve the quality of life for citizens by using innovative technology to facilitate their life, in matters of health, housing, culture, education, social cohesion, and individual safety (Giffinger et al. 2007).

All these dimensions together lead a city to sustained growth, by focusing on the critical aspects of a city. That is the reason why we can say that these dimensions are complementary (Smart City Institute 2021). This means that a city can only be smart and move towards a higher degree of smartness if the city is implementing initiatives to improve in those six dimensions simultaneously.

Across the different dimensions, it is valuable to measure whether the implemented initiatives are achieving the desired results. For this purpose, diverse studies were made to provide examples on how the Smart City's initiatives are being successful.

1.3) Measuring a Smart City

There are several indicators to measure the developments to become a Smart City. The Smart City INDEX (IMD Business School 2024a) is a ranking that shows which cities are closer to truly becoming a Smart City. In 2024, the Top 3 cities in the ranking are Zurich, Oslo and Canberra, which have made several efforts in this area (IMD Business School 2024b). This study is made by IMD (International Institute for Management Development) and is focused in 5 specific areas, namely economy, technology, quality of life, environment and inclusion. The evaluation of each city is made under two main pillars: structures, which consider the availability of structures in the city; and technology, which focus on technology resources and services available for the citizens. Inside these two pillars, the evaluation is divided into five different dimensions: health and safety; mobility; activities; opportunities; and governance (IMD Business School 2024c). In each of these dimensions, the ranking considers distinct measures, which are voted by the citizens in specific surveys (IMD Business School 2024c). These measures for each dimension in each pillar can be observed in Appendix 1.

In another study, conducted by Bosch et al. (2017), measures were defined for four different dimensions of a Smart City: people, planet, prosperity and governance. For each of these dimensions, the authors focus on some areas, in which they stipulated several measures, that are described in Appendix 1.

In another research conducted by Bîrgovan et al. (2022, 9), the authors defined ten measures for each of the three dimensions of a Smart City, more specifically, the areas of a Circular City:

economic, environmental and social. Some examples of measures for each dimension can be observed in Appendix 1.

To measure how smart a city is, there are several measures to help the local councils to perform this analysis. Various cities are already using these measures to assess if their initiatives and projects are being well implemented. As cities start to turn their strategy to become a Smart City, they are faced with development challenges, common to many diverse cities.

1.4) Challenges in Smart City Development

In a broader sense, a Smart City challenge can be associated with obstacles impeding the successful implementation of a Smart City strategy and related projects (Correia, Teixeira, and Marques 2022, 180).

The different challenges hindering Smart Cities development can be organized into two different categories: technical domain issues and non-technical domain issues (Pierce and Andersson 2017, 2808).

1.4.1) Technical Domain

The technical domain comprises issues in implementing and using technology, as Smart Cities use advanced technologies to improve citizens' quality of life (Gracias et al. 2023, 1719). These technical challenges relate to interoperability, security, privacy (Pierce and Andersson 2017, 2809), lack of IT infrastructure (Correia, Teixeira, and Marques 2022, 182; Razmjoo et al. 2021, 6) and lack of skilled and trained personnel (Correia, Teixeira, and Marques 2022, 182; Mutambik 2024, 4; Rana et al. 2018, 506).

1.4.1.1.Interoperability

For a Smart City to become a reality, Tolcha et al. (2018, 1) explains that the services integrated in a Smart City need to cooperate to manage resources efficiently and to create new

combinations of city services. This demands a high degree of interoperability - the capability of different systems and services to exchange information (Pierce and Andersson 2017, 2806). As Nam and Pardo (2011, 187) note, it is the integration of all systems that makes a city truly smart. However, Smart City technologies are usually developed by a multiplicity of vendors and organizations leading to fragmentation, and compatibility issues (Gracias et al. 2023, 1734).

1.4.1.2.Security and Privacy

Smart Cities architecture is built based on the IoT, generating vast amounts of data. The collection, transmission, storing, and processing of this data may lead to the discovery of citizens' behavioral patterns and personal information posing a significant risk to their privacy and security (Rizi and Seno 2022, 1). Additionally, Sookhak et al. (2018, 1727) draw attention to the possibility of cybersecurity attacks on Smart Cities that can easily give attackers access to sensitive information.

1.4.1.3.Lack of IT Infrastructure and Skilled and Trained Personnel

Joshi et al. (2016, 906) explains that there is a scarcity of professionals who have the technical knowledge and practical skills essential to work with advanced technologies and training them can pose a major challenge. Similarly, Scuotto, Ferraris, and Bresciani (2016, 362) note that governments often lack the technological expertise needed for Smart City development. This skill gap can result in inadequately managed IT infrastructure, fundamental to a Smart City's development.

1.4.2) Non-Technical Domain

Pierce and Andersson (2017, 2808) underline non-technical challenges for Smart Cities. Various studies found in the literature categorize the numerous challenges into categories: Governance & Legal, Financial and Social (Correia, Teixeira, and Marques 2022, 182; De Azambuja 2021

425; Mutambik 2024, 4; Rana et al. 2018, 506; Razmjoo et al. 2021, 6). These categories help policymakers and stakeholders address these challenges more effectively.

1.4.2.1. Governance & Legal

The main issues identified in the literature determine as key barriers related to Governance & Legal the lack of cooperation and coordination, unclear Smart City vision and strategy, organizational capabilities and agility, and poor private-public participation (Alshamaila, Papagiannidis, and Alsawalqah 2024, 4; Correia, Teixeira, and Marques 2022, 182; José and Rodrigues 2024, 147; Mutambik 2024, 4; Pierce and Anderson 2017, 2809; Rana et al. 2018, 506).

Lack of Cooperation and Coordination is one of the most discussed challenges. Pierce and Andersson (2017, 2807) link this to the lack of cooperation between municipal departments and the absence of a structured platform to debate relevant Smart City projects, resulting in misaligned efforts performed independently by different departments. The concept of Smart City relies on the capacity of connecting the various sectors of society, which makes intersectoral cooperation crucial (Paskaleva 2011 cited in Pierce and Andersson 2017, 2807).

An unclear Smart City vision and strategy can substantially affect the implementation of Smart City projects (Alshamaila, Papagiannidis, and Alsawalqah 2024, 5). Therefore, initiating a project with only a variety of potential initiatives is impeditive to reach long-term objectives (Sánchez-Corcuera et al. 2019 cited in José and Rodrigues 2024, 146). As Letaifa (2015, 1417) explains, the struggle of defining a proper strategy and vision can be explained by the yet to be defined consensual definition of what a Smart City is and the many distinctive ways it can be perceived.

Challenges related to organizational capabilities and agility present significant barriers for the development of Smart Cities. Cities pursuing a Smart City path require significant adaptation

of their governance processes (José and Rodrigues 2024, 147). Most city governments do not have the means to properly explore technology solutions due to inflexible management structures and restricted resources (Mora, Deakin, and Reid 2018 cited in José and Rodrigues 2024, 147). Outdated and complex procurement processes for technology acquisition can hinder this process (Coletta, Heaphy, and Kitchin 2018 cited in José and Rodrigues 2024, 147). Additionally, internal bureaucracy and external oversight also slow decision-making, which can undermine collaboration with private companies and the city's capacity to foster entrepreneurial initiatives within its territory (Ferraris, Santoro and Pellicelli 2020 cited in José and Rodrigues 2024, 147; Jonek-Kowalska and Wolniak 2021 cited in José and Rodrigues 2024, 147), which also exemplifies the last challenge of poor private-public participation.

1.4.2.2 Financial

The Financial category of challenges comprise limited funding, and large up front investment costs (Abdalla et al. 2019, 13; Correia, Teixeira, and Marques 2022, 182; Gracias et al. 2023, 1735; José and Rodrigues 2024, 148; Pierce and Anderson 2017, 2808; Rana et al. 2018, 506).

Smart City initiatives are often costly, while city budgets are usually limited (Gracias et al. 2023, 1735). Additionally, securing funding can be challenging for cities (Gracias et al. 2023, 1735) due to the risk of turning fixed capital to local experimental infrastructure projects and the difficulty of monetizing Smart City investments, as benefits often take time to materialize (Manville et al. 2014 cited in Pierce and Anderson 2017, 2807). Overall, since local governments often lack the financial capacities to undertake the investments associated with digital transformation, private funding plays an important role in Smart City initiatives (José and Rodrigues 2024, 148).

1.4.2.3 Social

Social challenges often refer to *lack of involvement of citizens, low awareness level of the community* and *resistance to change.* (Alshamaila, Papagiannidis, and Alsawalqah 2024, 4; Correia, Teixeira, and Marques 2022, 182; Gracias et al. 2023, 1735; José and Rodrigues 2024. 154; Rana et al. 2018, 506).

The success of Smart City initiatives is often linked to citizen participation (José and Rodrigues 2024, 154) with multiple techniques being considered for citizens engagement, namely user tests, citizen consultations and online citizen platforms (Borghys et al. 2020 cited in José and Rodrigues 2024, 154). However, local governments often face some challenges in involving citizens in this process, struggling with the complexity, time, and resources required for meaningful participation (Nguyen, Marques, and Benneworth 2022 cited in José and Rodrigues 2024, 157). Furthermore, citizens may hesitate to utilize new technologies (Gracias et al. 2023, 1735) due to the lack of confidence in the business operators, including company and government officials (Shimizu et al. 2022, 1). This emphasises the importance of actively involving citizens and raising awareness about the benefits and functionalities of Smart City initiatives (Mutambik 2024, 4).

Even with a variety of existing challenges in the development of a Smart City, several Smart Cities` projects are under development in several cities around the world, so it is crucial to measure its performance, which could be done with the support of a management tool.

2) Balanced Scorecard

2.1) Mission, Vision, Values, and Strategy

Companies, directly or indirectly, are governed by mission, vision, values and strategy. However, the key difference for successful companies is the ability to clearly define those elements to foster growth, innovation and sustainability. Each element is a statement which constitutes part of a hierarchy of statements that sets an organizational direction (Collis and

Rukstad 2008, 3), helping organizations align their efforts, communicate their goals, and ensure consistency in decision-making.

McKeown (2012, 2) considers vision, mission and values as more general concepts, while the strategy, although inspirational, is more concrete. Firms in the same business often have the same mission, they may also have similar values and vision (Collis and Rukstad 2008, 3).

Collis and Rukstad (2008, 3) defined the first layer as the mission which is the least specific statement. However, it is the guiding light for formulating and implementing an organization's strategy (Baetz and Bart 1996, 526). The mission statement sets the underlying motivation for the existence of a company and three questions can be asked (Kenny 2020, 3): *"who are the customers? What range of services does the company wish to provide them? What is the level of service?"* By defining a mission, the company should be able to clarify in which business the company is, and the business the company is not in (Kenny 2020, 4).

The values of a company describe the desired culture of that company. They express its core beliefs and serve as guiding principles for its actions and behavior (Collis and Rukstad 2008, 3).

The vision is oriented towards future aspirations and goals (Kenny 2014, 2) and it should encompass a perspective that extends beyond day-to-day activity.

It can be said that the culmination of these statements results in the strategy statement. However, few executives are able to outline their company's strategy, and these companies are typically the most successful in their industry (Collis and Rukstad 2008, 1).

The strategy is a unique statement that defines the competitive advantage of the company. A commonly used concept is the sweet spot (Appendix 2) which combines firm's capabilities and customers' needs in a way that competitors cannot reach out, given the context in which they

operate. As a result, developing such a strategy requires a complete evaluation of the industry landscape (Collis and Rukstad 2008, 8).

According to Collis and Rukstad (2008, 2), a strategy statement comprises three key elements - objective, scope, and advantage - that help clarify and guide both the formulation and implementation of a strategy.

Since the strategy ensures a competitive advantage for the company, it clarifies and simplifies the process of attaining its ultimate goal. Consequently, the starting point is to outline this objective and establish the timeline for its achievement. It should be a specific, measurable and time bound single goal (Collis and Rukstad 2008, 4). When leaders are asked about the strategic objective, possibly the most frequently given answer is to maximize shareholder value. Hence, a second question emerges: what is the objective that is most likely to maximize shareholder value over the next few years?

Once the objective has been defined, it is necessary to clarify the scope of the business, that is, the boundaries within which the company will operate in order to reach the objective. More specifically, it enables managers to clearly distinguish the activities they should focus on and those they should avoid due to three dimensions: customer or offering, geographic location, and vertical integration.

At this point, the company knows what it is going to work towards (objective) and the limits of its operations (scope). However, the key step is to identify an approach that differentiates it from its rivals (advantage). Company's competitive advantage is the essence of its strategy (Collis and Rukstad, 2008, 5).

This advantage is built upon both an internal component and an external one. Externally, the company must focus on the customer value proposition which translates the value to be delivered to consumers and the reasons why they should consume its product instead of the

existing alternatives. To ensure differentiation internally, the company must work on a combination of activities that allows them to interact and reinforced one another to prevent best practices from being diffused (Porter 1996, 10).

All these statements' definitions imply trade-offs that allow the company to establish itself in a unique and valuable position (Porter 1996, 9).

Implementing the strategy requires all the company's resources to be aligned, in particular human resources. This means that an effective communication of the strategy is a critical factor in order to align behaviors. This communication would be smoother if employees were directly involved in the strategy-setting process.

2.1.1) Why do companies fail to have a strategy?

To facilitate the definition of the strategy concept, some of the factors that make companies unsuccessful in defining and implementing a strategy have already been mentioned. It is undoubted that the greatest threats to strategy come from within the company.

Porter (1996, 2) pointed out that one of the main problems of companies is confusing strategy with operational effectiveness which can yield positive results, such as improvements in productivity or quality. Nevertheless, it does not assure sustainable profitability.

In addition, since strategy is associated with competitive advantage, it is essential to carry out a complete and careful analysis of the industry, in particularly analyzing its competitors, however, this tends not to occur.

Porter (1996, 16) also highlights the leaders' desire to grow as a barrier. They are attracted to the biggest industries with the thought that these industries are the most profitable. But its competitors are also thinking along these lines, so the industry will expand, become more

competitive and it will become increasingly challenging to secure a competitive advantage (Magretta 2011), instead, a homogeneity emerges among the players (Porter 1996, 4).

Magretta (2011) studied the fusion between marketing and strategy. Marketing describes the value proposition of the company, for that reason, it is therefore a useful starting point for strategy. But strategy requires a distinctive value proposition through a distinctive value chain which establishes a range of activities that best deliver that value. Subsequently, strategy is then confused with "what we are good at", leading to an inward looking and overestimate their strengths (Magretta 2011).

Ultimately, assuming that strategy communication is the very last detail of strategy definition, it is frequently the biggest threat (Beer 2020, 5). A top-down approach or the ineffectiveness of the top team communicating through a unique and effective voice can be prejudicial.

The complexity of companies implementing a strategy has been widely discussed among academics, mainly because companies are highly competitive with regard to financial metrics. Kaplan and Norton (1992) concluded that focusing only on financial indicators to reach strategic objectives can be misleading.

2.2) Balanced Scorecard Conception

As a tool to support companies to learn how to implement their strategy, the BSC was introduced by Kaplan and Norton, in 1992. The model emerged from firms' necessity to evaluate their performance against strategic goals, using both financial and non-financial measures, and to get an in-depth understanding of their business model (Lueg 2015, 35). In general, the BSC helps organizations put strategy into action and ultimately "*motivate employees to make strategy their everyday job*" (Kaplan 2009, 26).

The already existing traditional performance measurement systems have a financial bias (Karpagam and Suganthi 2012, 8), focusing on metrics such as return on investment, return on

sales, price variances, productivity, among others (Ghalayini and Noble 1996, 64). As financial indicators have become obsolete (Lueg 2015, 35), the BSC was created to complement those traditional measures by incorporating intangible assets that contribute to overall value creation (Kaplan and Norton 2007).

The purpose was to create a management system where the short-term financial measures of past events (lagging indicators) "*complement operational measures which are the drivers of future financial performances (leading indicators)*" (Lueg 2015, 35), to achieve long-term goals (Kaplan 2009, 18; Karpagam and Suganthi 2012, 7).

The next 15 years after the BSC creation, many realized that a forward-looking focus, rather than backwards, is more accurate to evaluate the implementation of a firm's strategy. Therefore, the model was extended and eventually used as "*a management tool for describing, communicating and implementing strategy*" (Kaplan 2009, 2).

2.2.1) Balanced Scorecard Structure

The BSC's structure consists of four perspectives: Financial, Customer, Internal Processes, and Learning and Growth. The model has the financial measures as the ultimate purpose for the firm's success, supported by the other three perspectives as outcome measures, which shows how the long-term strategy delivers the target results (Kaplan 2009, 14).

However, Kaplan and Norton suggest that to construct a BSC, before focusing on monitoring the four perspectives, it is crucial to define the strategy first (Kaplan 2009, 14). Accordingly, the process of building the model goes through clarifying the strategic objectives, which are aligned with the vision, mission, and strategy of the firm (Kaplan and Norton 2007; Quezada et al. 2009, 493).

As shown in Appendix 3, for each perspective, the company needs to identify strategic objectives, performance measures for each objective, what is the target that the company wants or must achieve, and finally, the initiatives that will lead to those objectives.

According to Kaplan (2009, 19), for the selection of metrics, companies must first be able to describe what they want to achieve with their strategies, to further provide a robust structure of the four perspectives. Each objective must then be expressed as quantifiable performance indicators (Lueg 2015, 35).

For each measure, a target must be set so the employees *"know how much of each measure has to be achieved in a given time frame"* (Lueg 2015, 35). The milestones are the managers' beliefs about how their initiatives will help reach the desired tangible value for each measure (Kaplan and Norton 2007). Those targets will mark the organization's progress along the strategic objectives defined.

Once the targets are defined, managers launch action programs with strategic initiatives, which will drive them toward the set targets for all measures (Kaplan and Norton 2007; Lueg 2015, 35). Bukh and Malmi (2005, 95) highlighted that those actions need to have a high impact on financials and to be realistic concerning the organization's context. Kaplan and Norton (2004, 45) argue that *"the execution of strategy is managed through the execution of initiatives"*. Additionally, the authors stated that one initiative might affect more than one objective, but all initiatives combined are needed for the strategy to be successful.

2.2.2) Strategy Map

Often, the BSC was seen as irrelevant since, in practice, it lacked strategic causality (Nørreklit et al. 2012 cited in Lueg 2015, 38). In that sense, the strategy map was introduced as an extension of the model. It turned out to be a helpful tool for organizations to focus on their strategies in a *"comprehensive yet concise and systematic way"* (Kaplan and Norton 2000 cited

in Buytendijk, Hatch, and Micheli 2010, 336). In addition, this modification made it easier for top managers to make strategic judgments and to reflect their visions to middle managers and employees (Lueg 2015, 35). This way, employees know how their jobs contribute to the overall strategic objectives (Lawson, Hatch and Desroches 2007 cited in Buytendijk, Hatch, and Micheli 2010, 336).

Strategy maps offer an illustration of how strategic goals are achieved and how it will create value (Kaplan and Norton 2004, 41-42), by showing the hierarchical interdependencies between the four perspectives (Karpagam and Suganthi 2012, 12), while the BSC only measures the performance outcomes. It was developed to provide *"the missing link between strategy formulation and strategy execution"* (Kaplan and Norton 2004 cited in Buytendijk, Hatch, and Micheli 2010, 336).

In this sense, the development of a strategy map based on a BSC is crucial for assessing managers, units or projects (Lueg 2015, 38), as it monitors organization performance against strategic goals and the set parameters. In addition, strategy maps can be incorporated in the compensation system, as it facilitates links between the BSC initiatives and results (Lueg 2015, 36-37). However, concerns may appear on whether the data collected is valid and reliable, and how the targets of measures were achieved (Kaplan and Norton 2007).

In literature, cause-and-effect relationships are the characteristics that make the BSC different from other scorecards (Bukh and Malmi 2005, 88). The cause-and-effect relationships between the four perspectives start from the bottom, with the Learning and Growth Perspective, which is based on intangible assets that are seen as the basis of the organization's strategy (Kaplan and Norton 2004, 42). Those assets support the Internal Processes Perspective, which in turn creates a value proposition for customers. The Customer Perspective works on creating a loyal

relationship with the targeted customers. If those customers are satisfied and generate sales, then the outcomes from the Financial Perspective can be achieved.

The improvement of an operational measure, with high probability, will drive performance improvement on financial measures, leading to the desired target (Bukh and Malmi 2005, 93). Therefore, aligning objectives in these four perspectives will ultimately lead to value creation. This causality only happens if the firm can capitalize on the improvements of its operations or if the strategy is well defined and implemented. If improved performance is not reflected financially, then the executive should reexamine their strategy as "*not all long-term strategies are profitable strategies*" (Kaplan and Norton 1992).

2.2.3) Cascading the BSC

Strategy maps can highlight incongruencies between the corporate BSC and that of the business units, since each one has a different set of internal drivers (Lueg 2015, 36; Kaplan and Norton 2001 cited in Bukh and Malmi 2005, 100). Most top managers have a financial bias when choosing measures, making them common to all units within the organization (Lueg 2015, 37). Therefore, once the corporate BSC has been prepared, Kaplan and Norton suggest cascading the model over the diverse units of the organization, to break down the strategy into unit-specific measures, to align unit and individual goals with the strategy (Lueg 2015, 36). Designing a strategy map with clearly defined casual relationships leads to a better understanding of the strategy when cascading down to the units of the organization (Saghaei and Ghasemi 2009, 1032).

As Bukh and Malmi (2005, 101) stated, this is a top-down approach but also needs to be a collaborative approach. The process of developing a corporate BSC should have the cooperation of middle managers from all the business units within the organization, to ensure commitment and buy-in from all units (Lueg 2015, 38; Buytendijk, Hatch, and Micheli 2010,

336). The collective view creates a sense of ownership and enhances more acceptance from employees than an imposed BSC (Lueg 2015, 36), making them more committed towards the strategy. Buytendijk, Hatch, and Micheli (2010, 336) argued that strategy maps help to visualize how the different business units contributed to the organization's overall performance, by quantifying the achievement of targets (Lueg 2015, 38).

Excluding managers from the process might lead them to have resistance on using the BSC, as they do not see any benefit for the specific business unit that can be taken from it (Buytendijk, Hatch, and Micheli 2010, 337).

The center of all these analyses described is the four perspectives on which the BSC was based. In that sense, organizations must understand how their strategy fits inside each of the perspectives to be able to categorize their strategic objectives, measures, targets and initiatives, as a way of visually being aware of the path one must take to achieve the corporation strategy.

2.3) The Four Perspectives of the Balanced Scorecard

The BSC is divided into four perspectives, traditionally defined by Kaplan and Norton (1992, 72): the Financial Perspective, the Customer Perspective, the Internal Process Perspective, and the Learning and Growth Perspective. These perspectives reflect the most crucial aspects that allow organizations to effectively execute their business strategies (Devine, Kloppenborg, and O'clock 2010, 38), representing the views of four essential stakeholders in any firm (Swalqa, Holloway and Alam 2011, 198).

Kaplan and Norton (1996a, 34) explain that these four perspectives can be viewed only as a template, and that in some cases they may not be necessary or sufficient. As Speckbacher, Bischof, and Pfeiffer (2003, 370) determined, companies may use only two or three perspectives or employ additional perspectives depending on their strategic needs.

2.3.1 Financial Perspective

The Financial Perspective aims to answer the question: "*to succeed financially, how should we appear to our shareholders?"* (Malgwi and Dahiru 2014, 2). Kaplan and Norton acknowledged the value of traditional financial data, emphasizing that accurate financial information is essential for strategic decision making (Al-Najjar and Kalaf 2012, 45). Usually, this perspective occupies the topmost part of the BSC (Al-Hosaini and Sofian 2015, 28).

This perspective highlights both short-term and long-term financial goals to maximize return on investment, relying on traditional financial measures to provide evidence if the company's strategy is resulting in increased profitability and lower costs (Rašić-Jelavić and Pajdaković-Vulić 2021, 39). Revenue growth, cost reduction and asset utilization are the three key financial themes that drive business strategy (Kaplan and Norton 1992 cited in Malgwi and Dahiru 2014, 2). Additionally, common financial measures include business growth (revenue growth, asset growth or income from new products and services); business profitability (profit margin, return on investment, return on assets); and value creation for owners (economic value added, market value added, dividends or stock prices) (Belak 2002 cited in Rašić-Jelavić and Pajdaković-Vulić 2021, 39).

2.3.2 Customer Perspective

A satisfied customer base leads to higher revenues, ultimately improving financial performance (Pandey 2005 cited in Zahoor and Sahaf 2017, 186). This perspective answers the question: "*to achieve the organization's vision, how should we appear to customers?"* (Malgwi and Dahiru 2014, 3).

Through market segmentation, companies are able to determine target segments (Rašić-Jelavić and Pajdaković-Vulić 2021, 40). Once this is done, Kaplan and Norton (1996b, 58 and 61) suggest two set of measures: generic measures, such as customer retention, market share, customer satisfaction, customer acquisition, and customer profitability; and performance

drivers like lead times, product quality, product attributes, company's image and customers relationship. Then, companies must identify what customers value and how they differentiate themselves from competitors (performance drivers) to attract and satisfy customers (generic measures) (Kaplan and Norton 2001, 93). Therefore, if a company successfully achieves its customer objectives, it is likely that the targeted revenue will be generated (Malgwi and Dahiru 2014, 3).

2.3.3 Internal Process Perspective

As Kaplan and Norton (1992, 74) state "*customer-based measures are important, but they must be translated into measures of what the organization must do internally to meet its customers' expectations*". Therefore, managers should be able to find measures that answer the question: "*to satisfy the customers and shareholders, what business processes must we excel at?"* (Malgwi and Dahiru, 4).

This perspective focuses on identifying the most critical internal processes essential for producing and delivering valuable products/services to customers (Rašić-Jelavić and Pajdaković-Vulić 2021, 40). In this sense, Kaplan and Norton (1996b, 63) identify three key internal processes critical to a company's success: innovation process, which focuses on searching customers' needs and developing new products and services to fulfill them; operational process, focusing on activities from the production to the delivery of the finished product (procurement, production, and distribution); and post-sales services processes, emphasizing the organization's responsiveness to customer needs after selling the product or service. Common measures include time to market, production cycle time, delivery cycle time, equipment effectiveness, number of defective products, debugging time, asset utilization, inventory turnover and unit costs (Belak 2002 cited in Rašić-Jelavić and Pajdaković-Vulić 2021, 40).

2.3.4 Learning and Growth Perspective

As Malgwi and Dahiru (2014, 4) refer, processes can only be effectively implemented by skilled and motivated employees who are guided by strong leadership and equipped with accurate and timely information. Thus, this perspective seeks to answer the following question: "t*o achieve the company's vision, how will we sustain our ability to change and improve?"* (Malgwi and Dahiru, 5).

As Rašić-Jelavić and Pajdaković-Vulić (2021, 40) explain, this perspective emphasizes intangible drivers of performance including human, information and organizational capital. The central elements of this perspective are the continuous learning, growth and employee's development, so that it can be ensured that they are equipped with the necessary knowledge to achieve the company's vision and long-term strategies (Rašić-Jelavić and Pajdaković-Vulić 2021, 40).

Kaplan and Norton (1996b, 64) refer three elements for this perspective: employee capabilities, to ensure they are able to provide services that give the company a competitive advantage; information systems, which involves measuring how up to date the organizations' IT infrastructures are and its ability to provide information promptly and efficiently to employees (Malgwi and Dahiru 2014, 5); and motivation, empowerment and alignment. Kaplan and Norton (2001, cited in Rašić-Jelavić and Pajdaković-Vulić 2021) identified three main areas where the measurement is possible: employee retention; employee satisfaction; and employee productivity.

2.4) Balanced Scorecard Dynamics and Implementation Issues

According to Kaplan (2009, 30), the success or failure of its implementation is largely dependent on the leadership within an organization. Empirical research has further explored the actual impact of the BSC on organizational performance. Some studies suggest that the BSC

does not always deliver immediate financial benefits (Neely 2008, 22), which indicates that while the BSC can influence internal processes, these changes may not always translate into financial improvements, especially in the short-term.

In contrast, research on shareholder returns offers a more positive view. Crabtree and DeBusk (2008, 12) examined firms over a three-year period and found that companies using the BSC outperformed those not using it by over 27% in key financial measures, like market value of equity and net assets. These findings highlight the BSC's potential to drive long-term financial success, though the study also noted limitations, acknowledging that other variables could have contributed to this performance, making it difficult to attribute the improvements solely to BSC adoption.

Moreover, Liu, Ratnatunga, and Yao (2014, 1) emphasized the importance of firm characteristics in determining the success of BSC implementation, indicating that the effectiveness of the BSC may vary depending on the specific context in which it is applied, particularly in relation to firm size, strategy, and external factors.

As described by Madsen and Stenheim (2014, 122), management concepts are ideational, resulting in different interpretations or even adaptations depending on the context of the organization. In this way, it is a dynamic process with internal and external influences. This is where the problem arises. Many managers seem to struggle with adapting and implementing a concept that is considered vague and theoretical (Madsen and Stenheim 2014, 124).

The cause-effect relationship required between the different perspectives is one of the main factors hindering its implementation (Madsen and Stenheim 2014, 124). Capelo, Lopes, and Mata (2015, 18) noted through the analysis of some studies that measures and initiatives often do not follow this cause-and-effect relationship.

Norreklit (2000, 82) goes even further by stating that instead of a cause-and-effect relationship, there is a logical relationship, since the BSC does not encompass the time dimension and consequently measures cause and effect at the same time.

In addition, Othman (2007) cited in Buytendijk, Hatch and Micheli (2010, 337), argues that strategy maps may fall short in reflecting the strategy in an extensive period of time, as it is a static representation of strategy that is equivalent to assuming that the organizations and strategies will remain the same. In fact, organizations must take into consideration changes in industry that may lead to changing the strategy in the future. In this sense, Buytendijk, Hatch and Micheli (2010, 337) suggest that organizations need to combine methods with the BSC that create possible unexpected events, such as scenario analysis, to prepare the organization for what might happen in the future.

Moreover, critics arise to cause-and-effect relationships as they are a one-way and linear approach, from the Financial Perspective to the Learning and Growth Perspective, not being able to transform into a two-way approach in the opposite direction (Buytendijk, Hatch, and Micheli 2010, 337).

The BSC also affects organizations on a social scale. The commitment of both the top level and the whole company is a fundamental issue in the adoption of the BSC. As in implementing the strategy, monitoring it requires alignment between all the organization's resources. Madsen and Stenheim (2014, 122) explained that lack of time and resources is frequently the main reason for the BSC's failure to be implemented, especially because the top level does not consider the implementation of the BSC a priority. A concept champion, which is a person responsible for the BSC as a project, can be an essential element in ensuring the alignment, commitment and continuity of this management tool within a company (Madsen and Stenheim 2014, 126).

Therefore, the BSC has the potential to drive long-term performance but faces challenges in implementation due to its complexity and reliance on leadership alignment. Success varies based on organizational context and characteristics, highlighting the need for tailored approaches.

2.5) Implementation of the Balanced Scorecard in the Public Sector

Growing demands for greater transparency and accountability in the management of public funds have propelled public sector organizations to use performance management practices typically utilized in the private sector, being potential ways of improving and demonstrating their performance and accountability (Northcott and Taulapapa 2012, 167). As Sharma and Gadenne (2011, 168) note, taxpayers and other stakeholders' increased interest in municipal programs motivated the adoption of performance measurements in the public sector.

Although originally developed for the private sector, the BSC can also be applied in the public sector to measure performance requiring, however, some modifications in its structure (Schobel and Drogosiewicz 2018, 3).

The ultimate goal of the private sector is financial, therefore there is logical hierarchy in the BSC perspective where the Financial Perspective occupies the topmost position, reflecting its primary importance as all the other perspectives are drivers to achieve strong financial performance (Wisniewski and Ólafsson 2004, 605). However, in the public sector, financial measures can be only considered as having an enabling role (Schobel and Drogosiewicz 2018, 3). Here, the focus is on meeting the needs of public organizations' constituents (Kaplan 1999, 3). Therefore, the hierarchy encountered in for-profit organizations is not suitable for a public sector organization (Wisniewski and Ólafsson 2004, 605). In this sense, the BSC may be adapted by "*rearrang[ing] the scorecard to place customers or constituents at the top of the hierarchy"* (Kaplan and Norton 2001, 98), where the Customer Perspective is therefore placed

at the highest position in the BSC (Wisniewski and Ólafsson 2004, 605). Additionally, Wisniewski and Ólafsson (2004, 605) place the Financial Perspective at the bottom of the BSC, seeing the financial measures only as enablers.

Moreover, the BSC holds significant potential in "*supporting public sector organizations in bridging the gap between ambiguous missions and strategy statements and day-to-day operational actions; in establishing a process to ensure strategic focus, avoiding a generalist approach; in shifting their attention from programs and initiatives to the outcomes; in avoiding the illusion that having a diverse range of programs and initiatives equals to have a strategy; and in aligning initiatives, departments, and individuals in ways that reinforce each other enabling performance improvements"* (Aydin 2019, 180).

Concerning the factors that contribute to successfully implementing the BSC in municipalities, Wisniewski and Ólafsson (2004, 607) refer that strategy mapping is an essential step. Northcott and Taulapapa (2012, 180) have also identified two other factors: modifying the BSC to suit the organization's needs, and appropriate learning, both while using the BSC and prior to its implementation. The authors noted in their study that modifications had been made to the local government's BSCs to reflect the general nature of local government services and aims, which may help secure a successful implementation.

2.5.1 Challenges of the Balanced Scorecard in the context of Municipalities

As it was already mentioned, when implementing the BSC in the public sector, there is an additional complexity of private sector bias, as it was designed for organizations within that sector (Bolton 2003 cited in Greatbanks and Tapp 2007, 848; Wisniewski and Olafsson 2004, 604). In that way, changes have to be made to the model to accurately be able to show how to achieve the strategic goals, as the sectoral and organizational context needs to be considered (Greatbanks and Tapp 2007, 848).

The main issue lies on the transferability of frameworks between the sectors. Difficulties regarding the implementation of the BSC might appear, as public organizations must go through a reconfiguration process on the model's structure and terminology, so it can be a valuable tool to guide them through their strategy and goals, as it was previously mentioned (Griffiths 2003; Kaplan 2001; Niven 2006: cited in Northcott and Taulapapa 2012, 177).

As a consequence of the reconfiguration mentioned above, KPIs are an aspect that needs attention. The choice of a workable set of KPIs is made more difficult since the organization needs to identify KPIs customer-related and not financial (Northcott and Taulapapa 2012, 177). According to Wisniewski and Olafsson (2004, 606), measuring quality of life or social inclusion, which are intangibles relevant for public organizations, is more difficult and time-consuming, as it is a long-term process until reaching the actual value.

Moreover, a study carried by Madsen et al. (2019, 24-25) showed that in different countries, municipalities had troubles implementing the cause-and-effect relationship on their BSC, using only the model for performance measurement purposes and rarely developing strategy maps. The main reason lies in the limited knowledge of the more advanced parts of the BSC process in the development of causality. The respondents of this study revealed that municipalities do not have a reasonable reflection on how the perspectives and correspondent measures relate, choosing to use the BSC only as a measurement and reporting tool (Madsen et al. 2019).

Most importantly, a public organization must base its performance measurement tool in the BSC with its linking causality and reformulate it, to be able to reflect its ultimate objective: creating public value.

2.6) Creating Public Value

2.6.1. Public Value Management

Public Value Management (PVM) emerged as a significant framework in public administration, introduced by Mark Moore in his seminal work *Creating Public Value: Strategic Management in Governance* in 1995, where he sustains that the goal of the public sector is to create public value (Bojang 2021, 227).

In the view of Bojang (2021, 228), public value is about the needs and expectations of citizens, ensuring that the goods and services provided by the government hold significant value for both individuals and the community.

Consequently, "*collaboration and engagement emerge as an important aspect of public value management"* (Naidoo and Holtzhausen 2020, 193), as the creation of public value requires cooperation from public managers and important stakeholders. It is essential to understand what the public considers as important, which is why engaging stakeholders is a crucial aspect of this approach.

According to Moore, three essential elements must be fulfilled to produce public value. Firstly, the identification of the important public value that the organization wants to create, this is, public managers need to understand what creates public value to deliver it in their work and be accountable for their results. Secondly, the need for sources of legitimacy and support that give the organization the power to pursue specific goals. Lastly, the operational capabilities that must be developed to achieve these goals. These elements form the foundation for public value generation, ensuring that public managers align their efforts with the aspirations and needs of the community (Naidoo and Holtzhausen 2020, 192).

Regarding the role of government, Moore suggests that it should go beyond just supervising and providing services. Instead, the government should focus on creating value in the public sector. This means public managers should actively look for opportunities that provide the most

value for the public and use government resources wisely to achieve positive social outcomes (Bojang 2021, 227).

To assess the effectiveness of public value creation, Moore proposes a public value scorecard, an adaptation of the BSC, which he critiques as inadequate for non-profit organizations. Moore's scorecard highlights the importance of reducing costs while creating value and provides a way for government organizations to track their results (Naidoo and Holtzhausen 2020, 198).

2.6.2. Public Value Scorecard

In the Public Value Scorecard, developed by Moore (2003), a different strategic approach has been used, namely “Public Value Strategy”. This concept was defined by the author with 3 connected dimensions: public value circle; legitimacy and support circle; and operational capacity (Appendix 4). For the first dimension, the creation of public value circle, Moore establishes considerable differences from profit and non-profit organizations, where in the first ones, the major goal is to maximize the profit, and for the second ones, the major goal is to create well-being, social and economic conditions for everyone (Moore 2003, 11).

In the second dimension, the legitimacy and support circle, Moore (2003, 12) sustains that in non-profit organizations, legitimacy and support can be achieved by establishing a position with the beneficiaries of its initiatives and by aligning their purpose with third parties, once these third parties provide financial support to put in practice the initiatives.

The last dimension, operational capacity, is regardless of the allocation of financial resources in the development of initiatives and how much will be allocated in securing and maintaining the third parties for the financial support (Moore 2003, 13).

In Moore´s vison, these three dimensions are all related with each other. As if an organization clearly defines its strategy, manages spending effectively on initiatives and engages well with

third parties, it is going to be able to align its purpose with these partners and to capture the attention from beneficiaries, allowing it to have legitimacy and support (Moore 2003, 13).

In the BSC created by Moore, several measures related to these three dimensions were developed. For the creation of public value dimension, some of the measures used were organizational vision and mission, strategic goals and links among goals, activities, outputs, and outcomes. For the second dimension, legitimacy and support, the measures included: lenders relations and diversification; visibility; legitimacy with general public; and credibility with civil society actors. In the last dimension, productivity and efficiency, financial integrity and organizational learning and innovation were presented as key measures for operational capacity (Moore 2003).

The combination of the three dimensions and the measures for each of them, result in a BSC that can be used by non-profit organizations, local governments, among others, to achieve their strategic goals.

However, in recent years, the context for public value creation has dramatically changed with the adoption of IT-enabled innovations in digital governance and Smart Cities. This shift brings new challenges to the concept of public value proposed by Moore and requires an update to include this emergent paradigm (Neumann et al. 2022, 1).

2.6.3. Smart Cities and Public Value Management

Over the last years, IT-enabled innovations have, in a greater sense, changed the scope of public value creation. This transformation is especially true for Smart City initiatives where digital advancements are often central to governance strategies focused on maximizing public value (Neumann et al. 2022, 1). Yet, it has to be understood that "*smart city views may be broadly divided into those that focus on technology and those that adopt a human-centric, people-*

driven, holistic perspective" (Barrutia et al. 2022, 1). For public value frameworks to be effective in a Smart City context, they must be adaptable to both perspectives.

Therefore, while public value approaches have focused on achieving social well-being and economic stability, Smart Cities require a broader view. In this context of a Smart City, the creation of public value is increasingly characterized by citizen-centric services that merge with information technology as described by Barrutia et al. (2022, 2).

Nevertheless, Cosgrave, Tryfonas, and Crick (2014, 371) highlighted a mutual relationship between Smart Cities and PVM. The growth of Smart City technologies, especially through greater data availability, helps governments follow important PVM principles, requiring them to be transparent, accountable, and responsive to citizens' needs. At the same time, PVM supports Smart City goals by helping local governments manage the challenges of Smart City governance. Through cooperation and creativity, the PVM approach addresses the specific issues that arise in the digital environment of Smart Cities (Cosgrave, Tryfonas, and Crick 2014, 371).

Accordingly, Smart City initiatives require public value theories to expand, integrating the role of technology and the specific dynamics of Smart City settings. As Smart Cities develop, they not only depend on these theories but also help make public value a more prominent and essential idea. This relationship shows that, to effectively create value in Smart Cities, public value frameworks must adjust to both technological progress and the citizen-focused approaches that define Smart City governance. Because of this need, versions of the BSC have been emerging to adapt to a Smart City reality.

2.7) How to adjust the Balanced Scorecard for Smart Cities

As mentioned, the BSC can be adapted to public entities and municipalities, including Smart Cities, which has been occurring in the past years.

A research developed by Neiva et al. (2021) defined four new dimensions for the BSC: social; environmental; urban infrastructure and economic; and financial sustainability (Neiva et al. (2021, 1666). For each of these dimensions, the author assigned distinct measures and further described several initiatives for those defined measures, which both can be observed in Appendix 5. The last step in the development of the BSC was the creation of the strategic map, with the connections and links between all the initiatives to achieve the strategic goals (Neiva et al. 2021, 1168).

Another research (Momot et al. 2023), developed a Smart Cities Strategic Model, based on a Smart City BSC. In this used BSC, the original perspectives were changed to five different perspectives: smart people; innovative governance; ICT and infrastructure; smart economy; and quality of life and urban comfort (Momot et al. 2023, 5). For each of these perspectives, there were several measures used by the authors to develop their new model, identified in Appendix 5.

In another example of a BSC developed for Smart Cities by Maccani, Donnellan, and Helfert (2013, 56), five different dimensions were defined: technological infrastructure; social infrastructure; public-people-private partnership; governance and management; and smart information services. For these dimensions, the authors defined some measures that clearly support the city in measuring its progress in becoming a Smart City (Appendix 5).

The development of BSCs, inspired by the ones presented above, is helpful for Smart Cities as the major goal of the local governments is not the maximization of the profit, but rather the creation of public value. However, the BSCs for Smart Cities presented above are broad, incorporated with measures without plenty of detail, which become arduous to measure and to apply to local councils. Although the different BSC introduced can be an inspiration due to the relation with public value, for this strategic analysis to be useful for Smart Cities, it is essential

to employ more detailed measures, to support local councils in implementing their initiatives and assessing their impact.

C. Methodology

To better understand what a Smart City is and how a BSC that would be suitable for the CMC could be developed, the methodology employed integrates qualitative research that can be structured into three phases: literature review, meetings with the Marketing and Innovation Division within the local council, and the BSC development.

Our research began with an extensive review of academic literature concerning issues related to Smart Cities, as well as the BSC. Key sources included the Giffinger European Smart City Model to identify the dimensions usually associated with a Smart City, as well as the IMD Smart City Index to understand how a Smart City can be measured. Concerning the BSC, the works from Kaplan and Norton were analyzed, along with other specific sources to understand how a BSC could be developed for a public institution like the CMC.

To complement our research, seven meetings with the Marketing and Innovation Division were held and a table summarizing them and its participants is present in Appendix 6. These meetings served two main purposes: first, to understand the internal organization and the role of the division within the local council including how Smart City initiatives were implemented and financed, as well as to have a better understanding of the vision, mission, values and strategy of the CMC regarding the Smart City program within the municipality. Second, and in a later phase of our project, the meetings aimed to assess the relevance of the proposed BSC, particularly regarding the perspectives, objectives and measures defined.

An important finding from the meetings was that a strategy for the Smart City program had yet to be defined by the division. Without a strategy, it is therefore harder to assess if the BSC fully addresses the priorities of the local council. Nonetheless, the BSC perspectives, objectives,

measures, and initiatives were developed by integrating findings from the literature review, insights gathered through the meetings, as well as by analyzing documents provided by the CMC along with information available on their website, namely in *Cascais Ambiente DNA Cascais, Data Cascais* and *Vida Cascais.*

Therefore, 27 documents were provided by the Marketing and Innovation Division, 17 of them being practical resources covering a wide range of themes. These included reports on other Smart Cities, such as Sydney; analyses of indicators and Smart City rankings, such as the CITYkeys indicators; and practical guides on how to build a Smart City, including reports from the University of Liège. The other 10 documents focused on the CMC, referring to topics directly related to its structure, activities, and objectives. These included strategic plans regarding the areas of education, environment, mobility and social; the report on Cascais 2030 objectives; as well as a document related to the mission, vision, and values of the Marketing and Innovation Division regarding the Smart City program. Additional sources included the analysis of financial documents of the CMC, such as the *Plano de Actividades e Orçamento* and *Prestação de Contas*; documents related to the DNA Cascais, such as the *Plano de Actividades*; and documents concerning the *Sistema Municipal de Participação*.

Through the meetings, it became clear that the ultimate goal of becoming a Smart City was to enhance citizens' quality of life, emphasizing public value. As a result, the traditional structure of the BSC, where the Financial Perspective is at the top, had to be adjusted to reflect the objectives of a public institution like the CMC. Through insights gathered from publications by authors such as Wisniewski and Ólafsson (2004), Schobel and Drogosiewicz (2018) and Northcott and Taulapapa (2012), a BSC tailored to the goal of the CMC was developed: meeting the needs of public organizations' constituents (Kaplan 1999), where the Public Value Perspective occupies the topmost position of the BSC, and financial measures are considered as having an enabling role. Therefore, four perspectives were defined for the BSC based on the

model presented in the research paper "*Developing balanced scorecards in local authorities: a comparison of experience*" by Wisniewski and Ólafsson (2004) (Appendix 7).

Moreover, the BSC was designed by taking into account the six areas of intervention that the Marketing and Innovation Division highlights as being the core of a Smart City: Mobility; Environment and Energy; Governance; Quality of Life; Society and Education; Economy and Innovation.

Thus, the Financial Perspective was defined as being the foundation of the BSC as the financial resources will allow the feasibility of Smart City projects, and without a solid financial structure the municipality would not be able to invest in innovation, infrastructures and services that a Smart City requires, both externally and within the organization.

Above this perspective is the Learning and Growth Perspective, which incorporates elements from the Governance area of intervention. It focuses on areas related to human, information and organizational capital, necessary to support innovation, ensuring that the CMC has the internal capabilities and knowledge conducive to the implementation of Smart City projects.

The Processes Perspective is therefore positioned next. Here, the group considered the processes as including the areas of intervention of Mobility, Environment and Energy, Society and Education, and Economy and Innovation, representing the initiatives and measures that need to be implemented in order to effectively enhance citizens' quality of life. By having an organization aligned with Smart City objectives, as well as the necessary capabilities to sustain innovation, initiatives within these areas can be effectively implemented, leading to the local council's ability to deliver value to its citizens.

The last perspective is the Public Value, which also comprises the Quality of Life area of intervention. Therefore, all the other perspectives will contribute to the ultimate goal of

enhancing the quality of life of citizens, translating the commitment of the CMC in placing the citizen at the center of its actions.

In this sense, financial stability will enable the investment in organizational capabilities, which in turn will allow for the effective establishment of initiatives across the areas in the Processes Perspective. These initiatives will lead to the creation of public value, the aim of Cascais Smart City program. Therefore, a strategy map was designed to reflect these connections.

Despite measures and initiatives being defined, targets could not be established due to the unavailability of data necessary to assess the CMC's current position in relation to some of the proposed measures. As different measures from those normally used by the local council were proposed, to effectively determine realistic targets at this stage additional time and analysis would have been necessary for the CMC, which proved difficult, given the timeframe of the Work Project.

D. Cascais Smart City

1) Marketing and Innovation Division Introduction

The CMC has an organizational structure that is divided into municipal directorates, containing various departments. These departments are further divided into divisions and units, which may include additional offices (Assembleia da República 2023).

One of these divisions and units is the Division of Marketing and Innovation, the division responsible for monitoring Smart City projects in Cascais. This division was created by an option of the executive in 2015, originally named the Division of Information and Intelligent Cities, with the aim of defining a strategic plan to further enhance the vision of Cascais becoming a Smart City. This vision has been embraced by the CMC emphasizing that "Cascais has been a Smart City for 660 years", referring to the city's foundation and reflecting the commitment to improve citizens' quality of life since its beginning. Although Cascais meets the

criteria for being considered a city, it has chosen to maintain the village status, a choice driven by the belief that the concept of village is more closely aligned and associated with quality of life. With the introduction of the new designation of the division, its original purpose remained the same, with the added responsibility of marketing Cascais for its quality of life (Carvalho and Cotrim, Meeting, September 13, 2024; Appendix 6.2).

The Division of Marketing and Innovation, under the broader Department of Communication and Service to the Citizen, has as primary role fostering innovation within the municipality. Within the CMC, there is no clear distinction between a Smart City initiative and other municipal initiatives, as each department's projects are seen as a contribution to building a smarter city. Therefore, the Division of Marketing and Innovation does not have a direct involvement in the implementation of every initiative, rather it assumes a role of monitoring and provide data support to the various projects implemented in the municipality in order to foster innovation and promote data-driven insights. Hence, Cascais assumes the objective of being a data-driven municipality, and the division has the responsibility of gathering and organizing the data to better support the decisions taken by each department, as well as to monitor the overall performance of the local council. Furthermore, the division can also support the departments in implementing initiatives by offering guidance on data collection methods so that they can have a comprehensive understanding of the initiatives' impact on citizens. In this sense, the division has created an open data platform, under the premise that one of the pillars of a Smart City is the transparency of information (Carvalho and Cotrim, Meeting, September 13, 2024; Appendix 6.2).

This innovation can also be seen within the CMC. The Division of Marketing and Innovation supports the enhancement of the internal processes based on the organization of data. For instance, the division is currently working in a project centered in the organization of financial

data across all departments aiming to improve how the information is categorized and accessed (Carvalho and Cotrim, Meeting, September 13, 2024; Appendix 6.2).

Cascais also embraces the role of being an experimental laboratory. In this sense, companies approach the Division of Marketing and Innovation with pilot project ideas. The division has then the role of assessing if the project might be beneficial to the municipality and, if so, direct it to the relevant department so that it can be implemented. Once the project is completed, the division has also the role of identifying what went well and what can be improved for future initiatives (Carvalho and Cotrim, Meeting, September 13, 2024; Appendix 6.2).

As a driver of innovation, the division also plays a prominent role in assessing the current trends and the solutions that companies are creating by being in contact with startups, SMEs, and entrepreneurs and by attending conferences. This contact enables the division to assess and explore new solutions to societal challenges (Carvalho, Meeting, October 3, 2024; Appendix 6.4).

2) Cascais Smart City Strategy

2.1) Mission and Vision

The mission of Cascais Smart City approach can be described as an active and intensive job for the city to become the best place to live one day or the whole life (Câmara Municipal de Cascais 2024a). Due to this commitment, in 2021, Cascais was nominated (2nd place) by the European Innovation Council as a European Rising Innovative City. In 2023, Cascais won the *Prémio Nacional de Inovação*, a Portuguese award for the most innovative public company or public administration, assigned by *ANI – Agência Nacional de Inovação* and *COTEC Portugal – Associação Empresarial para a Inovação* (Câmara Municipal de Cascais 2024a).

Cascais Smart City vision is focused on innovation, in strong correlation with sustainability, interactivity and integrated solutions, which are the main grounds to foster a better city for its

citizens. The guidelines for CMC intervention are the innovation in local policies, smart use of technology, protection of natural and cultural resources in the area, continuous involvement of the local people, and permanent engagement to attract investment of different companies and youth talent (Câmara Municipal de Cascais 2024a).

The mission and vision are clearly defined for Cascais Smart City, however, the strategy itself is under development. A document with the consolidation of all the strategies from all departments involved in Cascais Smart City is being written by the members of the Division of Marketing and Innovation (Carvalho, Meeting, October 3, 2024; Appendix 6.4). On Cascais Data website, by providing all the relevant information regarding this approach, is it possible to use information that possibly could define Cascais Smart City´s strategy (Câmara Municipal de Cascais n.d.b.).

2.2) Strategy

The objective of Cascais Smart City is to enhance the quality of life for all the citizens and visitors in the municipality, by putting into practice projects and initiatives to deal with daily problems in Cascais. This approach has continuously focused on six main areas, such as Mobility, Environment and Energy, Governance, Society and Education, Economy and Innovation, and Quality of Life. Cascais Smart City has several different ways of acting which allow the city to distinguish itself from other cities. The monitorization and evaluation of several data is crucial in Cascais Smart City, once it allows the city to utilize different technological solution based on that same data and to know which resources are more critical to have a sustainable and efficient use. Moreover, with the analyzed data, the city can work through an open data available for all the citizens, allowing a greater engagement from all the inhabitants. Furthermore, it cooperates with other cities in international knowledge sharing

networks, to be able to apply these common ideas and initiatives in its territory (Câmara Municipal de Cascais n.d.b.).

2.3) Main challenges

Nowadays, any city faces several challenges, which are a continuous motivation for the local governments to seek innovative and attractive solutions for the needs of its citizens. In Cascais, one of the main challenges is the inclusive and innovative governance, with the local council extremely engaged in providing an excellent and innovative "service to the client", where everyone feels included in the city's daily life. Population aging and equal opportunities for young and old citizens are others huge challenges that have been guiding the CMC to actively intervene in this possible discrepancy. Climate change and socioeconomic equilibrium among citizens are also important problems, which made Cascais a bright innovative city (Câmara Municipal de Cascais 2024a).

2.4) Alignment with Cascais 2030

To strive against these issues and in line with the mission and vision of Cascais Smart City, in 2017, the plan Cascais 2030 was designed. The plan is aligned with the 2030 Agenda, which constitutes a plan of action with 17 objectives for people, planet and prosperity developed by the United Nations (United Nations n.d.a). The CMC's goal is to fulfill all the 17 objectives in Cascais by 2030. This involves several innovation initiatives, which encompass the three areas (economic, social and environmental) of the 2030 Agenda (United Nations n.d.a). Cascais Smart City's initiatives are associated with Cascais 2030, where beyond these three main dimensions, the project embraces the three other areas, being them mobility, quality of life and governance (Câmara Municipal de Cascais n.d.a).

2.5) Ecosystem and its Values

In Cascais Smart City, the six areas play an important role in the development of a vast ecosystem where the local council operates in. This ecosystem has in the center, as its main goal, the enhancement of the quality of life for all the citizens. To achieve this goal, the CMC works with different players within the ecosystem, such as the citizens itself, local government, public entities and NGO's, universities, and private entities. These players help the local council to implement pilot-projects to test if they are doable, resulting in a massive collaboration between all the parts involved, to achieve the major goal, the creation of public value (Câmara Municipal de Cascais 2024a).

Furthermore, in this ecosystem, the six areas develop and implement all the initiatives, based on six values: citizen in the center; data-driven; transparency; bench learning; co-creation; and sustainability, which guide them to set up and work in this cooperative ecosystem. First, the most important value of having the citizens in the center, as all the initiatives implemented in Cascais prioritize the citizens, aiming to provide them with the best experience in the city. This experience should provide the citizens with praiseworthy services and prompt answers to the problems, to improve its quality of life.

Secondly, the data-driven value is an extremely important pillar in Cascais Smart City, once several data is collected, not only to store it, but rather to analyze and to support CMC's decision-making based on those data. Moreover, the transparency value, where Cascais share publicly all the collected data, to allow people internally to know where the priorities are and for the common citizen to take advantage of this information to be able to foster and carry out their own ideas.

Furthermore, bench learning, where the project constantly interacts with other recognized Smart Cities to learn about new experiences and projects, and share knowledge about what is already explored in Cascais.

Afterward, the co-creation value, as CMC's is permanently working collectively with academia and companies, to encounter the brightest solutions for its citizens and to carry through initiatives from both sides.

The last one, sustainability, which encompasses not only the environmental aspect, as well as socioeconomic, territorial cohesion, opportunities for young people, among others. Align with this value, the CMC executed several initiatives aligned with a roadmap for carbon neutrality in 2050 created internally. These initiatives are related with discrepancies between citizens, housing, job-sharing, to afford the young generations with countless opportunities for their development, among others. All these six values are in the DNA of Cascais Smart City, where all the collaborators in their daily operations and all the initiatives embrace these values (Carvalho, Meeting, October 3, 2024; Appendix 6.4).

This innovative development in Cascais and this ecosystem recently started to be guided by four important commitments: Governance, Municipality, Talent, and Future, with the aim of transforming the traditional six areas of intervention, into these four new commitments. (Câmara Municipal de Cascais 2024a).

3) Areas of intervention

Throughout the meetings with the CMC, it was explained that the principles for the development of the Smart City program were inspired from other Smart Cities that had already been developed, such as Sydney. Following the study of the different market practices, the local council adopted the six areas of intervention that were considered standard for a Smart City, consisting of Environment and Energy, Governance, Mobility, Quality of Life, Society and Education, and Economy and Innovation (Câmara Municipal de Cascais n.d.b). These areas are clearly outlined by the CMC.

3.1) Mobility

The Mobility area aims to promote both the social and territorial cohesion of Cascais through universal access to free public transport, and, in parallel, to mitigate the environmental consequences of the movement of citizens and goods by encouraging the use of more sustainable options (Câmara Municipal de Cascais 2024a).

3.2) Environment and Energy

In the Environment and Energy context, CMC is committed to encouraging sustainable practices in accordance with circular economy principles. For this purpose, the local council is focused on preserving its natural resources, incentivizing consistent energy and water consumption and fostering effective urban waste management (Câmara Municipal de Cascais 2024a).

3.3) Governance

Regarding Governance, CMC focuses on two fundamental elements: the citizen and data. While preserving the relationship with the citizens and promoting transparency, the local council intends to automate and simplify services in order to provide quality and innovative public services. In this context, data is a relevant driver for informed political decision-making (Câmara Municipal de Cascais 2024a).

3.4) Quality of Life

In order to improve the quality of life of its citizens, CMC emphasizes the value of an active, healthy and sustainable lifestyle, striving to guarantee the proper conditions for each citizen. With the intention of achieving inclusion and attenuating economic and social asymmetries, the local council is committed to accessing social, cultural and health resources for all citizens (Câmara Municipal de Cascais 2024a).

3.5) Society and Education

In CMC, the citizens are at the center, even in decision-making. Consequently, active citizenship and participatory democracy are two of the objectives of the Society and Education area. Furthermore, the universality of opportunities is a pertinent issue for CMC, and it is guaranteed by investing in the qualification of citizens' skills in different areas and throughout their lives (Câmara Municipal de Cascais 2024a).

3.6) Economy and Innovation

Lastly, under Economy and Innovation, CMC advocates developing the local economy in a sustainable way through the fostering of a dynamic innovation ecosystem characterized by the dissemination of knowledge, networking and the sharing of experiences. Supporting local entrepreneurs and contributing to attracting and retaining talent is essential (Câmara Municipal de Cascais 2024b).

4) Commitments

The six areas of intervention were framed within four commitments defined by CMC that outline the way in which the local council performs its functions within each area of intervention.

4.1) Commitment to Governance

Firstly, CMC has defined a commitment to Governance, which involves the optimization, digitalization and qualification of citizen services and municipal management. Efficiency in public service provision is a key element for the local council and implies quality, promptness, automation and simplification of processes. To that end, investment must be directed towards internal training and innovation programs, anticipating and solving problems, data-based decision-making, and bench learning, which is defined by the sharing and implementation of good practices. The local council has defined transparency, citizens at the center and data-driven as fundamental values for this commitment (Câmara Municipal de Cascais n.d.b).

4.2) Commitment to the Citizen

Moreover, the commitment to the Citizen is supported by the values of co-creation, the citizen at the center and transparency. This commitment relies on the ability to achieve a 360º perspective, meaning that the local council intends to implement Citizen Relationship Management (CzRM) and customize citizen services; on the universality of the municipal participation system, guaranteeing community involvement in decision-making; and on investing in policies that improve citizens' quality of life by developing innovative services and strategies (Câmara Municipal de Cascais 2024a).

4.3) Commitment to Talent

The commitment to Talent is centered on stimulating knowledge and retaining talent as a driving force for development and socio-economic balance. Establishing policies to attract financial resources, talent and companies is the primary approach, however, creating an ecosystem that fosters networks for sharing knowledge and creating value is equally valuable. As a result, CMC is trying to reach a greater position on the map of innovation, culture and education, maintaining a focus on bench learning, sustainability and the citizen at the center as dominant values (Câmara Municipal de Cascais n.d.b).

4.4) Commitment to the Future

Ultimately, the commitment to the Future relies on investing in and safeguarding social, economic, territorial and environmental sustainability. In this context, the Smart City is comprised of innovative projects in the remaining structuring areas, which are also supported by innovative solutions through the use of emerging technologies that produce efficient and sustainable results. Planning, monitoring and evaluation processes are optimized through the integration and interoperability of systems. The values emphasized by the local council in this

commitment include sustainability, the citizens at the center and data-driven (Câmara Municipal de Cascais n.d.b).

The combination of these commitments and all the initiatives in the 6 different areas, developed and implemented by CMC, is making a huge contribution for Cascais progressively evolving as a Smart City.

As Cascais Smart City has matured, the local council has internally recognized that the six areas of intervention that guided the implementation of the Smart City have become incompatible with CMC's strategy. Therefore, the local council is planning and developing a strategy based on the four commitments, instead of the six areas of intervention, which also introduces some uniqueness to the Smart Cities topic.

Although all the intervention areas impact each of the commitments, CMC states that it is possible to establish a clearer correlation between the four commitments and the intervention areas. The commitment to governance focuses primarily on the area of Governance and the commitment to the Citizen can be closely associated with the area of Quality of Life. The commitment to Talent involves the areas of Education and Society, and Economy and Innovation. The Environment and Energy, Mobility, and Quality of Life areas are integrated into the Commitment to the Future.

5) Cascais SWOT Analysis

To fully understand CMC positioning strategy, a SWOT Analysis was conducted which, although has no widely known creator (Teoli, Sanvictores, and An 2019), is a common strategy tool for evaluating how an organization positions itself relative to competitors in the broader market (Teoli, Sanvictores, and An 2019). While mostly used in the business world, it has applicability to all types of organizations.

The tool can also be known as an Internal-External Analysis, as it explains "*how well the internally-related factors fit with the externally-related factors"* (Teoli, Sanvictores, and An 2019). Additionally, as Direção Municipal Estratégia Inovação e Qualificação (2013) highlights, this internal and external perspective provides the opportunity to assess the endogenous and exogenous position of CMC. The endogenous position focuses on internally-related factors that the local council can control, while an exogenous analysis focuses on externally-related factors that the local council directly cannot control but must consider in its actions.

The analysis of internal characteristics focuses on identifying internal resources, core capabilities and competencies, based on strengths and weaknesses inherent to the organization (Sammut-Bonnici and Galea 2015, 1). According to Teoli, Sanvictores, and An (2019), strengths describe the characteristics that give a competitive advantage over competition, whereas weaknesses focus on the characteristics that create a relative disadvantage.

Moreover, the external analysis focuses on highlighting market opportunities and threats by analyzing competitor's resources and market environment (Sammut-Bonnici and Galea 2015, 1). While opportunities are environmental factors that can be exploited to benefit the organization, threats highlight the extent to which level environmental factors can present challenges to the organization (Teoli, Sanvictores, and An 2019).

In this sense, a SWOT Analysis for the BSC's four perspectives of the local council was performed, by specifying the strengths, weaknesses, opportunities and threats deepening the several areas (Appendix 6). This analysis served as a foundation for defining CMC strategic objectives.

In addition to this, insights from meetings with the CMC were integrated and a analysis of relevant documents provided was performed, enabling us to create a SWOT Analysis that encompasses the city council's broader strategic position.

Strengths	***Weaknesses***	***Opportunities***	***Threats***
Existing leadership and team are focused on developing Cascais as a Smart City	Strategy is not internally defined and communicated	Increased public and private interest in sustainability, attracting partners	Potential leadership changes may disrupt strategic focus
Collaborative leadership and aligned team values	Insufficient system documentation	Partnerships with private entities, universities, public organizations, and other cities, to share knowledge and expertise	Complex bureaucracies when involved in applications to European grants
Sufficient financial autonomy to develop proposed projects	Lack of exploitation of financial resources from private sector organizations	Rising demand for sustainable and convenient transport	Insufficient investment in innovation could hinder future implementation of Cascais 2030 goals
Citizen involvement in decision-making (e.g. *Orçamento Participativo*)	Limited technological infrastructure restricts projects	Global trend toward renewable energy offers opportunity for local development	Competition from private transport services (e.g., Uber, Bolt)
Initiatives for energy efficiency and renewable technologies	Limited employee training on Smart City topics	Tech advances offer chances to enhance innovation and attract new businesses	Climate change may increase frequency of environmental disruptions
Strong commitment to youth entrepreneurship, open data initiatives for transparency (e.g., Data Cascais), innovation and collaboration	The local council lacks up-to-date digital transformation, preferring to use the more accessible and already existing systems and technology within CMC	Expand digital channels to boost citizen engagement	Lack of continuity in some projects may reduce trust among citizens
Leading in innovation with hydrogen-powered vehicle unit under development		Enhancing Cascais geostrategic positioning near Lisbon and developing economic activities in maritime dimension	Resistance to change may slow policy adoption
Housing construction and building rehabilitation, which are property of CMC, with the support of the PRR program		Draw attention of start-ups to host themselves in Cascais	High levels of coastline erosion and degradation of landscape due to disorderly occupation and human interventions
Four municipal enterprises enabling Cascais to have entities focused on crucial aspects of the city (Cascais Envolvente, Cascais Próxima, Cascais Dinâmica, Cascais Ambiente)		Promoting the cultural and natural landscape	Massive urban growth, threatening natural resources and citizens quality of life
"Mobility as a Service", offering free public transportation and sustainable strategies			

Table 1 – *SWOT Analysis for Cascais. Own representation.*

E. Balanced Scorecard

All the previously explored chapters worked as a support to be able to develop a BSC for the CMC in the context of a Smart City, explained with detail in this chapter.

There are some measures that need further detail, either in its formula or the legend for a better understanding of the scale, which can be found in Appendix 9. To provide a better visualization of the BSC, Appendix 10 was prepared with tables for each perspective, with the corresponding objectives, measures, and initiatives.

1) Processes

The Processes Perspective comprises four areas of intervention: Mobility, Environment and Energy, Society and Education, and Economy and Innovation. In this thesis, the focus is on Society and Education, and Economy and Innovation. This perspective is intended to be above the Learning and Growth Perspective, and below the Public Value Perspective.

1.1) Society and Education

Smart Cities are built around its citizens and their needs, therefore a crucial part of being smart is the capacity of integrating citizens in the decision-making process (Vrabie and Tirziu 2016, 123). As smart technologies and innovation needs grow, educating citizens to adapt and drive innovation has become equally important (Liu, Huang, and Wosinski 2017, chap. 1). Therefore, a Smart City is a center of higher education and smart and skilled individuals, nurturing a culture of lifelong learning (Nam and Pardo 2011, 287). Thus, three strategic objectives were defined for this area, considering the commitment of Cascais in achieving the Sustainable Development Goal 4 “Quality Education”.

1.1.1) Encourage Active Citizenship Participation

Citizens are viewed as sources of creativity within the Smart City ecosystem, which allows for a process of co-creation enabling innovative ways for citizens to share, design, and contribute to local policies, based on their own needs and desires, and offering valuable insights and feedback to governments. This translates into a bottom-up approach, where initiatives originate

from citizens (Nguyen, Bleus and Bockhaven 2017). Two measures have been defined for this objective:

1.1.1.1) Residents contribute to the decision of local government (1-5).

This measure is based on the indicator established in the IMD Smart City Index (IMD Business School 2024d) and is measured on a scale of 1-5 based on the scale of Arnstein (1969) (Appendix 9.1). It measures the availability of opportunities citizens have to be involved in the local governance.

The CMC has already implemented initiatives like the Participatory Budget, that in the 2023/24 edition had 21 winning projects proposed by citizens (Câmara Municipal de Cascais, 2024b) and the Youth Participatory Budget, that in 2023/24 had 16 winning ideas proposed by students (Câmara Municipal de Cascais, 2024c). These initiatives are one of the most effective forms of citizen participation as they provide solutions that address the real needs of the community (Nguyen, Bleus and Bockhaven 2017). Therefore, the local council should continue to promote these initiatives in order to encourage active citizen participation.

Additionally, the CMC has the *Sistema de Participação Municipal* that fosters active citizenship through participation processes that include public consultations and citizens panels, as well as the opportunity for the involvement of community members in co-creating projects. The local council can continue to foster this public participation processes and increase the participatory initiatives to enrich this system (Câmara Municipal de Cascais and Dias 2022).

Therefore, according to the scale defined for the measure, the CMC has already reached level 5, as it provides citizens with a variety of ways to engage in the local governance and participate in decision-making. The target should be to maintain this level, continuing to encourage the participation of citizens.

1.1.1.2) Citizen Participation Rate in Projects

Engaging the local community in urban planning is important to guarantee that urban plans are aligned with citizens' needs, as well as getting different skills and knowledge from different backgrounds (ETSI 2017).

This measure, established by the European Telecommunications Standards Institute (ETSI), starts by analyzing the projects that were executed with active citizen participation based on the scale mentioned in the first measure out of the total projects executed (Appendix 9.2). Active participation is defined as minimum level 3 (ETSI 2017), and the measure can be calculated based on projects with this level or higher.

To enhance active citizen participation, the CMC could adopt a digital platform similar to *Decide Madrid* (Ayuntamiento de Madrid, n.d.), where debates are promoted; citizens can propose ideas for community projects or infrastructure improvements, which can be voted by other citizens and be implemented by the local council; provide input on city policies through surveys or proposals; and vote on the participatory budget (Pina et al. 2022, 155). This platform would then centralize public participation initiatives, fostering community engagement and collaboration.

This measure comprises the projects proposed through the participatory and youth participatory budget, as well as projects influenced by citizen feedback (for instance, through the *FixCascais* or *Painéis de Cidadão*), and projects that were implemented through co-creation (such as *Reivente o Seu Bairro* or *Humanização dos Espaços Exteriores Escolares)*. The percentage of projects implemented with active citizen participation can then increase with the introduction of said platform, as it would centralize and simplify access to public participation tools.

The two proposed measures complement each other by capturing the actual involvement of citizens in implemented projects and the availability of opportunities for citizens to participate in local governance.

1.1.2) Invest in the development of citizens' skills in several areas throughout life

The intention of investing in the education of citizens throughout life is clearly defined in the *Plano Estratégico Educativo Municipal (PEEM)* of Cascais emphasizing the importance of lifelong learning to bridge gaps related to digital, social, scientific, and technological competencies (Câmara Municipal de Cascais and Instituto Superior Técnico 2018).

In this sense, "*the transformation of traditional cities into smart cities requires a skilled workforce"* (Fitsilis et al. 2023, 11). Thus, due to the rapid change in the urban environment, the acquisition by individuals of 21st century skills – digital literacy, critical thinking, creativity and collaboration – is essential (Tanantong et al. 2024, 2). It is therefore the human element, equipped with those skills, that propels the Smart City concept towards its full potential (Tanantong et al. 2024, 2). This can be achieved by providing citizens with opportunities for lifelong learning. Three measures were therefore defined for this objective:

1.1.2.1) Access to Educational Resources (1-5)

This measure is established by ETSI and is measured on a scale of 1-5 (being 5 the highest value) (Appendix 9.3). This measure goes beyond traditional education and emphasizes the importance of lifelong learning opportunities to foster employability, but also to enhance social inclusion, active citizenship and personal development. Therefore, the measure provides indication of the extent to which the city provides easy access (physically or digitally) to a wide coverage of educational resources (ETSI 2017).

The CMC has the *Cidade das Profissões* (Câmara Municipal de Cascais, n.d.c), which promotes lifelong learning by offering a variety of courses and workshops, including programs to bridge the digital divide and enhance skill acquisition. The local council also offers some programs focused on competency validation and the promotion of continuous training (Câmara Municipal

de Cascais n.d.d). To ensure accessibility, the CMC could develop an online platform, similar to Singapore's SkillsFuture, where all the courses are centralized and organized by theme, simplifying course access and registration (SkillsFuture Singapore n.d.a).

To expand this project, and also inspired by the SkillsFuture platform, the CMC could personalize this platform for each citizen where it presents their current skill set and provide tailored recommendations of courses they could attend, based on their reskilling needs (SkillsFuture Singapore 2019).

Based on the scale defined (Appendix 9.3), it is considered that Cascais classifies as a 4. Although the municipality has a good comprehensive range of schools, the opportunities for lifelong learning could be easier to access. The information on available courses is not centralized, which can make it difficult for citizens to access them. Therefore, the CMC should improve the accessibility of these courses in order to reach level 5.

1.1.2.2) Percentage of municipal budget allocated for provision of programs designated for bridging the digital divide

As already mentioned, lifelong learning opportunities are also a way of bridging the gap related to digital competencies. In a Smart City context, this goal is even more prominent with the increasing reliance on digital solutions. Therefore, developing programs can be a useful tool to improve technological skills to participate in a technology-driven society, empowering citizens to become active users of new technology (ISO 37122 2019).

Although the CMC already offers some courses to bridge the digital divide (through the *Cidade das Profissões* for instance), it could expand its offerings in IT skills courses, including categories such as web creation, artificial intelligence, data, web development, cybersecurity and online transactions (Barcelona Activa n.d.a). For example, Barcelona, in its Barcelona Activa platform, has a space dedicated to “IT training for all citizens”, centralizing in one space

all the available courses, organized by category, with the possibility of online registration, enhancing accessibility.

To further promote digital competencies and bridge the digital divide, the CMC can expand its investments in infrastructures to offer access to free wi-fi in the city (City of Brussels 2023), and partner with associations to distribute computers and other digital devices to people in need (Cities Coalition for Digital Rights n.d.).

1.1.2.3) Percentage of Adults Undergoing Reskilling

A report issued by the European Parliament (Hogarth 2019, 1) emphasizes that digital transformation and technological advancements are reshaping the content of jobs and training demands. To maintain a competitive economy, ensuring that individuals are equipped with the skills to adapt to future changes and avoid the risk of job loss is essential and the importance of reskilling is prominent.

This measure, established by the OECD (OECD 2021), reflects how well the workforce is preparing for the evolvement of job requirements and technological advancement. A lower percentage may indicate that local governments need to increase investment in reskilling initiatives.

In addition to all the courses offered to promote lifelong learning, in 2020, the CMC implemented the pilot project Reskill Hub. This initiative aimed to promote workforce reskilling by informing workers about companies' requalification needs, available training, as well as assessing the gap between existing training programs and the real needs of companies (Nova SBE, Câmara Municipal de Cascais, and Cascais Invest 2020). The CMC should consider re-implementing this program permanently to support workforce reskilling.

1.1.3) Invest in the development of technological infrastructures that support the modernization of the educational process

The PEEM recognizes technology as being an important pedagogical resource to enhance the education system. This objective aligns with the European Union's Digital Education Action Plan that promotes the development of a high-performing digital education ecosystem (European Commission n.d.d).

According to a UNESCO report (UNESCO IITE, BNU and ISTE 2022, 1), the utilization of technology in teaching and learning improves the quality of education, promotes educational equity and ensures lifelong learning opportunities for all, helping to achieve the Sustainable Development Goal 4 (Quality Education). Therefore, the concept of Smart Education emerges as the integration of intelligent technology in education aiming to enhance the learning process by making it more efficient, personalized, and accessible (Zhu, Yu and Riezebos 2016, 1). Two measures were defined for this objective:

1.1.3.1) Percentage of students with classroom access to ICT facilities

Integrating ICT into classroom environments enhances learning, as it enables interactive, engaging, and accessible lessons through the adoption of multimedia resources and other digital tools. ICT can also foster the flexibility of learning, allowing for more collaborative and student-centered approaches (Zhu, Yu and Riezebos 2016, 1).

This measure, defined by the ITU-T (ITU-T 2022), comprises ICT facilities that can be measured to include internet connectivity, computer labs, ICT modules, and digital learning tools.

1.1.3.2) Percentage of Expenditure in Education for Promoting ICT

This measure, defined by the MAtchUP, (Mabe et al. 2018) an EU-funded Smart City project, captures the financial resources dedicated to ICT within education, demonstrating the commitments of local governments in enhancing technological infrastructure.

The following initiatives will impact both measures proposed above.

The CMC has already taken considerable steps towards integrating technology in education. Computing classes are now part of the school curriculum for 7th grade students across 36 classes, reaching over 1000 students (Câmara Municipal de Cascais, n.d.e). Moreover, the CMC has implemented in schools of two parishes the project "*Pensamento computacional, programação e robótica"* (Direção Municipal de Apoio à Gestão 2024), however wider access should be granted to reach more schools and students. The *Cascais + Tecnológico* Program has already equipped schools with computers (Câmara Municipal de Cascais 2017). Additionally, the CMC has also integrated Educational Innovative Spaces in 52 schools, equipped with tablets, interactive panels, and equipment for introducing robotics and programming, promoting a new classroom organization where technology is integrated to enhance learning experiences. The CMC should implement these spaces in all 62 schools within the municipality, covering not only primary schools, but also all the cycles up to secondary education, ensuring that all students benefit from these innovative learning environments (Câmara Municipal de Cascais 2023).

Additionally, the CMC has introduced the "*Lexplore + Leitura"* program in 53 schools, combining artificial intelligence and eye-tracking technology to assess students' reading abilities. This initiative provides teachers with indicators that enable them to timely implement pedagogical strategies to enhance students' reading skills (Câmara Municipal de Cascais 2022)

However, to effectively implement technology in classrooms, it is necessary to train educators to be able to integrate and use technology into learning settings (Gümüş et al. 2023, 3994). In this sense, the PEEM recognizes the importance of empowering the educational community and outlines the need for training to meet the rapid pace of technological advancements.

1.2) Economy and Innovation

As previously mentioned in the Literature Review, the European Smart City Model identifies six dimensions to characterize a Smart City, one of them being Smart Economy (Giffinger et al. 2007). According to these authors, Smart Economy includes factors such as innovative spirit, entrepreneurship, productivity and flexibility of labor market (Giffinger et al. 2007). Considering these factors, two objectives were defined based on the CMC's commitment to attract, retain, and develop skills and knowledge through the promotion of creativity and innovation and foster competitiveness (DNA Cascais, n.d.a). These objectives align with the CMC's commitment to the Sustainable Development Goals, specifically goal 8.

1.2.1) Foster a culture of innovation based on the promotion of knowledge, networking, sharing of experiences and R&D development

Innovation constitutes the cornerstone of economic success in Smart Cities, resulting in increased competitiveness. By creating an innovative ecosystem, Smart Cities become hubs to groundbreaking ideas, disruptive technologies, and transformative processes. To achieve sustained business excellence and economic competitiveness, knowledge creation is essential – it comprises the generation, dissemination, and application of knowledge to foster innovation, problem-solving, and continuous improvement by the creation of collaborative networks between academia, industry, government entities, and citizens (Ayanda 2023a). The focus on innovation helps Smart Cities to attract businesses and talent, resulting in a sustainable competitive edge. Therefore, two measures were defined for this objective:

I1.2.1.1) nnovation Ecosystem (1-5)

This measure, established by the Eden Strategy Institute, is based on a scale of 1 to 5 (being 5 the highest value) (Appendix 9.8). It measures the extent to which engaged stakeholders have sustained innovation and partnerships, with the local government playing an instrumental role

in supporting and fostering these efforts (Eden Strategy Institute 2018). It is therefore important to consider that in a Smart City, the collaboration between different stakeholders, such as academia, businesses, local governments and citizens, play an essential role in the exchange of knowledge, ideas, and best practices, fostering and stimulating a culture of innovation and enhancing the innovation ecosystem (Ayanda 2023a).

The CMC has implemented in its territory a Living Lab, an open innovation ecosystem in a real-life environment where innovative solutions are tested and developed to address environmental issues (Câmara Municipal de Cascais, n.d.f). This space fosters co-creation accepting initiatives from citizens and businesses. To enhance the ecosystem, the CMC could establish more Living Labs, increasing the number of partners involved and broadening the range of purposes they serve. For example, Rotterdam has six Living Labs with some different purposes: supporting municipal policy by leveraging real-world data to address social challenges such as social cohesion and new ways of crime prevention; promoting sustainable urban practices; and improve quality of life through physical improvement of public spaces (Puerari et al. 2018, 9).

The CMC could also invest in Innovation Hubs - coworking spaces for learning, co-creation, and community-building, aimed at fostering innovative ideas and supporting creative ways of solving problems (Jiménez and Zheng 2021, 163). Numerous cities in Europe have established innovation hubs, such as Amsterdam (Amsterdam Science Park, n.d.), that offer co-creation facilities with the opportunity to collaborate with researchers, startups and talent. Additionally, the CMC could also host open innovation challenges where SMEs and startups present innovative solutions to specific urban challenges, and selected proposals are awarded with the opportunity to pilot their solutions (Barcelona Open Challenge, n.d.).

The program "*Empreendedorismo Jovem, Social e Criativo" (*DNA Cascais n.d.b) also fosters innovation, encouraging students to develop creative and impactful entrepreneurial initiatives. In the academic year 2023/24, 87 projects were developed by students involved in this initiative (Câmara Municipal de Cascais n.d.g). Within this program, various projects not only enable students to develop entrepreneurial skills, but also provide a platform for collaboration between diverse stakeholders, including citizens, businesses, and social organizations.

Moreover, the CMC highlights network collaboration as a key instrument for promoting innovation. In this sense, Cascais hosted delegations from various cities, as well as companies, NGOs and academic institutions (Direção Municipal de Apoio à Gestão 2024).

According to the scale defined for this measure it is considered that Cascais currently sits on level 4. Although they have already some initiatives to foster collaboration between different sectors of society, such as the Living Lab, and collaborate frequently with universities and businesses, they could further enhance this ecosystem, as pointed before, to reach level 5.

1.2.1.2) R&D Expenditure as percentage of city's GDP

R&D propels innovation by deploying new technologies, improving existing technologies, or the combination of new technologies in novel ways (Jones 2023). Smart Cities invest in R&D initiatives to position themselves as hubs of cutting-edge research and innovation, leading to disruptive innovations (Ayanda 2023a). The investment in R&D can also attract researchers, institutions, and talent, fostering a culture of networking and sharing of ideas. This measure, presented by ETSI, ITU-T, and the European Smart City Model demonstrates the commitment of local governments in R&D.

Although, according to feedback from the Division of Marketing and Innovation from the CMC, this measure is not the most relevant, it was considered significant and it was maintained. Not only is it extensively mentioned in the literature, but also reflects the commitment of the

CMC in fostering innovation, a commitment they embrace by designating the municipality as the “Innovation Territory” (Direção Municipal de Apoio à Gestão 2024).

In 2022, Cascais presented 8.254 million euros in R&D expenditures across institutions in the state sector, higher education, and private non-profit organizations, in contrast to 85.465 million euros of R&D expenditures in Oeiras municipality for instance (INE 2024a). This highlights the need for the CMC to strengthen its R&D strategy. Therefore, the local council should offer grants and loans to institutions engaged in research and technological development activities. Berlin’s Pro Fit program provides financial support to SMEs and research institutions, supporting them during all phases of the innovation process (Senate Department for Economics, Energy and Public Enterprises n.d.). Moreover, establishing innovation hubs as previously mentioned would also attract more businesses and research institutions to Cascais, fostering R&D.

1.2.2) Enhance entrepreneurial growth by creating the necessary conditions for the establishment of companies

Entrepreneurship plays a crucial role in economic development and growth (Doran, McCarthy and O’Connor 2018, 4) by fostering competition, increasing the diversity of the products and creating new jobs. Furthermore, it introduces new innovations and enhances productivity, contributing to economic resilience and progress (Doran, McCarthy, and O’Connor 2018, 4). Moreover, entrepreneurship can also be determined in the achievement of the Sustainable Development Objectives, specifically objective 8.

In a Smart City context, companies, namely startups and small businesses, have an important role in driving innovation by creating new ideas and solutions to the market, contributing to propel the economy forward. Therefore, it is essential that Smart Cities provide the proper

supportive infrastructure for the establishment of companies, such as incubators and accelerators (Ayanda 2023b). Two measures were defined for this objective:

1.2.2.1) Support Programs (1-5)

This measure, established by the Eden Strategy Institute, is based on a scale of 1 to 5 (5 being the highest value) (Appendix 9.10) and assesses the local government capacity to introduce programs that encourage private actors to participate in Smart City initiatives, such as incubators, collaborative and digital platforms and networks (Eden Strategy Institute 2018). It also contributes to establish a conducive environment for the establishment of companies in the city by attracting startups and SMEs.

The CMC, through the DNA Cascais project, has already implemented incubators that provide companies with support for business development through technical orientation, access to funding and investors, shared facilities, specialized consultancy, and access to training (DNA Cascais, n.d.c). Additionally, DNA Cascais promotes Startup Mentoring, helping entrepreneurs optimize business plans, assess businesses ideas for innovation, scalability, and alignment with the skills and background of entrepreneurs (DNA Cascais 2023).

Inspired by Startup SG, a platform supporting entrepreneurs in Singapore, the CMC could implement a single, unified platform aiming to centralize opportunities for businesses based on their needs. This centralized platform would permit to consolidate all incubation, mentoring, funding, partnership opportunities, and news related to startups in one place, facilitating the utilization of these resources by entrepreneurs. By having an account in this platform, startups can showcase their potential, attracting the visibility in local markets, discover new investments and business opportunities, stay up to date with the latest ecosystem news, and connect with a vast network of other startups and investors. This platform, trough machine learning, enables

the expansion of this network with personalized recommendations of potential business partners, fostering co-creation (Enterprise Singapore n.d.a).

Moreover, this platform could also include talent programs, designed to support startups in having access to skilled talent. For instance, internship and apprenticeships programs aimed at connecting recent graduates with startups, as well as partnerships with universities and research institutions, ensuring that they have access to skilled researchers and experts helping them to build technological capabilities (Enterprise Singapore n.d.b).

Additionally, and taking as example Barcelona Activa, the CMC could also provide specialized advisory services to SMEs to support their digitalization processes. This program defines a digitalization plan, identifying solutions to be adopted, namely the adoption of digital tools to streamline operations and the digitization of management processes (Barcelona Activa, n.d.b).

Finally, the CMC offers a range of financial support measures for companies, including access to bank financing, business angels, crowdfunding, and incentive systems. To complement these efforts, the CMC should continue to offer personalized financial support to businesses. Additionally, fostering stronger connection between these businesses and potential investors through network events and pitch sessions (Enterprise Singapore n.d.a) would attract more investment and strengthening the entrepreneurial ecosystem in Cascais.

Therefore, it is considered that the CMC is on level 4 (Appendix 9.10), having already established numerous support programs. However, to reach level 5, the local council could focus on expanding the services to entrepreneurs and enhance the ones already in place, to make them more accessible.

1.2.2.2) New Businesses Registered per 100 000 inhabitants

This measure is established by ETSI. The number of businesses registered can inform a city's level of economic activity and performance, providing an indication of the overall business

climate (ETSI 2017), as well as the local entrepreneurial mindset. Strong entrepreneurial activity is also closely linked to a dynamic and growing economy (ETSI 2017). This measure includes startups as well, an important element of economic prosperity, as they have a crucial role in driving economic growth by spurring innovation, enhance competition, offer new products and services and create new jobs (Mehmeti and Musabelli 2024, 63).

1.2.2.3) Survival rate of New Businesses

This measure was suggested by the Marketing and Innovation Division and is equally present in ISO 37122. It is an important measure as it provides insights on the local business environment and the extent to which it provides sufficient support and resources for new businesses to succeed, as well as the sustainability of those businesses, essential for long-term entrepreneurial growth.

All the initiatives above contribute to the increase of these two measures.

F. Discussion and Recommendations

As a result of the study conducted, some topics can be explored regarding the development of the BSC for the context of the Cascais Smart City. In this respect, some recommendations will be made to promote the implementation and adaptation of this management tool in order to contribute to the evolution of Cascais as a Smart City, for which the objectives of the 2030 agenda play a relevant role.

As a result of adapting the BSC to the nature of the local council, the basis of support is the Financial Perspective, since investments in the context of a Smart City can represent a challenge for a public organization. In the specific scenario of the CMC, financial resources were referred to as not being a constraint, but it is essential to maintain this tendency. To this end, optimizing

the budget and attracting the private sector are objectives that must be retained within the organization.

Moreover, the attainment of the objectives will be challenging in the absence of the effectiveness and efficiency of the CMC internal resources. The Learning and Growth Perspective encapsulates the commitment to Governance, ensuring the seamless functioning of the local council with regard to processes, human resources, technologies, and the network of partners.

Once these objectives have been achieved, it is possible to establish objectives related to the service provided to citizens with the aim of improving their quality of life. In this context, the Processes Perspective encompasses the areas of intervention delineated by the CMC as a Smart City. These objectives are unified by a common focus on innovation, sustainability, the preservation of resources, social and territorial cohesion, and active citizenship.

All the previous perspectives strive to create public value, and, for this reason, this is the final perspective. As mentioned above, the CMC's ultimate objective is to promote the well-being and quality of life of citizens, ensuring their involvement and participation in governance and supporting the development of projects and initiatives with the required technological skills and resources.

During the Work Project, some constraints to the development of the BSC and its implementation were discerned. Some of them are considered common implementation issues, as explained in the Literature Review.

Primarily, CMC is undergoing significant changes and new developments in terms of internal procedures and resources that greatly impact governance. However, if such changes and developments were already implemented, the development of the BSC would have a more solid base of information on the local council's needs. For example, so far, the CMC has defined its

mission, vision and values, however, the strategy has yet to be developed. Since the BSC is a tool that aims to monitor and facilitate the implementation of the CMC's strategy, until the strategy is defined, the development of this tool as well as the achievement of the strategic objectives are compromised.

Furthermore, the CMC intends in the short-term to guarantee internal organization in terms of procedures, human resources and technological resources. Currently, the entity is obtaining input from managers through a questionnaire that addresses questions about governance and political context, organization and human resources, data and technology, innovation and sustainability. The purpose is to conduct a diagnosis of the local council, gathering information that is either missing or out of date, as well as ensuring that the process of collecting, processing and sharing information is more efficient. In the absence of this information, it is not feasible to determine the local council's current situation with regard to the measures that have been established and, consequently, no targets have been defined. Accordingly, it is highly recommended to specify targets when this information is clear, since it is an essential element for monitoring and achieving the objectives.

As was mentioned by the local council during the meetings throughout the development of this Work Project, the CMC is deeply committed to data collection, analysis and sharing. However, it was stated that the adoption of new technologies is not regarded as a priority for the following years. This approach constitutes a limitation for the Smart City progress, since the concept of a Smart City is profoundly related with the adoption of new technologies as a lever to truly become a Smart City. Consequently, it is relevant to innovate and adopt new technologies appropriate to the achievement of strategic objectives, to continue its positive path towards becoming a Smart City.

Regarding the BSC, two final recommendations can be outlined. On the one hand, cascading the BSC to the various divisions and, if appropriate, to the various departments would enable a more effective and clear communication of the CMC's strategy and objectives, contributing to the commitment and alignment of resources. This is an essential step, especially since it is a large public entity with a complex structure, therefore the BSC also becomes complex.

Moreover, this tool should be adapted to the needs and context of the organization and, accordingly, should be reviewed whenever necessary.

The implementation of the BSC by the local council, developed in detail in this Work Project, is expected to foster the main objective of achieving the plan Cascais 2030 and to effectively evolve into a Smart City. In addition to this valuable and effective tool, the local council could benefit from utilize complementary frameworks, which can improve operational efficiency, support the visualization of the BSC implementation, and further contribute to achieve all the objectives.

A framework developed by Meadows (1999), called Leverage Points: places to intervene in a system, mentioned twelve different places to intervene in an organization, which impact it at different levels. The author defined leverage points as "*places in a complex system where a small shift in one thing can produce big changes in everything*" (Meadows 1999, 1). The twelve intervention places started in the least impactful, as a change in constants, parameters, numbers (such as subsidies, taxes, standards) and the most impactful, the power to transcend paradigms. This last point explains that if the organization is capable of detach itself from paradigms and believe that no paradigm is true, it should be able to choose any paradigm that helps the organization to achieve its objectives, allowing profound transformations and develop innovative solutions (Meadows 1999).

The local council could utilize this approach to identify where each proposed change outlined in the developed BSC aligns on the leverage points list. If this approach is applied, it could assist the local council to recognize which of the delineated initiatives have a broader impact on the organization in a way of achieving the main objective of becoming a Smart City. The BSC developed presents plenty of detail, which could be a tremendous challenge for the local council to implement at once, so it is crucial to recognize the most impactful initiatives, specifically the leverage points, to distinguish the most urgent ones to be implemented.

An additional tool that could be implemented by the local council is a Strategic Dashboard, where it is possible to monetarize the measures and initiatives implementation, through data visualization (Allio 2012). The development of one dashboard could assist the local council to understand in which phase of implementation their new initiatives mentioned in this Work Project are, and to visualize how far the CMC is from achieving the targets defined. Pappas and Whitman (2011) mentioned three types of dashboards which could be implemented in different corporations: strategic, operational, and analytical. The local council should implement the strategic one, since its goal is to demonstrate its performance relative to the defined Smart City's objectives. To a proper evaluation visualization, it is crucial to have clear information, easy to understand and to analyze, to really support in the performance evaluation.

Pappas and Whitman (2011) mentioned the importance of possessing line graphs, bar charts and bullet bars, which represents three relevant visualization tools to present in this dashboard tool. While the local council is extremely committed to data collection and analysis, it should be easy to develop a dashboard with all the relevant and necessary information to understand at what stage the initiatives and targets defined in the BSC are. Moreover, these graphs and charts could allow a better understanding for all the CMC employees, contributing to a higher general commitment in the local council.

G. Conclusion

Around the world, the concept of Smart City is spreading, leading to more cities adapting their initiatives to promote connectivity between data and services, using technological tools to promote ICT. The above-mentioned trend has the ultimate goal of solving urban challenges and improving quality of life for citizens.

The execution of this Work Project with the CMC proposes a performance monitoring model to examine the impact of the local council strategy and corresponding initiatives on evolving as a Smart City and fostering a greater quality of life for citizens. Additionally, the purpose also involves the replication of the developed BSC for other municipalities, also aiming to evolve as a Smart City.

The BSC was the model chosen for analyzing the local council, due to its usage for monitoring and evaluating the implementation of an organization's strategy. In the case of the CMC, changes had to be made so the model can be implemented accurately to the public sector, as it was mentioned in the Methodology. The proposed model on this Work Project is an adaptation that brings a valuable response to the CMC challenge mentioned above. For that matter, the customer becomes the result of the other three perspectives, as the goal of a Smart City is to create and continuously improve public value.

While building the BSC, some limitations have emerged, as previously mentioned in the Discussion and Recommendations. That led to an incomplete model due to inability to define targets for the diverse measures. Therefore, the next stage for the CMC to continue developing this model is to define the targets for the chosen measures and continuously monitor the achievement of those same targets, which is crucial for the BSC to be useful for the local council.

Overall, the proposed BSC works as a strong base for future actions to better guide the CMC to evolve as a Smart City, by providing objectives, measures and initiatives for the local council to implement internally and externally in its areas of intervention, to achieve its ultimate goal of improving citizens' quality of life. By building on the model, Cascais is better positioned to achieve its motto of "A better place to live for a day or a lifetime".

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I. Appendices

1. Measures for Smart Cities

In the last years, several authors have developed studies and research to analyze how far a city is from becoming a Smart City. To perform these investigations, the authors outlined distinct measures, which can be used for the local councils to measure its performance in Smart Cities' area. In this appendix, three examples of different studies with several measures are presented, which were previously outlined above in the Work Project.

For the Smart City INDEX, in the first pillar, the structures, for the health & safety dimension, some examples of measures used are: recycling services are satisfactory; public safety is not a problem; medical services provision is satisfactory; and finding housing with rent equal to 30% or less of a monthly salary is not a problem. In the mobility dimension, the measures are: traffic congestion is not a problem; and public transport is satisfactory. The opportunities (work & school) dimension has in consideration some measures, for example: most children have access to a good school; lifelong opportunities are provided by local institutions; business is creating new jobs; and minorities feel welcome. In the activities dimension, there are only two measures: green spaces and cultural activities (shows, bars and museums) are satisfactory. For the last dimension, the governance, some measures analyzed are: information on local government decisions are easily accessible; corruption of city officials is not an issue of concern; and residents contribute to decision making of local government (IMD Business School 2024d).

For the second pillar, technology, each one of the 5 dimensions has different measures from the ones in the structure pillar. For the health & safety, some of the measures are: online reporting of city maintenance problems provides a speedy solution; a website or app allows residents to easily give away unwanted items; free public Wi-Fi has improved access to city services; and arranging medical appointments online has improved access. In the mobility dimension, some

examples of used measures are: car-sharing apps have reduced congestion; bicycle hiring reduced congestion; and online scheduling and ticket sales has made public transport easier to use. In the opportunities (work & school) dimension some of the measures utilized are: IT skills are taught well in schools; online services provided by the city has made it easier to start a new business; and the current internet speed and reliability meet connectivity needs. In the activities dimension, only one measure is utilized: online purchasing of tickets to shows and museums has made it easier to attend. For the last dimension, governance, three measures are used, namely: online voting has increased participation; an online platform where residents can propose ideas has improved city life; and processing Identification Documents online has reduced waiting times (IMD Business School 2024d).

In the research conducted by Bosch et al. (2017), in each of these 4 dimensions, the authors divided into several areas. In the people´s dimension, the division is: health; safety; access to services; education; and quality of housing and the built environment.

For this people´s dimension, some examples of measures are: share of population with access to a public transport stop within 500m; % of bicycle paths and lanes in relation to the length of streets (excluding motorways); the percentage of schools with environmental education programs; green area (hectares) per 100.000 population; among others (Bosch et al. 2017).

In the planet´s dimension, the authors separated into 5 areas, namely: energy & mitigation; materials, water and land; climate resilience; pollution & waste; and ecosystem. Several measures were attributed to this dimension, for example: annual concentration of relevant air pollutants; percentage of city's solid waste that is recycled, percentage of total energy derived from renewable sources, among others (Bosch et al. 2017).

For the prosperity dimension, the chosen areas are: employment; equity; green economy; economic performance; innovation and attractiveness & competitiveness. For these six areas, some examples of the established measures are: percentage of the labour force unemployed; %

of population living in affordable housing; percentage annual procurement using environmental criteria as share of total annual procurement of the city administration; and % of innovation hubs in the city, whether private or public, per 100.000 inhabitants (Bosch et al. 2017).

For the last dimension, the authors separated into 3 areas, being them: organization; community involvement; and muti-level governance. The measures for these areas are: the number of projects in which citizens actively participated as a percentage of the total projects executed; the extent to which the city has a supportive smart city policy; annual expenditures by the municipality for a transition towards a smart city; among others (Bosch et al. 2017).

In the study developed by Bîrgovan et al. (2022), to define the thirty measures, the authors had also in consideration the seven pillars of a circular economy, namely: "*materials are cycled at continuous high value; all energy is based on renewable sources; biodiversity is supported and enhanced through human activity; human society and culture are preserved; the health and well-being of humans and other species are structurally supported; human activities maximize the generation of societal value; and water resources are extracted and cycled sustainably*" (BÎrgovan et al. 2022, 9), which are incorporated in the environmental, economic and social dimensions of a Smart City.

In the environmental dimension, the authors established several measures, such as: annual amount of CO_2 emissions; amount of waste produced in the city; use of renewable resource; and eco-car strategy - municipal fleet powered by biogas, hydrogen, or electricity (including plug-in hybrids) (BÎrgovan et al. 2022, 9).

For the economic dimension, some of the measures defined are: budget allocated to stimulate pilot projects that employ circular economy at the local level; waste management costs; environmental costs (costs of exhaustion, water pollution, CO_2 emissions, toxicity, and land use in EUR per kilogram); E-government; and sales of locally produced goods (Bîrgovan et al. 2022, 9).

In the social dimension, the authors determined several measures, namely: liveability/quality of life ranking; employment opportunities, job creation, number of new jobs (circular economy, green, recycling); unemployment rate; environmental education (% of schools); percent of population living below poverty line; among others (Bîrgovan et al. 2022, 9).

2. The Strategic Sweet Spot

Figure 2 - The Strategic Sweet Spot

3. Translating Vision and Strategy: Four Perspectives

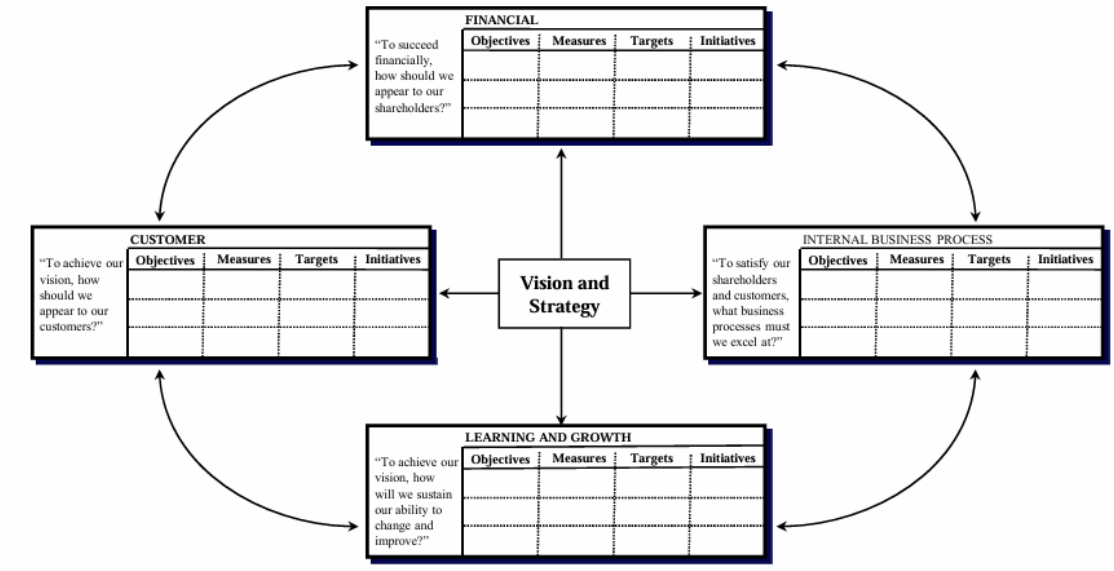

Figure 3 - Translating Vision and Strategy: Four Perspectives (Kaplan 2009)

4. Strategic Triangle

Figure 4- The Strategic Triangle by Moore (2003)

5. BSCs developed for Smart Cities

The appendix demonstrates three examples of BSC developed specifically for Smart Cities, to help the cities to clearly define measures to analyze its performance in some specific areas of the BSC, adapted for Smart Cities.

In the research developed by Neiva et al. (2021), to define the indicators for each dimension and the drivers for them, the authors developed a multicriteria tree, with several common objectives for Smart Cities. In the tree, fourteen measures were created and then for these measures, the authors formulated forty initiatives (Neiva et al. 2021, 1665). To determine which of these forty initiatives were going to be used in the BSC, thirty experts in sustainable development were consulted and then came up with the fourteen most relevant initiatives to be used in the BSC (Neiva et al. 2021, 1666).

The measures were assigned in the following way to each dimension of the BSC. For the social dimension, the authors allocated 2 measures: transparency and social equality and community involvement. For the environmental dimension the measures were: waste, land use, greenhouse gas emissions and water resources. For the urban infrastructure dimension, the authors assigned: transport, occupation and urban space, pollution and comfort of contributors. In the

last dimension, the economic and financial sustainability, the measures were: access to public goods, governance, rate of return on investment and employment rate (Neiva et al. 2021, 1667). To develop the final hypothetical BSC for Smart Cities, the authors associated initiatives in each dimension. These initiatives allow the cities to be on the right track to become Smart Cities. In this example of BSC, for the social dimension, the initiatives are: increase the social justice; encourage sustainable production and consumption; and increase the level of employment. For the environmental dimension, the assigned ones are: CO2 reduction strategy; recycled waste; land use policy; policies for renewable energy; and access to drinking water. The urban infrastructure dimension has allocated the following initiatives: promote research, capacitation and technical support through partnerships for development towards sustainable transport; create policies towards building urban spaces in a regular, adequate and sustainable way; and ensure the development of quality infrastructure to promote social welfare accessible to most of the population. For economic and financial sustainability, access to health; access to education; and promotion of public transportation are the relevant initiatives. (Neiva et al. 2021, 1667).

In the study developed by Momot et al. (2023, 6), for the smart people perspective, the measures were: human capital; digital skills; and social cohesion. In the innovative governance perspective, the assigned ones are: partner ecosystem; e-governance; administrative processes; government accountability and transparency; and urban planning. In the second perspective, ICT and infrastructure, the measures are: digital infrastructure; telecommunication; and social networks. For the smart economy perspective, the allocated ones are: cashless payments; financing; e-commerce; international integration; investments; and innovations. For the last perspective, the quality of life and urban comfort, the allotted measures are: transportation; healthcare; security; education; environment; culture; and information policy.

For the example of a BSC developed by Maccani, Donnellan, and Helfert (2013), the authors assigned the measures in the following way. For the technological infrastructure, the authors identified three, being them: ambient intelligence, digital city and intelligent city, which they considered fundamental in developing this dimension (Maccani, Donnellan, and Helfert 2013, 57). In the social perspective, the authors divided into four measures, namely: learning city; creative city; human city; and knowledge city (Maccani, Donnellan, and Helfert 2013, 57). The public-people-private partnership dimension has four different measures, such as: collaboration, participation, engagement and partnerships (Maccani, Donnellan, and Helfert 2013, 58). In the perspective of governance and management, the measures can be defined as: managerial interoperability across city´s smart services; applications; organizations; and central leadership, with a suggestion of the authors to create a Chief Information Officer (CIO) for the last one (Maccani, Donnellan, and Helfert 2013, 58). For the last dimension, the smart information services, the authors described in just one measure: make sense of data; and to achieve it, they proposed the implementation of an integrated collective awareness platform at a city's scale (Maccani, Donnellan, and Helfert 2013, 59).

6. Meetings with the CMC

Date and Hour	People Involved	Main Topic	Key Points Discussed
31/05/2024 at 11:00	Dr. Marta Cotrim (Marketing and Innovation Division) Dr. Cláudia Carvalho (Marketing and Innovation Division)	Introduction of the Work Project to the Division of Marketing and Innovation	• Presentation of the objectives to be achieved with the Work Project. • Presentation of the internal document of the Marketing and Innovation Division concerning the Smart City Program, including the areas of intervention, mission and values.
13/09/2024 at 14:00	Dr. Marta Cotrim Dr. Cláudia Carvalho	The historical, present and future contexts of the Smart City project in Cascais.	• Origin of the Smart City Program • Role of the Marketing and Innovation Division. • Pillars and areas of intervention of the program. • Involvement of different departments in the program. • Process of implementing initiatives and different partners. • Financing of initiatives • The ecosystem of partnerships and pilot projects, namely the collaboration and mutual benefits between Cascais and companies seeking to test their projects.
24/09/2024 at 15:00	Dr. Cláudia Carvalho Dr. Sara Torres (Marketing and Innovation Division)	Financing for Cascais 2030 and Smart City initiatives	• Sources of financing for Smart City initiatives. • Budget process, including how the annual budget is defined and how it can be modified throughout the year. • Process of EU funding for Smart City initiatives.

03/10/2024 at 15:00	Dr. Cláudia Carvalho	Mission, vision and values defined by the Marketing and Innovation Division for the Smart City Program and presentation of the Balanced Scorecard Perspectives	• Role of the Marketing and Innovation Division. • Collaboration of the Marketing and Innovation Division with external partners. • Vision, mission, values and lack of strategy regarding the Smart City program. • Presentation of the perspectives for the proposed Balanced Scorecard. • Connection between the 6 areas of intervention and the 4 commitments of the Smart City Program. • Role of the actual executive in the Smart City program and the changes that may be implemented with a new executive.
22/10/2024 at 14:15	Dr. Marta Cotrim Dr. Cláudia Carvalho	Presentation of changes to the structure of the Balanced Scorecard and discussion of key topics for certain perspectives	• Presentation of modifications to the structure of the Balanced Scorecard. • Discussion of key points regarding the Financial Perspective, focusing on the *Plano do Orçamento* for the 2024-2028 period. • Discussion of key points regarding the Learning and Growth Perspective, namely the ecosystem of partnerships and internal systems. • Discussion of key points regarding the Public Value Perspective, namely the methods of gathering citizen feedback. • Process of defining a strategy within the Marketing and Innovation Division.
28/10/2014 at 14:30	Dr. Cláudia Carvalho Dr. Sara Torres	Presentation of the objectives defined for the Balanced Scorecard	• Presentation of the objectives defined for each of the 4 perspectives in the Balanced Scorecard. • Feedback from the Marketing and Innovation Division regarding the selected objectives.
20/11/2024 at 15:30	Dr. Cláudia Carvalho Dr. Sara Torres Dr. Teresa Ramos (Marketing and Innovation Division)	Presentation of measures defined for the Balanced Scorecard	• Presentation of measures defined for 3 perspectives of the Balanced Scorecard. • Feedback was given to the selected measures and objectives.

6.1 Meeting of 31st of May 2024

The goal of the first meeting was to give the group the opportunity to present itself and to meet two members of the Marketing and Innovation Division, who supported the work project with the necessary information. An internal document from this Division was presented concerning the Smart City Program, allowing the group to understand the work already developed in the local council. Furthermore, it was possible to discuss the expectations of the work project from both sides.

At the end, the group and the CMC agreed to schedule the next meeting for September to get the necessary information to start developing the work project.

6.2. Meeting of 13rd of September 2024

In the second meeting, held on the 13th of September 2024, the key points discussed included the origin of Smart City program and its responsible division. The Smart City program emerged as an idea from the executive, as it was considered that Cascais had been a Smart City for 660 years, that is, since its creation. This program has been in place for about 10 years, with an understanding that more than just technology, a Smart City is about the quality of life. Therefore, despite meeting the criteria to be considered a city, the municipality chose to remain a village, a concept that is more closely related to quality of life.

Thus, the division responsible for the Smart City program was created, originally named Division of Information and Intelligent Cities, with the aim of creating a strategic plan for Cascais as a Smart City. Later, and with the executive change, the division was renamed to Marketing and Innovation Division, with the responsibilities of fostering innovation, marketing the municipality for its quality of life, as well as monitoring and provide data support to the various projects implemented in the municipality. Therefore, as a data-driven municipality, the Marketing and Innovation Division has the responsibility of organizing and gathering data to

evaluate the performance of the municipality, as well as to support the other departments in the implementation of projects, being almost as internal consultants, helping to apply innovative methodologies and monitor progress. This division also houses a Data Analysis unit responsible for managing the open data platform (Cascais Data).

The meeting then shifted to the present context of the Smart City program, the pillars and areas of intervention on which it is based and the reason behind their choice. Initially, the Smart City program was based in six areas of intervention, usually found in Smart City frameworks, being then reorganized in four strategic pillars, which the division is still refining and perfecting: Governance, Citizen, Talend, and Future. This reflects the Smart City vision that the CMC as for the municipality.

It was also discussed if this program was seen by the municipality as a priority, and from that point, how the different departments of the local council contribute to the Smart City project with their own initiatives. Therefore, the Marketing and Innovation Division is not directly responsible for each Smart City project implemented. Each department within the CMC contributes with their own initiatives to build a smarter city, making the Smart City program an "umbrella" that encompasses all the relevant questions of the municipality's ecosystem, such as the environment, housing issues, citizens participation, mobility, etc.

The process of implementing an initiative was then discussed, particularly how that process is different depending on the areas of intervention, the available partners and if it is a pilot project, and whether certain areas were considered to have more prevalence than others. In this context, it was noted that companies could contact the division to address urban challenges during the year and implement project pilots.

Then, it was explored how initiatives are financed. There is no dedicated budget solely for Smart City projects, with the funding coming from the general budget assigned to each

department. It was noted that there were no financial constraints within the CMC, and that the challenge to implement projects usually lies in the complexity of public procurement. In this sense, the CMC has established a funding line for innovation to minimize the procurement process complexity. Moreover, many projects receive funding from the European Union.

Additionally, it was emphasized that even with failed initiatives, most of them being pilot projects, they were important to gather valuable information and improve future implementations. Two examples were discussed in this context, such as the City Points app, which faced issues due to poor integration with the municipal system and lack of user data control, as well as the autonomous vehicle project that connected the Carcavelos train station to NOVA SBE, that failed due to regulatory constraints.

Finally, what is the aim of implementing the Balanced Scorecard in the context of the Smart City was explained in order to align expectations.

Despite this discussion, several doubts arose that were further discussed in the following meetings: what are the primary responsibilities of the Marketing and Innovation Division; how does the Marketing and Innovation Division can assess all the initiatives contributing to the Smart City Project that were taken by the other departments; how does the financing of initiatives work, especially concerning those initiatives that were proposed by companies and were not planned initially.

6.3. Meeting of 24th of September 2024

The meeting conducted on 24th September 2024 between the group and the CMC focused on understanding the financial context that supports the Cascais Smart City. The discussion included the primary sources of funding, financial planning, and resource management for strategic projects.

The CMC emphasized that there are no income sources exclusively for specific programs or initiatives, such as the Smart City program. Financial planning is conducted annually, with individual departments proposing budgets for their respective projects and the budget is adjusted throughout the year based on evolving needs and the availability of new funding opportunities. In the preparation stage for each new project, especially when new opportunities arise during the year, a financial plan is also prepared to assess whether the project is viable and whether it needs to be funded by international entities. However, resource management is necessary in order to allow the reuse of existing resources for each project.

Cascais has the role of "living laboratory" where experimental projects are piloted to test innovative solutions in real-world contexts, without any financial exchange in many cases. These initiatives involve partnerships with private companies, universities, and other entities, allowing for mutual learning. The CMC provides the territory for testing, gaining insights into the feasibility and scalability of proposed solutions, by obtaining citizen feedback.

There are projects for which CMC applies for financing streams or joining existing networks of cities collaborating on shared goals. For European-funded projects, co-financing is often required, with the municipality responsible for covering a portion of the expenses. This process is complex, requiring auditing and compliance with regulations. In most cases, the CMC needs to proceed with the investment and afterwards it receives the return on that investment, which often impedes the implementation of these funds, since there is not always the possibility of assuming the investment.

Lastly, it was discussed that parking taxes and the establishment of the headquarters of car rental companies in the municipality contributed to the possibility of guaranteeing free access to public transport for the Cascais citizens. The latter enables the municipality to collect car tax as revenue.

6.4. Meeting of 3rd of October 2024

On October 3, 2024, we went to the local council to discuss the ongoing development of the BSC tailored to Cascais as a Smart City. The meeting served as a key moment to align ideas, review progress, and address how the academic perspective of the project could complement the city's operational needs.

The conversation opened with CMC reflecting on the work completed so far and emphasizing the importance of setting clear and realistic goals for the project's completion by December. It was noted that while the idea of using a BSC to monitor Cascais' Smart City strategy was promising, there was still a need to ensure it addressed both the academic requirements of your project and the city's practical expectations. It was referred that the model should ultimately help measure public value—specifically, how municipal initiatives improve the quality of life for Cascais' residents.

CMC explained that it has historically relied on internal metrics to evaluate its initiatives, which often focus on operational performance. However, these measures don't fully capture the direct impact on citizens. Our proposal to put public value at the top of the BSC was well-received as a way to bridge this gap. The local council also pointed out that many existing international standards and frameworks, like ISO 37122 or Bright Cities, fall short in addressing the local and municipal context. Instead, it was encouraged a more localized approach that considers Cascais' specific needs and characteristics.

As the discussion progressed, CMC outlined Cascais' four main commitments—sustainability, governance, citizen engagement, and quality of life. These commitments represent the city's priorities and provide a clear structure for evaluating its progress. At the same time, it was highlighted the challenge of reconciling these commitments with the six thematic areas currently used to organize municipal projects. This overlap created a need for a flexible model

that could connect strategic priorities with the practical work being carried out by different departments.

The CMC then provided insights into the way they operate. It was described the local council as a dynamic and decentralized organization, where many initiatives emerge through partnerships and departmental creativity. While this fosters innovation, it also complicates efforts to consolidate strategies under a unified model. Departments like mobility, housing, and public participation often act independently, making it essential for the BSC to accommodate a diverse range of operations.

During the meeting, the group also managed with the challenge of categorizing projects within specific commitments. The local council illustrated this with examples, such as the Mobi Cascais app, a tool designed to enhance urban mobility by providing real-time transport information. While its primary focus is on mobility, the app's real-time data and optimized services align closely with governance objectives. Another example was participatory budgeting, which could be seen either as a tool for fostering citizen engagement or as a governance initiative, depending on the perspective. These examples underscored the importance of looking at projects from multiple angles when integrating them into the BSC.

CMC also shared its mission, vison, values and updates on the municipality's efforts to refine its strategic planning. While Cascais is working on consolidating its strategies into a comprehensive document, it was noted that this process was still underway and might not be finalized by the time your project is completed. Despite this, it was reassured the team that the ideas discussed in the meeting aligned closely with the city's broader vision and strategy.

The conversation then turned to metrics. CMC stressed the importance of creating indicators that are both meaningful and actionable. The local council is particularly interested in developing a localized quality-of-life index that reflects the tangible benefits of municipal

projects. Unlike broad international metrics, this index would be tailored to the city's unique circumstances. Our team was encouraged to incorporate this focus into the BSC, emphasizing the need for indicators that genuinely measure the impact on citizens.

The meeting was a pivotal moment in shaping the BSC project for Cascais. It clarified the city's priorities, reaffirmed the importance of focusing on public value, and highlighted the need for a framework that bridges strategy with practical operations. By aligning the six areas of intervention with localized metrics and fostering a collaborative spirit, both the team and CMC were set to develop a meaningful and impactful tool that reflects the city's vision as a Smart City.

6.5. Meeting of 22nd of October 2024

The fifth meeting, held on 22nd of October 2024, focused on understanding CMC objectives related to evolving as a Smart City, to then start developing the BSC.

At the beginning of the meeting, the group proposed scheduling weekly meetings (30 minutes) with the local council, until early December, to ensure that both the group and the local council had availability, with the possibility of adjustments based on the need.

Regarding the BSC, it was first debated the order by which the model was going to be structured, as a reminder for what was explored in the previous meeting (3rd of October 2024). Additionally, it was explained that, to start defining the BSC's objectives, the group performed a SWOT Analysis. With this analysis, the group explained how CMC's areas of intervention were going to be distributed by the four different perspectives.

The following topics discussed were regarding three of the four perspectives: the Financial Perspective, the Learning and Growth Perspective, and the Public Value Perspective. For the

Financial Perspective, questions were made regarding the document *Plano de Orçamento 2024-2028*, developed by CMC, to understand if there were objectives already defined until 2028.

Firstly, it was explained how revenues and expenses are estimated, as there are already some commitments at the start of the year related to pre-defined expenses. Furthermore, CMC explained that often, the central government returns investments that the local council has already made. Examples of EU or national programs were also provided, while going through the document. Moreover, it was important to understand co-financed projects. The key points lead to the conclusion that, often, CMC has already spent the total value needed for the projects, and only then does the local council receive the co-financed part from the partner entity.

As a final point, the CMC stated that there is no available information regarding specific financial objectives with defined targets. It was added that the executive change in the CMC in the next year may be a barrier to define those same targets.

For the Learning and Growth Perspective, the discussion started with the ecosystem of Cascais, as it was stated in the previous meeting (3rd of October 2024) that it represents a challenge for CMC. As a response, the local council explained that it represents a challenge in a way that the relationships must be fostered to integrate partners in projects, while understanding internal needs and existing projects, to be able to make proactive responses to external contacts, to identify which projects might benefit from external collaboration.

Furthermore, the CMC mentioned an initiative to foster the relationships within the ecosystem, which referred to the development of a metropolitan platform, together with Deloitte, which already exists in other municipalities within the Lisbon Metropolitan Area. The local council emphasized that this platform would provide data from diverse sensors to improve the response of critical problems arising in Cascais.

Moreover, it was discussed which systems and software were used internally in CMC. The local council gave some examples of systems combining different sources of data and explained that there is a wide range of different systems and software, which are not listed in one document. Due to this response, it was suggested that an e-mail should be sent listing the systems used internally by CMC, to understand its procedures and what can be improved in the future, to ensure that there are no repeated initiatives in the BSC.

The last considered perspective was the Public Value Perspective, in which it was firstly discussed the feedback from citizens regarding their opinion on whether their needs are being met. Therefore, it is important to understand if it is a regular process or if it happens occasionally, and how this feedback is collected. The CMC explained that it depends on the needs from specific services, whether the service will integrate improvements, on which it needs public opinion. The way that feedback is collected also depends, as it can be collected by volunteers on the streets or as an online questionnaire, promoted on social media, or even through satisfaction questionnaires on phone lines. However, as was highlighted by CMC, there is no common process to gather feedback from citizens, depending on the service itself, or the dimension of specific projects.

Furthermore, it was questioned if there is a tool to measure citizens' participation in projects. The CMC explained that the diverse departments within the local council have a way to measure whether the implementation of the project is being successful. However, there is no centralized document with that specific information. Moreover, CMC added that there is an internal initiative to gather all that information on a Data Warehouse.

Lastly, aside from the perspectives, it was discussed whether the CMC had already been able to analyze the previously sent document to help them define the strategy. The CMC highlighted that the challenge is to know how to apply the theory and put it into practice. The local council

explained that there is already a strategic document being developed, however, it will not be finished by the time the group needs to deliver the whole Work Project.

Still, it was highlighted that the main objective of CMC can be summarized as to guarantee that both the resident citizens and visitors have the greatest quality of life, by providing innovative experiences. As a response, the group provided a helpful mindset to support the local council to define its strategy: to think about the strategy as the point that distinguishes CMC from the other municipalities, in an innovative and competitive way. The meeting ended with CMC suggesting a challenge to the group to define the strategy from our point of view.

6.6. Meeting 28th of October 2024

In the sixth meeting, held on 28th of October 2024, it was possible to understand that the constant contact between the citizen and the six areas of intervention, made it possible to outline the main gaps and to adapt the objectives of each area to provide a quick answer for what needs to be corrected. Moreover, it was notable that there is an alignment between the top management and all the departments, which contributes to an easier implementation of the projects.

Secondly, it was noticeable that the public procurement is an extremely bureaucratic process and different types of this process might come out depending on the values associated. Sometimes, with projects with a lower value, the local council develops a research in the market to understand the companies that could work together with and then the CMC presents its objective for one project. Afterwards, the entities provide a budget to develop the project and the one that match all the requirements and with the lowest budget, is accepted. When the projects require a higher investment, this process is made through public tenders, where every entity can apply, if it matches all the requirements and if it feels that could implement the project that CMC wants to develop. Furthermore, it was mentioned a platform where all these entities

and companies need to register and where all the documents, transactions and payments are managed at national level, to fulfil all the legal requirements.

In this meeting it was referred that the technology is not the main concern in the Smart Cities' topic for the CMC, as the priority for the local council focus more on the data collection, analyse and sharing with the citizens, to be able to understand where are the key interventions that need to be realized. In addition, it was mentioned the data warehouse which the local council utilize to develop all these collections, analysis and data sharing to different departments according to the needs of each one. Moreover, it was possible to note that for the CMC, there is a higher commitment with partnerships with companies in the municipality to provide opportunities to each entity to develop their projects, than for high investments in new infrastructures of technologies. It was stated that this topic does not represent a priority nowadays, but the possibility is always opened, since in the future, a higher investment in these new technologies could be needed.

Another topic discussed in the meeting was the large aspirations of the CMC of being able to attract all the citizens to participate and to be involved in the decision-making process, to diversify the citizens that regularly are involved.

Furthermore, it was presented by the group the three main objectives as a draft for Public Value Perspective in the BSC, which were well received by the CMC. These three objectives were: improve well-being and quality of life of citizens; ensure inclusive participation and citizen engagement and; promote technological literacy and digital inclusion among citizens.

The last topic presented to the CMC during this meeting was the several objectives defined for each of the four areas in the Process Perspective. In this presentation, it was possible to receive some positive and constructive feedback form the local council, which were extremely useful in the refinement of the final objectives.

6.7. Meeting 20th of November 2024

In the last meeting, held on 20th of November 2024, the main goal was to discuss the most important parts of the work project. It was possible to present a proposal of final objectives and measures and, to discuss with the local council what were their main recommendations for the group in these extremely important topics for the development of the BSC.

First, the CMC gave some feedback about the SWOT analysis developed for the local council. The CMC stated that the information transmitted by them about the internal negative points, might have been somewhat biased from reality, so the local council provided some suggestions to improve the SWOT analysis.

Afterwards, it was presented the measures for each objective in each perspective of the BSC. First, the group started with the presentation of the measures for the Public Value dimension, where it received positive and some constructive feedback from the local council about specific topics in this measurement. The local council provided relevant information to complement this dimension, more specifically about the green spaces in the municipality, their relevance of being close to residential areas and their importance in the flood control. The CMC referred, as well, the irrelevance of increasing the green spaces if they are inaccessible for the citizens, as the main objective of these green spaces is to give the opportunity to the citizens to benefit from them.

Then, it was presented the measures for the mobility area, where some feedback was received. The constructive feedback was pertaining to the electrical vehicles and some possible different measures related to it and with the main purpose of the public bicycles to rent in the municipality. Moreover, the feedback encompassed topics such as the measures of traffic systems available and the number of users of ICT apps for sustainable mobility.

Furthermore, the measures for the environmental and energy area were discussed where, once again, the CMC provided some suggestions. These suggestions allowed the group to improve some measures, which were focused on the energy consumption in the municipality and with the specificity of each ICT system to measure topics within this area.

Moreover, the measures associated with the society and education area were discussed, where some feedback were provided on topics related to projects developed for the young generation, programs of scholar entrepreneurship and the availability of computers in every school in the municipality.

Then, the measures for economy and innovation were approached, with some recommendations in topics such as the importance of partnerships with companies more committed with new technologies and connected with the market trends.

Furthermore, the last topic from the BSC discussed in the meeting was the measures for the learning and growth perspective, which were well received by the local council. The CMC referred to the importance of clearly defining a scale for some measures and the relevance of developing these measurements annually. In addition, it was mentioned the significance of maintaining an ecosystem of partnerships with the local organizations, the citizens and the social organizations.

The last topic debated during the meeting was the cascading of the BSC, where the group explained the importance of adapting the BSC to the reality and needs of each department in the CMC, to be able to implement all the relevant measures and initiatives outlined during this work project.

This was the last meeting, once the group did not come out with further questions as all the previous meetings served as inspiration for the conclusion of the work project. At the end, it was discussed the schedule for a future presentation for the local council, after the submission

of the work project, to present the final BSC and discuss it with several departments and collaborators involved in Cascais Smart City.

7. Hierarchy of a Balanced Scorecard

Figure 5- Hierarchy of a Balanced Scorecard by Wisniewski and Ólafsson (2004)

8. SWOT Analysis for Each Perspective

8.1.Financial Perspective

Strengths	***Weaknesses***	***Opportunities***	***Threats***
High level of financial autonomy, not having troubles with funding for its operations and projects	In pilot projects, often there is not a financial exchange, as only territory, data or knowledge are exchanged, leaving a gap for possible new sources of revenue	Seek financing and expertise from the private sector to have access to better innovation and technology	Bureaucracies behind grant applications due to procedures compliance and regulated audits, increasing the level of uncertainty to receive the funds needed
Circularity between taxes received and the investment area in which it is used	Several commitments made in a given year have high costs in subsequent years, which at times means that there is no room for new initiatives	National universities and public organizations contact the municipality for joint projects to combine experience, knowledge, and resources.	Large up-front investment on smart cities projects, before receiving the value, which is responsibility from the partner, that at times come after the project is finished
Positive evolution (2021-2023) of public revenues and expenses, by receiving more than expected, and spending less than budgeted.		Other cities, through sharing networks, seek for partners in a project which will help elevate the smartness degree	
Besides annual planning of public budget for revenues and expenditures,		International exposure by placing applications to European funds	

there is a constant adjustments, during the year, when additional events not expected arise			
		Co-financed projects where the expenditure of financial resources is shared with the partner.	

Table 1 – SWOT Analys for the Financial Perspective. Own Representation.

8.2.Learning and Growth Perspective

Strengths	***Weaknesses***	***Opportunities***	***Threats***
Citizen involvement in initiatives and decisions.	Limited training on Smart City topics for employees.	Growing corporate interest in innovation and sustainability attracts new partners.	Possible changes in leadership.
Collaborative team with aligned values, thanks to a stable leadership	Low proactivity in seeking partnerships with new companies.	Increased citizen engagement in sustainability and well-being.	Rapid evolution in trends and technology could shift municipal strategy.
Goals and measures support Smart City success.	Lack of a defined strategy hinders resource alignment.	Globalization allows for ongoing network connections.	
Funding sources enable training and new systems.	Insufficient documentation on systems, partners, and Smart City initiatives.	Municipality departments are open to innovation and cross-collaboration.	
Openness to new projects and experiments enriches the community.	Lengthy public procurement processes delay tech adoption for city innovation.	Potential to improve public services with advanced technology and automation.	
Strong partner network supports project development.		Expanding Data Cascais to provide more relevant data for citizens.	
Constant interaction between departments and social organizations.			
Close contact with academia for pilot projects.			

	Commitment to innovation and transparency.			
	Data Cascais portal provides accessible data, fostering transparency.			

Table 2 – SWOT Analysis for the Learning and Growth Perspective. Own Representation.

8.3.Processes Perspective

	Strenghts	***Weaknesses***	***Opportunities***	***Threats***
	Integration of digital skills for future education in municipal schools.	Low family involvement and participation in schools.	Integration of technology into the school curriculum and development of related skills.	Central government political dynamics may impose significant changes to the educational system that local authorities cannot influence.
	Community access to school resources, including sports facilities and libraries.	Lack of cooperation and communication between schools.	Focus on knowledge, skills, and creativity, with an emphasis on entrepreneurship from early education.	Funding restrictions may limit the educational system's operations.
	Commitment to achieving quality education as outlined in the Sustainable Development Goals 2030.	Limited participation of private schools in activities organized by the municipality.	Increase community access to educational facilities.	Interaction between various institutions in the educational system can negatively impact its functioning.
Society and Education	Availability of programs that promote lifelong learning opportunities.		Definition of thematic areas like citizenship, culture, sports, and health to address within the educational system.	Cooperation among educational actors is crucial; lack of collaboration may hinder necessary development in the education sector.

	Existence of the Municipal Participation System allowing citizens to engage in municipal issues according to their interests.		Development of joint initiatives between public and private schools to bridge gaps between the two systems.	
	Orçamento Participativo promotes active, informed, and responsible citizenship.			
Mobility	The road network connects the territory to schools in a dynamic and sustainable manner, with investments in efficient public transport and new mobility options that minimize environmental impact. This includes free municipal public transport services.	Network organization prioritizes connections to train stations, impacting transversal links that have significant gaps.	Growing concern for sustainability is likely to encourage higher public transport usage.	Insufficient resources to meet high demand may lead to increased use of private transport options.
	The municipality is constructing the first production, storage, and supply unit for hydrogen-powered vehicles, positioning Cascais as a leader in innovation and sustainability.	Numerous variations in the main network complicate service perception.		Rising demand for convenience and lower prices from private transport companies (e.g., Uber, Bolt) could decrease public transport usage.
		Lack of direct connections forces transfers, leading to increased travel		

		times between key destinations.		
		Long travel times, with some routes exceeding one hour.		
		Imbalanced frequency of service does not adequately meet the population's needs and typical work schedules.		
	Cascais is recognized for its excellence in environmental management, particularly through the enhancement of natural resources and the management of spaces like the Sintra-Cascais Natural Park, contributing to urban green space improvement.	Although the municipality measures 93% of total greenhouse gas emissions, it lacks the capability to assess fugitive and indirect emissions related to energy transmission, aviation, waste, and land use changes.	Growing public concern for sustainability and increased use of renewable energy sources presents potential for further initiatives and policies.	Proximity to the ocean increases Cascais' vulnerability to climate change impacts, including temperature fluctuations, rising sea levels, and more frequent extreme weather events.
Environment and Energy	The municipality has implemented measures to reduce energy consumption and leverage endogenous energy resources, enhancing energy efficiency and promoting renewable technologies.	In 2021, transportation accounted for half of CO2 emissions, with residential areas contributing 27%.		
	Cascais takes coordinated action against climate change, focusing on			

	planning and public communication initiatives that highlight ongoing environmental efforts.			
	The municipality supports marine life protection through nature conservation and public awareness campaigns, particularly targeting schools to educate about environmental policies.			
Economy and Innovation	The municipality has various programs to support entrepreneurship and companies.	Lack of technological infrastructure hampers the successful implementation of some initiatives.	Potential to invest in information technologies that foster greater innovation across all sectors.	Insufficient investment in innovation may significantly hinder the implementation of the Cascais 2030 plan.
	The CMC promotes the commitment of being the "innovation territory"		Increasing technological advancement presents significant development opportunities for the municipality, enhancing innovation.	Lack of investment in attracting new businesses could stifle economic growth in the municipality.
			Interdepartmental teams within the municipality are open to innovation and collaboration across different areas.	Strong commitment from neighboring municipalities to attract innovative companies may pose challenges for Cascais.
			Funding for projects in various areas is not a constraint	

		for the division, allowing for potential growth and development.	

Table 3 – SWOT Analysis for the Processes Perspective. Own Representation.

8.4.Public Value Perspective

Strengths	***Weaknesses***	***Opportunities***	***Threats***
Programs like the *Orçamento Participativo* directly involve citizens in decision-making, fostering inclusion and shared responsibility.	Communication gaps hinder citizens' understanding of the policies and services provided.	Expand digital channels to improve communication and increase citizen engagement.	Demographic challenges, such as an aging population, strain service provision and generational balance.
Digital platforms allow citizens to report urban issues and track requests, promoting transparency.	Uneven distribution of social services and infrastructure across the municipality's districts.	Make municipal initiatives more accessible to inform and encourage broader civic participation.	Lack of project continuity may lead to citizen distrust in municipal commitment.
A wide range of social projects and services supports elderly individuals, people with disabilities, children, and young people.		Implement measures to address population aging and promote equal opportunities for all groups.	Exclusion of segments less familiar with technology, like elderly people, may reduce the adoption of Smart City solutions.
The existence of Rede Social that promotes partnerships and resource optimization to address social issues.		Develop monitoring systems to improve the *Rede Social* efficiency and the organizations involved.	Resistance to change may hinder the implementation of new policies and technological solutions.
Health and sustainability policies improve citizens' quality of life, encouraging physical, mental, and social well-being.			

Table 4 – SWOT Analysis for the Public Value Perspective. Own Representation.

9. Balanced Scorecard: Measures details

9.1. Residents contribute to the decision of local government (scale)

The scale can be defined as follows, based on the scale of Arnstein (1969):

1- citizens receive information about the ongoing projects and policies but cannot give feedback;

2- citizens have the means to provide feedback and are consulted, but with no direct impact in decision-making;

3- citizens have the means to provide feedback that actively shapes decision-making;

4- citizens collaborate with the local governments in creating and implementing projects, having a role of co-creation;

5- citizens have the means to shape decision-making by proposing and deciding on projects.

9.2. Citizen participation rate in projects

(*Formula 15)*

$$\%\ of\ citizen\ participation\ in\ projects = \\ = \frac{Number\ of\ projects\ with\ active\ citizen\ participation}{Total\ number\ of\ projects} * 100$$

9.3. Access to educational resources (scale)

1- The city lacks basic educational amenities;

2- Decent access to basic education but limited resources for lifelong learning;

3- Access to basic education is good with some free resources for lifelong learning;

4- Easy access to basic education and good comprehensive free resources for lifelong learning;

5- Wide variety of educational resources with easy access offline and online (open online courses), most of them freely, with strong support for lifelong learning.

9.4. Percentage of municipal budget designated to bridge the digital devise

(*Formula 16)*

$$\%\ of\ municipal\ budget\ designated\ to\ bridge\ the\ digital\ devise = \\ = \frac{Annual\ expenditures\ on\ digital\ divide\ programmes}{Total\ annual\ municipal\ budget} * 100$$

9.5. Percentage of adults undergoing reskilling

(*Formula 17)*

$$\%\ of\ adults\ undergoing\ reskilling = \\ = \frac{Number\ of\ adults\ who\ participated\ in\ reskilling\ programs}{Total\ Adult\ Population} * 100$$

The adult population can be considered to include individuals aged 18 and above.

9.6. Proportion of students with classroom access to ICT facilities

(*Formula 18)*

$$Proportion\ of\ students\ with\ classroom\ access\ to\ ICT\ facilities\ (\%) = \\ = \frac{Number\ of\ students\ with\ classroom\ access\ to\ ICT\ facilities}{Total\ number\ of\ students\ enrolled\ in\ schools} * 100$$

9.7. Expenditure in education for promoting ICT

(*Formula 19)*

$$Expenditure\ in\ education\ for\ promoting\ ICT = \\ = \frac{Educational\ budget\ dedicated\ to\ ICTs}{Total\ Education\ Budget} * 100$$

9.8. Innovation ecosystem (scale)

1- Limited collaboration and partnerships between sectors, and the local government has no involvement in fostering innovation;
2- Some level of collaboration and partnerships, but are inconsistent and not effectively promoting sustained innovation;
3- Collaborations and partnerships are present and moderate in number, with some promoting sustained innovation, and local government supports innovation but with lack of cohesive approaches;
4- Strong collaborations and partnerships promoting innovative initiatives, and the local government catalyses innovation through incentives and policies;
5- Collaboration and partnerships are numerous and promote highly sustainable and impactful initiatives, and the local government actively supports innovation.

9.9. R&D expenditures as percentage of city's GDP

(*Formula 20)*

$$R\&D\ expenditure\ as\ \%\ of\ city'GDP\ = \frac{Total\ expenditures\ on\ R\&D}{City\ GDP} * 100$$

9.10. Support programs (scale)

1- Low or limited government efforts to attract private actors;
2- A few programs exist but they are limited in number and sporadic, and the local government lacks consistency in fostering a proper environment for business establishment;
3- Some support programs exist which may attract some businesses, and the local government provides structured support;

4- A considerable number of support programs are available, and the local government plays a proactive role in attracting businesses;
5- A high number and effective programs exist, and the local government plays a key role in fostering a sustainable environment for businesses.

9.11. New businesses registered per 100.000 inhabitants

(*Formula 21)*

$$New\ businesses\ per\ 100\ 000\ inhabitants = \\ = \frac{Number\ of\ new\ companies\ registered}{City\ Population} * 100\ 000$$

9.12. Number of businesses active after 2 years

(*Formula 22)*

$$Survival\ rate = \frac{Number\ of\ businesses\ active\ after\ 2\ years}{Number\ of\ businesses\ started\ 2\ years\ ago} * 100$$

10. Balanced Scorecard for Cascais Municipal Council (focused on the Processes Perspective, namely the areas of Society & Education, and Economy & Innovation)

Perspective	Objectives	Measures	Initiatives
Society and Education	Encourage active citizenship participation	Residents contribute to the decision of local government (1-5)	Continue to implement the participatory budget and youth participatory budget Continue to foster the Sistema *Municipal de Participação* and increase the participatory initiatives within it Create a unified online platform where citizens can engage with the local government and propose projects
		Percentage of Citizen Participation Rate in Projects	
	Invest in the development of citizens' skills in several areas throughout life	Access to educational resources (1-5)	Create an online platform where all the available courses are centralized and easily accessible
			Personalize the online platform according to each citizen's skill needs
		Percentage of municipal budget allocated for provision of programs for bridging the digital divide	Expand the offering of IT skills courses and include them in the online platform
			Expand the investments in infrastructures to offer free wi-fi in the village
			Partner with associations to distribute computers and other digital devices to people in need
		Percentage of adults undergoing reskilling	Re-implement a similar project to Reskill Hub, alongside the current course offerings
	Invest in the development of technological infrastructures that support the modernization of the educational process	Percentage of students with classroom access to ICT facilities	Expand the computing classes and the program *Pensamento computacional, programação e robótica* to include more students and schools. Expand the Educational Innovative Spaces to cover not only primary schools, but all cycles up to the secondary education. Continue to implement innovative solutions like the "Lexplore + Leitura" program in all schools of the municipality
		Percentage of Expenditure in Education for Promoting ICT	

Table 5 - Balanced Scorecard for the area of Society and Education. Own Representation.

Perspective	Objectives	Measures	Initiatives
Economy and Innovation	Foster a culture of innovation based on the promotion of knowledge, networking, sharing of experiences and R&D development.	Innovation Ecosystem (1-5)	Create more Living Labs with different purposes
			Create Innovation Hubs
			Continue to promote the "Empreendedorismo Jovem, Social e Criativo" program
			Continue to foster the network collaboration with different cities, NGOs and companies
		R&D Expenditure as percentage of city's GDP	Offer grants and loans to institutions engaged in research and development activities
			Attract more businesses and research institutions
	Enhance entrepreneurial growth by creating the necessary conditions for the establishment of companies.	Support Programs (1-5)	Continue to offer incubation and mentoring programs to companies. Implement an online platform where all the incubation, mentoring, funding, partnership opportunities and news related to startups are centralized in one place. Enhance the platform by integrating machine learning features and connect startups with a vast network of other startups and investors. Include in the platform talent programs to help startups connect with skilled talent. Expand the advisory services offered to companies by integrating programs to support its digitalization process
		New Businesses Registered per 100 000 inhabitants	
		Survival rate of New Businesses	

Table 6 - Balanced Scorecard for the area of Economy and Innovation. Own Representation