POLITECNICO DI TORINO

MSc in Management Engineering

From Value for Money to Value for Society: An Application to Hospital PPP Projects

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Chapter 1: Introduction

Public-Private Partnerships (PPPs) have become an increasingly adopted procurement strategy for the delivery of public infrastructures and services. This approach has been particularly relevant in sectors such as transportation, energy, and healthcare, where large upfront investments and long asset lifecycles require effective risk allocation and performance-oriented management. Traditionally, the evaluation of PPPs has been primarily based on the concept of Value for Money (VfM), which aims to determine whether private sector participation leads to cost savings and efficiency gains compared to conventional public procurement. While this perspective is essential to ensure the responsible use of public resources, it may offer only a partial representation of the overall value generated by infrastructure projects. Public investments are not intended solely to minimize costs but also maximize collective welfare: an exclusive reliance on VfM may underestimate the broader societal impacts of PPP projects. For this reason, a new metric will be defined, called Value for Society, which adopts a wider perspective that explicitly incorporates social, qualitative, and long-term effects, aiming to assess how infrastructure projects contribute to community well-being. Starting from this perspective, the present research aims to integrate traditional VfM analysis with a complementary VfS one and to develop a simplified, measurable approach for estimating the social value generated by earlier project delivery in hospital PPPs.

1.1 Definition of Public Private Partnership

The Public-Private partnership, or PPP terminology was first introduced in the United Kingdom in 1997. Prior to this, other arrangements of a similar collaborative form of engaging the private sector fell within the private finance initiative, which was introduced by the UK government in 1992. As an innovation to public procurement, PPPs have been adopted around the globe to deliver infrastructure projects and/or public services in the areas of transport, water, energy, education, healthcare, etc. (Almarri & Boussabaine, 2017)

Public-Private partnerships represent a valid alternative to traditional public procurement, for the realization of public infrastructures and services. This form of contract requires that the public and private sectors share common goals and, as a consequence of their collaboration, they can leverage each other's strengths to achieve better results in terms of costs and quality of the product or service. However, in partnerships, the private sector must consider its social responsibility, while the public sector must create appropriate legal and regulatory structures, as well as democratic and participatory decision-making. Public administration and private organizations can seek mutual benefits by developing a strategic partnership, built on trust, openness, fairness and mutual respect (Nutavoot 2001).

For the public sector, the main benefits of partnering with the private sector are reduced public spending, cost efficiency, better service delivery, and appropriate allocation of risks and responsibilities, while the private sector expects to have greater investment potential, to make a reasonable profit, and to have greater opportunities to expand its commercial interests. Both sectors view positive outcomes from the partnership and share responsibility accordingly. However, creating partnership relationships between two separate organizations has some disadvantages, such as increased complexity, loss of decision-making autonomy, and information asymmetry.

1.2 Key Economic Features Characterizing PPPs

• Public Policy Objective: A PPP serves a public policy objective, such as providing infrastructure and public services. While the private sector will tend to improve the efficiency of the process, the public sector intervenes to ensure the socially desirable quantity and quality of these services.

• Long-Term Arrangement: The public sector and the private partner enter into a long-term agreement to secure the supply of public goods or services, including the different phases of asset construction, operation, and even service provision.

• Private Sector Financing and Asset Ownership: The private partner providing the services finances and, in many cases, owns the associated asset required to produce these services.

• Risk Transfer and Sharing: A crucial characteristic is that each risk is transferred to the party that can manage or bear it the best. This risk-sharing method encourages close collaboration, and it will allow to reduce the probability and impact of the occurrence of a risk.

•Performance-Based Payments: Payments to private partners are frequently linked to goods or service quality; in the contract there is usually a set of parameters for evaluating the outcome, setting standards that must be maintained by the private sector.

1.3 Differences between PPPs and other forms of contract

The public-private partnership approach represents a departure from the traditional procurement of assets where the public sector pays for the construction or development of an asset and then makes separate arrangements for its ongoing maintenance and operations. Instead, the public-private partnership approach involves the provision of services to the public sector by the private sector, which also takes responsibility for the construction, development and financing of any assets needed to provide the required services. (Nutavoot 2001).

Having defined public-private partnerships and their fundamental characteristics, the key differences between them and other forms of contract can be identified. Traditional procurement doesn't imply the long-term risk sharing between the two parts, nor it involves the ownership of the asset of the private partner. While traditional public provision may involve some risk sharing (for instance, a local government may contract out the construction of a school to a private building firm, with the firm carrying the risks associated with the construction phase) such risk-sharing does not cover the operating phase and is therefore not inherent to the provision of the service in question.

Considering the private provision, it includes the ownership of the assets of the private partner but lacks of the long-term risk sharing model, typical of the public private partnership, but most importantly, privatization is not expected to follow a public policy function, but a profit-oriented approach.

The list of characteristics of PPPs above can also be used to identify arrangements that would in general not qualify as PPPs. Whenever either the public or the private sector partner carries all of the risks related to production and supply, there would be no partnership in the current sense of the word. Contracting out the construction of an infrastructure asset or outsourcing the provision of auxiliary services to the private sector (such as food supply or cleaning services in schools, hospitals, or prisons) would not qualify as a PPP as long as the public sector owns the assets and carries the risks of producing and supplying the public service in question.

1.4 How can PPPs gain a higher level of productive efficiency

There are three important key sources of value creation inside PPPs associated with three fundamental concepts: asset ownership, risk sharing and bundling.

- Private asset ownership:
  Public-private partnerships are a long-term type of contract, which makes them susceptible to a great deal of uncertainty: the public sector will need to enter an incomplete contract with the private agent, which specifies the provision of a service only to an incomplete extent because of informational and monitoring problems as well as genuine uncertainty about the future. The owner of the asset has the right to control its usage under all circumstances, and any changes in this respect require the owner's consent. This is especially important when contracts are incomplete because ownership embeds bargaining power. If the owner wishes to make a new investment that would cut production costs without affecting service quality, he can do so without renegotiating the contract, which only covers service provision (output). However, if an operator who is not the owner of the asset wishes to make the same investment, he needs the owner's consent, which, in turn, calls for a renegotiation of the contract. This mechanism enables the private partner to pursue productive efficiency by removing the agency costs. (Välilä, Timo, 2005)

- Risk sharing:
  Transferable risk refers to an uncertain but quantifiable outcome in terms of some of the project's costs or benefits related to the production of the underlying asset, provision of related services or financial viability of the project. For any of these, or other, risks to be transferable from the public to the private sector, there must be a way to quantify the uncertain outcome in terms of its impact, timing, and probability of occurrence.
  Once all project risks have been identified, an agreement is reached as to which the identified risks are assigned to each partner. In this case productive efficiency is pursued by improving the assessment and management of the project's risks. When a partner has to carry a risk, he will attempt to minimize any negative impact the risk could have on the project. Every risk should be allocated to the partner who is in the best position to affect the risky outcome and minimize any negative impact of the uncertainty on the

project. If none of the partners can control and manage a risk, the issue is to find the partner who can best bear the risk. Usually, the public partner will take responsibility for risks associated to political, legal, economic and regulatory environment events; accordingly, the risks associated with the asset itself, including design, construction, technology, operation, maintenance and others, should be primarily carried by the private partner (Välilä, Timo, 2005)

- Bundling:

The essence of a PPP lies in the public sector's decision to purchase a service rather than an asset and to leave asset construction and service provision to a private partner.

When the same firm undertakes both the construction of a tunnel and its subsequent long-term operation, it may be able to make investments in the construction phase that will allow it to reduce maintenance costs in the operation phase and thereby enhance productive efficiency. In contrast, if two separate firms undertake the construction and operation phases, such investments will not be made in the construction phase and, consequently, productive efficiency will be lower.

Chapter 2: Literature review

2.1 Value for money

An important concept to introduce when talking about public-private partnerships is value for money. The public sector uses this value to determine the viability of PPPs and it represents the additional value realization through private partnering. A precise measure for value for money does not exist, nevertheless, value for money can be defined as what a government judges to be an optimal combination of quantity, quality, features and price (i.e. cost) expected over the whole of the project's lifetime (Burger & Hawkesworth 2011). One of the most cited definitions of VfM is that it "is the optimum combination of whole-of-life costs and quality of the product or service to meet the users' requirement" (Morallos and Amekudzi, 2008). Thus, the value-for-money concept attempts to encapsulate the interests of citizens, both as taxpayers and recipients of public services. As such, value for money should in principle also be the driving force behind traditional infrastructure procurement. Therefore, any project, whether it is a PPP or a traditionally procured project, should be undertaken only if it creates value for money. With value for money being the objective, PPPs and traditional infrastructure procurement are two models to deliver value for money.

VfM assessment can be classified into ex-ante assessment and ex-post assessment. The mainstream role of the former is to determine an optimal procurement route between different options at the initial decision-making stage. The ex-post VfM assessment is often entangled with performance measurement to assess whether VfM has been realized using the selected method. The ex-ante can be done before and after bids are delivered. In the first moment, it allows for deciding whether to consider the PPP option, whereas the second allows for attesting the VfM of the bids. At this stage, if it is shown that bids do not offer VfM advantage, then the tender procedure can be canceled, and traditional procurement methods should be adopted instead.

In assessing VfM for a project the "3E principles" should be followed: effectiveness, economy, efficiency. The first one requires that the output meets the predetermined requirements, economy means doing it with the lowest costs, and efficiency means reaching the highest output level possible while controlling the costs. There are many different methods to measure VfM, but the most largely used among countries is the public sector comparator (PSC). The PSC is the hypothetical cost of developing the project through traditional procurement (considering all costs and project risks), and it is compared to the cash flows that will be paid to the private partner in the PPP case. This method is a particular case of life-cycle cost analysis (LCCA), which can be defined as an economic model of project evaluation, which requires that all life-cycle costs are discounted to a net present value, and the sum of those costs represents the net present value of the infrastructure costs. The principle of LCCA is to account for all costs, recurring or nonrecurring, related to owning, operating, maintaining, and, eventually, disposing of the project (Cruz & Marques 2012).

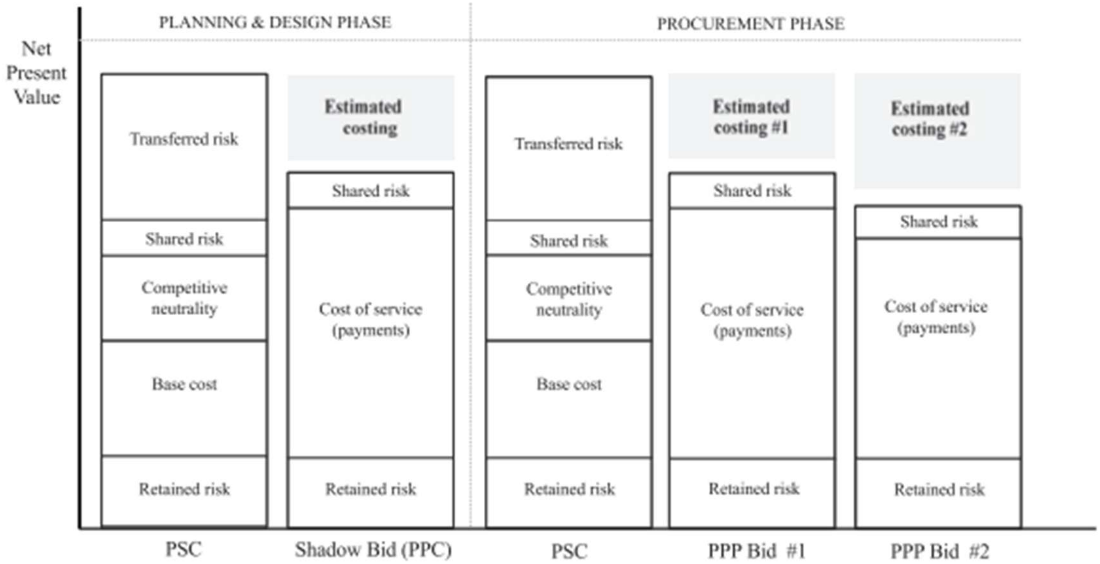
2.1.1 Public-Sector-Comparator

The calculation of the PSC does not have a standard methodology, but its most applied structure has five components: base cost (or raw PSC), competitive neutrality, retained risk, transferred risk and shared risk.

- Raw Public Sector Comparator (Raw PSC): this includes the cost of the investment and all operating costs, both direct and indirect, associated with the construction, maintenance, and management of the infrastructure under traditional public procurement.
- Competitive neutrality adjustment: this consists of removing any competitive advantage that the public authority might obtain in the construction and management of the infrastructure under traditional procurement. The adjustment ensures a fair comparison between the public and the PPP option by neutralizing differences arising from tax treatment, financing conditions, or regulatory privileges.
- Transferable risk: this refers to the risks associated with events that may affect the construction and operation of the project and that can be contractually allocated to the private partner under a PPP scheme. Transferable risks may include, for example, construction cost overruns, schedule delays, operational performance risks, and demand risks.

- Retained risk: this represents the portion of risk that cannot be transferred to the private sector and therefore remains with public authority under both procurement models. An example of retained risk includes legislative or regulatory changes that may impact on the execution or management of the infrastructure.

PSC= raw PSC + Competitive neutrality + Retained risk + Transferred risk



The figure represents the use of the PSC for determining the value for money of the two alternatives. In the planning and design phase of the project, PSC can be used to assess whether the PPP option is available or even better than traditional public procurement, comparing it to a shadow bid (hypothetical cost structure of a PPP project). In the procurement phase the PSC can be compared directly to the bids presented by private companies, selecting the one with the lowest estimated cost. If none of the presented bids create value for money, public administration should go back considering traditional public procurement. In both cases, if the PPP alternative brings value for money there will be a positive difference in comparison with the bid.

VfM = PSC – PPP

2.1.2 Limitations of using VfM and PSC

There are many criticisms about Value for Money and PSC limits as tools for evaluating PPP projects: in the first place, risk allocation, which is a fundamental point in the assessment of the cost structures, is such a difficult process to balance. There are many factors to be considered, and a critical factor is the long-term nature of these projects, which create a big level of uncertainty. If the risk allocation fails, there may be some undue risk that may for example bring the private partner to bankruptcy, or at list damage the project.

The second big criticism about PSC and other quantitative measures of value for money is that it highly relies on hypothetical costs, which gives a lot of space for decisional biases and could potentially become a tool to justify some preconceived idea, either in favor of an alternative or the other.

The last criticism concerns the narrow vision in evaluating the PPP alternative using only value for money, since it only takes into consideration the cost structure of the alternatives. In fact, a project should be judged by the costs and the function together, to be able to have the whole picture considered. This is true especially in the cases we are discussing, since they regard public infrastructures and services, such as hospitals, that have huge spillover benefits on society. PPP projects have many differences from traditional public procurement, that must be considered to be able to assess the real values of the two options.

2.2 Value for Society

2.2.1 Limitations of Value for Money in the Evaluation of Infrastructure's projects

Although Value for Money represents the most widely adopted framework for assessing the convenience of PPP schemes, several limitations emerge when it is applied to the evaluation of complex public infrastructure projects. Traditionally, VfM focuses primarily on financial costs and risk allocation achieved through private sector participation. The assessment is therefore mainly based on economic and monetary indicators, aiming to determine whether the selected procurement method minimizes lifecycle costs while maintaining the required service quality.

However, this approach is not always sufficient to understand all the impact generated by public investments. In particular, VfM struggles to adequately account for non-monetary benefits, indirect effects, and long-term societal outcomes. Elements such as improvements in citizens' well-being, equity in access to services, or broader socio-economic and environmental impacts are often difficult to quantify and are consequently underestimated or excluded from the evaluation.

As a result, relying exclusively on VfM may lead decision-makers to overlook relevant dimensions of public value. This limitation highlights the need to complement traditional financial assessments with a broader evaluation framework capable of incorporating social impacts. Since public infrastructure projects are primarily intended to generate collective welfare rather than purely economic returns, the inclusion of social value considerations becomes essential to support more comprehensive and socially oriented decision-making processes.

2.2.2 Introduction to the Concept of Value for Society (VfS)

Unlike traditional evaluations that focus primarily on cost-effectiveness, VfS adopts a broader perspective, aimed at measuring the contribution of public investment in improving citizen's quality of life and creating long-term, sustainable benefits. VfS focuses on social dimensions, such as equal access to services, impacts on the territory, and value generation for stakeholders. Moreover, this evaluation should take into consideration a long-term view of the impact of the project on society, since the service produced will be available and necessary for the next years. In the PPP context, the (EPEC 2011, p. 4) defined these nonfinancial benefits as the "benefits to service users or wider society from an infrastructure investment. Similarly, Rohman and Wiguna (2021) defined the social benefits of PPP projects as the positive benefits to society that the community can perceive because of the existence of the project (Jin, H., & Liu, C. 2023).

The two concepts, VfM and VfS, are therefore distinct but complementary: the first one ensures the efficiency of the investment, while the other evaluates its actual social utility. In this sense, VfS can be interpreted as a decision-making support tool for public authorities, useful for guiding project planning, selection, and monitoring choices, promoting decisions that are more consistent with sustainable development objectives and public interest.

The concept of VfS can be applied to every public project, and it is particularly relevant in the healthcare sector, where the primary goal of investments is not economic profitability, but rather improving the population's well-being. In hospital and healthcare infrastructure projects, social impacts, such as accessibility to services, quality of care, reduced waiting times, and the impact on public health, are crucial in the overall evaluation of the intervention.

2.2.3 Social Benefits and Costs in Hospital Projects

Hospital infrastructure projects generate a wide range of social impacts that extend well beyond their direct financial performance. These impacts can be grouped into different categories, including benefits for patients, advantages for the healthcare system, and broader effects on society as a whole.

From the patients' perspective, new or upgraded healthcare facilities may lead to higher quality of care, improved safety standards, and better clinical outcomes. Enhanced accessibility to services, reduced waiting times, and more efficient care pathways contribute to a more timely and effective treatment process, ultimately improving both physical and mental health conditions.

At the healthcare system level, modern infrastructures can increase operational efficiency, optimize resource allocation, and reduce long-term maintenance costs. These improvements may translate into time and cost savings for healthcare providers, enabling the system to serve a larger number of patients with the same or fewer resources.

Finally, hospital projects may also produce broader societal benefits, such as increased productivity due to better population health, reduced social inequalities in access to care, and potential environmental improvements associated with energy-efficient buildings. Nevertheless, many of these effects are difficult to measure and monetize, which represents a significant challenge when attempting to integrate them into traditional economic evaluation frameworks. This measurement complexity further reinforces the importance of adopting approaches, such as the Value for Society perspective, that explicitly recognize and account for all these impacts.

2.2.4 The Role of Time in Generating Value for Society

The time factor represents a crucial variable in the generation of Value for Society within public infrastructure projects. The value produced by an infrastructure depends not only on its technical quality or economic efficiency, but also on the moment at which it becomes available to the community and begins delivering services. Timely delivery allows the social benefits associated with the new facility to be anticipated, enabling earlier access to improved capacity, higher standards of care, and more advanced technologies. Conversely, construction delays may result in a significative loss of societal value, as communities continue to rely on outdated or insufficient infrastructure for a longer period. This lost benefit can be interpreted as an implicit social cost, reducing the overall effectiveness of public investment. From this perspective, time should not be considered merely as an operational or managerial constraint, but rather as an important driver of social value creation, directly influencing the entity and timing of the gains generated for society.

In the book “Partnership Pubblico Privato @Work” (2023) by Veronica Vecchi and Velia Leone, a simulation based on a traditional road infrastructure project that experienced a 29-month delay is presented. The analysis illustrates how construction overruns can translate into substantial social losses. Because users were required to continue using a slower existing road, the additional travel time, approximately 20 minutes per trip for more than 8,000 vehicles per day, generated an estimated social cost of about €14 million, calculated based on the economic value of users’ time. When these externalities were incorporated into the evaluation, the PPP option, initially more expensive from a purely financial perspective, proved to be socially preferable, ultimately generating a positive net value for society.

The literature on Public-Private Partnership (PPP) projects highlights how such procurement models tend, on average, to record better time performance than traditional procurement, with a lower incidence of construction delays. This result is generally attributed to more effective risk allocation, the presence of contractual incentives related to meeting deadlines and greater integration between design, construction and management. Risk allocation in PPP contracts is typically structured according to the principle that risks should be borne by the party best able to manage them. Construction risk, including cost overruns and delays, is commonly transferred to the private partner, which has both the technical expertise and the managerial capacity to control execution risks. Unlike traditional procurement, where the public authority often retains a significant share of construction risk, in PPP schemes delays directly affect the private partner’s financial returns, thereby creating strong incentives for timely delivery. Secondly, PPP contracts frequently include explicit performance-based payment mechanisms. Any delay in commissioning postpones revenue generation for the private partner. This contractual structure internalizes the cost of delays and encourages more rigorous project planning and monitoring. Another relevant advantage of PPP models relies on the integration of design, construction, financing, and often operation within a single contractual framework. In traditional procurement models, fragmentation between separate contracts for design and construction may lead to disputes, change orders, and responsibility gaps that contribute to delays. By contrast, the integrated nature of PPP arrangements supports a lifecycle perspective, incentivizing problem-solving and more efficient decision-making processes.

Estimates of the time differential between traditional procurement and PPP schemes vary significantly across the literature. For instance, Vecchi and Leone (2023), based on OpenCUP data from the Autorità Nazionale Anticorruzione, report that traditional public procurement procedures may require approximately 1,000 additional days to reach final testing and completion compared to PPP schemes (corresponding to 36% of the average procedure duration), with evidence in the healthcare sector suggesting even longer differentials. Another empirical study, however, provides more moderate estimates. Raisbeck, Duffield, and Xu (2010), based on a comparative analysis of 21 PPP projects and 33 traditionally procured projects, found that PPP projects were completed on average 3.4% ahead of schedule between contract signing and completion, whereas traditional projects were delivered 23.5% behind schedule. These differences highlight the lack of consensus in the literature regarding the precise size of the time advantage associated with PPP models, suggesting that further empirical investigation is needed to better understand the determinants and sector-specific variability of this effect.

Chapter 3: Research Methodology

3.1 Research Design

This research adopts a quantitative evaluative approach aimed at developing and testing a methodological framework capable of integrating traditional Value for Money (VfM) assessment with a complementary evaluation of social costs and benefits associated with infrastructure procurement models.

The primary objective of the study is to propose a simplified evaluation method that can be combined with the conventional VfM framework in order to incorporate the social dimension of public infrastructure projects. In particular, the proposed approach aims to account for the social implications associated with the choice between Public–Private Partnership (PPP) procurement and traditional public procurement.

Infrastructure investments in sectors such as healthcare are primarily designed to generate public and social benefits, including improved access to services, increased system capacity, and enhanced quality of care. However, traditional evaluation tools such as the Public Sector Comparator mainly focus on financial efficiency and risk allocation, often overlooking the potential social effects associated with differences in project delivery timelines or service availability.

To address this limitation, the research proposes a simplified Value for Society (VfS) assessment model that can be integrated with the VfM analysis. The aim of the model is to provide a quantitative estimate of the additional social value generated by the earlier availability of infrastructure services, which is frequently associated with PPP delivery mechanisms.

In order to test the applicability of the proposed framework, the research applies the methodology to a set of hospital infrastructure projects implemented through PPP schemes. The empirical analysis is conducted through a multiple case study approach, which allows the evaluation model to be applied to real-world projects characterized by different investment sizes, risk structures, and service capacity increases.

3.2 Work structure

The overall research design follows a structured approach composed of three main steps. First, a theoretical framework is developed through a review of the literature on PPPs, VfM evaluation, and social value assessment in public infrastructure projects. This phase supports the identification of the main limitations of traditional financial indicators and motivates the introduction of the Value for Society perspective.

Second, an operational model for VfS measurement is defined. The model translates time-related improvements in project delivery into quantifiable social benefits by focusing on healthcare service capacity, proxied by hospital bed availability.

Third, the proposed framework is empirically tested through its application to real hospital projects, enabling the comparison between economic efficiency (VfM) and broader societal impacts (VfS). Three hospital PPP projects are selected as case studies. The cases were chosen based on data availability, comparability in terms of service typology, and relevance to the healthcare sector. Analyzing multiple cases allows for a comparison and increases the robustness of the findings, reducing the risk of results being driven by single project characteristics.

3.3 Data Sources and Assumptions

The empirical analysis relies on project-level financial and operational data obtained from feasibility studies, concession documentation, and financial plans associated with the examined hospital infrastructure projects.

The main inputs used in the calculations include:

- total investment costs,
- concession fees,
- financing structures,
- operating and maintenance costs,
- construction timelines,
- hospital capacity indicators.

Several simplifying assumptions are introduced to ensure comparability across cases, including:

- a constant average bed occupancy rate of 80%;
- a uniform estimate of hospitalization cost per day;
- a standardized time advantage parameter derived from literature.

While these assumptions introduce some degree of simplification, they enable the construction of a replicable evaluation framework applicable to different projects and contexts.

Chapter 4: Analysis and Results

4.1 Description of the analyzed context

The empirical analysis developed in this study focuses on the construction of three new hospitals intended to replace existing and outdated healthcare facilities. The new infrastructures are designed to upgrade service provision by increasing treatment capacity, incorporating advanced medical technologies, optimizing clinical workflows, and providing modern, more efficient spaces. These improvements are expected to enhance not only the quality and effectiveness of care delivery, but also the overall patient experience and working conditions for healthcare professionals.

During the construction phase, the existing hospitals remain fully operational in order to ensure the continuity of healthcare services for the local population. In this transitional context, the timing of completion of the new facilities becomes a crucial determinant of the social value generated by the project. Earlier commissioning would enable the community to benefit sooner from improved service capacity, higher standards of care, and more technologically advanced infrastructure. On contrary, delays would prolong reliance on obsolete facilities, thereby extending the social costs associated with structural inefficiencies, higher maintenance costs, organizational constraints, and potential risks for both patients and staff.

From this perspective, the construction timeframe is not merely a technical dimension of project management, but a key factor influencing the entity and timing of the Value for Society generated by the investment.

4.2 Selection of an Operational Indicator for Value for Society

Although the concept of Value for Society comprehends a wide range of qualitative and multidimensional effects, its practical application requires the identification of operational indicators that can be measured and supported by available data. For quantitative assessment, it is necessary to focus on metrics that are clearly observable, directly linked to service provision, and sensitive to variations in project delivery time.

In this work, taking into consideration the healthcare sector, hospital bed capacity represents a suitable proxy for social value. The number of available beds constitutes an indicator of the system's ability to provide care and accommodate patients, and it is closely related to accessibility to healthcare services. An increase in bed capacity generally translates into reduced waiting times, improved admission rates, and enhanced responsiveness to demand peaks.

Moreover, bed capacity data are typically available, standardized, and easily comparable across different facilities and time periods, which makes this indicator particularly appropriate for empirical analysis. For these reasons, the present study adopts hospital beds as an operational measure through which the time related component of Value for Society can be quantified.

It should be acknowledged, however, that hospital bed capacity captures only one dimension of the broader social value associated with the timely completion of healthcare infrastructure. Delays in hospital construction will generate a wide range of additional effects, including impacts on clinical outcomes, staff productivity, organizational efficiency, technological diffusion, patient safety, and overall service quality. Given the intrinsic complexity of hospital systems, a comprehensive assessment of the time-related component of Value for Society would require a multidimensional analysis encompassing both quantitative and qualitative indicators.

For the purposes of this study, a deliberate simplification is adopted in order to isolate and quantify a clearly observable and measurable effect. Consequently, the results produced by the model should be interpreted as capturing only a partial estimate of the social value associated with project timing. Rather than providing an exhaustive valuation of all societal impacts, the proposed framework aims to offer an illustrative and operational approach to incorporating the time dimension into the assessment of Value for Society.

4.3 Proposal for a Simplified Model for VfS Assessment

Building on the previous considerations, this study proposes a simplified quantitative model aimed at estimating the social benefit generated by the earlier completion of the new hospital. The purpose of the model is to translate the time advantage potentially associated with PPP procurement into a measurable indicator of social value.

The model is based on the assumption, supported by literature, that PPP projects tend to achieve earlier delivery and lower construction delays compared to traditional procurement methods: the earlier availability of the new hospital allows the community to benefit sooner from the additional service capacity provided by the facility.

The social value generated during the advance period is estimated through the number of additional hospital services that can be delivered thanks to the increased bed capacity. In particular, the concept of additional bed-days is introduced, defined as:

$$\text{Additional bed-days} = \Delta N \times U \times T$$

where:

- ΔN represents the number of additional beds provided by the new hospital compared to the existing one.
- U is the average bed occupancy rate.
- T represent the advance period achieved by the PPP solution compared to traditional procurement.

The total social benefit is then calculated by multiplying the additional bed-days by the social value associated with one day of hospitalization:

$$\text{Social benefit} = \text{Additional bed-days} \times V$$

where V represents the social value per bed per day, approximated by the average daily cost of a hospital stay. The use of the average daily hospitalization cost as a proxy for social value is motivated by its ability to reflect, in monetary terms, the economic resources used to deliver healthcare services, including medical personnel, infrastructure, equipment, and support activities. While it does not capture the full welfare benefit experienced by patients, it provides a measurable and standardized estimate of the economic value of service provision. This formulation allows the time advantage of PPP delivery to be directly translated into a monetary estimate of social benefits for the community.

The main strengths of the proposed model lie in its simplicity, transparency, and replicability. The required inputs are limited and generally available, making the approach applicable to different case studies and contexts. However, the model captures only a partial representation of social value, focusing primarily on capacity-related effects, while other qualitative and long-term impacts remain excluded. Furthermore, the assumption of systematically earlier PPP delivery may not hold in all circumstances and should be further researched. The model should be interpreted as an initial approximation rather than a comprehensive measure of social value.

In order to validate the proposed evaluation framework and assess its practical applicability, the Value for Money and Value for Society approaches are applied to three hospital infrastructure projects. The objective of this empirical analysis to verify the economic convenience of the PPP procurement method through a traditional VfM assessment. Second, to estimate the additional social value generated by earlier project delivery using the simplified VfS model introduced in the previous chapter.

4.4 Analysis of Case 1

The first case study concerns the development of a new hospital infrastructure project developed through a Public–Private Partnership procurement scheme, with the objective of replacing and expanding existing healthcare facilities in order to improve service capacity and operational efficiency.

A key objective of the project is the humanization of healthcare spaces and the improvement of patient comfort. The new facility has been designed to ensure high standards of accommodation quality, with patient rooms conceived to guarantee privacy and a more domestic and welcoming environment.

The project also aims to significantly improve the efficiency and safety of internal logistics through a rational organization of flows within the hospital. A clear hierarchy of circulation paths ensures the separation between different categories of users, including emergency and non-emergency patients, visitors, hospital staff, and logistical services. This separation is intended to avoid congestion and increase operational efficiency.

Another important design principle is functional flexibility and technological innovation. The hospital structure is based on a modular grid system of 8×8 meters, which allows greater adaptability of spaces over time and facilitates future reconfiguration of hospital departments in response to evolving healthcare needs. In addition, the university component of the complex has been conceived as a “vertical campus” aimed at strengthening the continuity between education, research, and clinical practice, including spaces dedicated to innovation and potential research and business incubation activities.

Sustainability and environmental performance also represent key objectives of the project. The hospital is designed to achieve high levels of energy efficiency and environmental sustainability through the implementation of advanced technological solutions. These include a trigeneration system for the combined production of electricity, heating, and cooling energy, as well as the use of renewable energy sources such as photovoltaic systems and geothermal heat pumps using groundwater. Additional measures include heat recovery systems and rainwater collection systems for non-potable uses such as irrigation and sanitary services.

The total investment required for the construction of the facility amounts to approximately €464 million, covering construction costs, technological infrastructure, and the implementation of advanced medical equipment. The total bed capacity is increased by 30 with respect to the current infrastructure. The project represents a significant healthcare investment for the regional system and provides an appropriate case for evaluating the financial and social implications of PPP procurement in hospital infrastructure development.

The fee covering the investment and other services has been estimated at €40.0 million for the first year of operation. Specifically, this total fee remunerates:

- an investment component, amounting to €32.0 million per year, for the realization of the project.
- a service component, amounting to €8.0 million per year, for the maintenance and management services (both structural and technical systems) required to guarantee the availability of the facility.

It is specified that the concession fee has been adjusted for inflation over the duration of the concession only for the service component, and it is expected to be paid starting from the first year of operation.

Value for money:

The first step of the analysis of the case consists in calculating the Value for Money through the Public Sector Comparator model. The PSC was calculated as the sum of base costs, competitive neutrality adjustments, retained risks, transferred risks, and shared risks. To build the analysis it will be taken as reference the document called “Analisi delle tecniche di valutazione per la scelta del modello di realizzazione dell’intervento: il metodo del Public Sector Comparator e l'analisi del valore" disposed by Autorità per la Vigilanza sui Contratti Pubblici (AVCP) and Unità Tecnica Finanza di Progetto (UTFP).

The PSC is calculated as it follows:

PSC= raw PSC + Competitive neutrality + Retained risk + Transferred risk

- **Raw Public Sector Comparator (Raw PSC)**: this includes the cost of the investment and all operating costs, both direct and indirect, associated with the construction, maintenance, and management of the infrastructure under traditional public procurement.
- **Competitive neutrality adjustment**: this consists of removing any competitive advantage that the public authority might obtain in the construction and management of the infrastructure under traditional procurement. The adjustment ensures a fair comparison between the public and the PPP option by neutralizing differences arising from tax treatment, financing conditions, or regulatory privileges.
- **Transferable risk**: this refers to the risks associated with events that may affect the construction and operation of the project and that can be contractually allocated to the private partner under a PPP scheme. Transferable risks may include, for example, construction cost overruns, schedule delays, operational performance risks, and demand risks.
- **Retained risk**: this represents the portion of risk that cannot be transferred to the private sector and therefore remains with public authority under both procurement models. An example of retained risk includes legislative or regulatory changes that may impact on the execution or management of the infrastructure.

Raw PSC:

For the calculation of the Raw Public Sector Comparator (PSC), it is necessary to construct a financial plan for both the PPP option and the traditional procurement alternative

Regarding the PPP scenario, considering total investment costs amounting to 464.128.777 €, the present value of the total payments amounts to 444.063.777 €.

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Balance	Discounted Payment
0				464.128.777 €	
1	32.000.000 €	10.111.699 €	21.888.301 €	454.017.078 €	26.032.021 €
2	32.000.000 €	10.588.567 €	21.411.433 €	443.428.511 €	25.151.711 €
3	32.000.000 €	11.087.923 €	20.912.077 €	432.340.588 €	24.301.170 €
4	32.000.000 €	11.610.829 €	20.389.171 €	420.729.758 €	23.479.391 €
5	32.000.000 €	12.158.396 €	19.841.604 €	408.571.363 €	22.685.402 €
6	32.000.000 €	12.731.785 €	19.268.215 €	395.839.577 €	21.918.263 €
7	32.000.000 €	13.332.216 €	18.667.784 €	382.507.361 €	21.177.066 €
8	32.000.000 €	13.960.963 €	18.039.037 €	368.546.398 €	20.460.933 €
9	32.000.000 €	14.619.362 €	17.380.638 €	353.927.036 €	19.769.017 €
10	32.000.000 €	15.308.810 €	16.691.190 €	338.618.226 €	19.100.500 €
11	32.000.000 €	16.030.773 €	15.969.227 €	322.587.453 €	18.454.589 €
12	32.000.000 €	16.786.784 €	15.213.216 €	305.800.668 €	17.830.521 €
13	32.000.000 €	17.578.449 €	14.421.551 €	288.222.220 €	17.227.556 €
14	32.000.000 €	18.407.448 €	13.592.552 €	269.814.772 €	16.644.982 €
15	32.000.000 €	19.275.543 €	12.724.457 €	250.539.229 €	16.082.108 €
16	32.000.000 €	20.184.577 €	11.815.423 €	230.354.653 €	15.538.269 €
17	32.000.000 €	21.136.481 €	10.863.519 €	209.218.172 €	15.012.820 €
18	32.000.000 €	22.133.277 €	9.866.723 €	187.084.895 €	14.505.140 €
19	32.000.000 €	23.177.081 €	8.822.919 €	163.907.814 €	14.014.628 €
20	32.000.000 €	24.270.112 €	7.729.888 €	139.637.702 €	13.540.704 €
21	32.000.000 €	25.414.690 €	6.585.310 €	114.223.012 €	13.082.805 €
22	32.000.000 €	26.613.246 €	5.386.754 €	87.609.767 €	12.640.392 €
23	32.000.000 €	27.868.326 €	4.131.674 €	59.741.441 €	12.212.939 €
24	32.000.000 €	29.182.595 €	2.817.405 €	30.558.846 €	11.799.941 €
25	32.000.000 €	30.558.846 €	1.441.154 €	0 €	11.400.909 €

Considering the traditional procurement, for the purpose of comparison with the proposed solution, a Financial Amortization Plan has been developed for the same operation financed through Cassa Depositi e Prestiti (CDP), with a fixed interest rate of 4%. The present value of total payments amounts to 412.282.604 €

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Balance	Discounted Payment
0				464.128.777 €	
1	29.709.794 €	11.144.643 €	18.565.151 €	452.984.134 €	24.168.937 €
2	29.709.794 €	11.590.429 €	18.119.365 €	441.393.705 €	23.351.630 €
3	29.709.794 €	12.054.046 €	17.655.748 €	429.339.660 €	22.561.961 €
4	29.709.794 €	12.536.208 €	17.173.586 €	416.803.452 €	21.798.996 €
5	29.709.794 €	13.037.656 €	16.672.138 €	403.765.796 €	21.061.832 €
6	29.709.794 €	13.559.162 €	16.150.632 €	390.206.634 €	20.349.596 €
7	29.709.794 €	14.101.529 €	15.608.265 €	376.105.105 €	19.661.445 €
8	29.709.794 €	14.665.590 €	15.044.204 €	361.439.516 €	18.996.566 €
9	29.709.794 €	15.252.213 €	14.457.581 €	346.187.302 €	18.354.170 €
10	29.709.794 €	15.862.302 €	13.847.492 €	330.325.000 €	17.733.497 €
11	29.709.794 €	16.496.794 €	13.213.000 €	313.828.206 €	17.133.814 €
12	29.709.794 €	17.156.666 €	12.553.128 €	296.671.540 €	16.554.410 €
13	29.709.794 €	17.842.932 €	11.866.862 €	278.828.608 €	15.994.599 €
14	29.709.794 €	18.556.650 €	11.153.144 €	260.271.958 €	15.453.718 €
15	29.709.794 €	19.298.916 €	10.410.878 €	240.973.043 €	14.931.129 €
16	29.709.794 €	20.070.872 €	9.638.922 €	220.902.170 €	14.426.211 €
17	29.709.794 €	20.873.707 €	8.836.087 €	200.028.463 €	13.938.369 €
18	29.709.794 €	21.708.655 €	8.001.139 €	178.319.808 €	13.467.023 €
19	29.709.794 €	22.577.002 €	7.132.792 €	155.742.806 €	13.011.616 €
20	29.709.794 €	23.480.082 €	6.229.712 €	132.262.724 €	12.571.610 €
21	29.709.794 €	24.419.285 €	5.290.509 €	107.843.439 €	12.146.483 €
22	29.709.794 €	25.396.056 €	4.313.738 €	82.447.383 €	11.735.732 €
23	29.709.794 €	26.411.899 €	3.297.895 €	56.035.484 €	11.338.872 €
24	29.709.794 €	27.468.375 €	2.241.419 €	28.567.110 €	10.955.432 €
25	29.709.794 €	28.567.110 €	1.142.684 €	0 €	10.584.958 €

After this the operating costs must be discounted, with a total amounting to 156.730.958 €

Payment N.	Payment	Discounted Payment
1	8.120.000 €	7.845.411 €
2	8.241.800 €	7.693.808 €
3	8.365.427 €	7.545.136 €
4	8.490.908 €	7.399.336 €
5	8.618.272 €	7.256.354 €
6	8.747.546 €	7.116.134 €
7	8.878.759 €	6.978.625 €
8	9.011.941 €	6.843.772 €
9	9.147.120 €	6.711.525 €
10	9.284.327 €	6.581.834 €
11	9.423.591 €	6.454.649 €
12	9.564.945 €	6.329.921 €
13	9.708.420 €	6.207.604 €
14	9.854.046 €	6.087.650 €
15	10.001.857 €	5.970.014 €
16	10.151.884 €	5.854.652 €
17	10.304.163 €	5.741.518 €
18	10.458.725 €	5.630.571 €
19	10.615.606 €	5.521.768 €
20	10.774.840 €	5.415.067 €
21	10.936.463 €	5.310.428 €
22	11.100.510 €	5.207.811 €
23	11.267.017 €	5.107.177 €
24	11.436.022 €	5.008.488 €
25	11.607.563 €	4.911.705 €

In order to determine the public RAW Performance, it is necessary to adjust the indicator for any competitive advantage (or disadvantage) that the public entity may hold over the private sector in terms of tax benefits, guarantees, increased revenues, etc. The removal of competitive advantage factors allows for a neutral position, making the resulting values comparable. The operational costs RAW will be determined by considering the operating costs incurred, net of the operational risk value, in a state of neutrality and with a balanced budget objective, where operating revenues are equal to operating costs.

Risk allocation:

In light of the considerations set out above and in accordance with the guidelines of the Supervisory Authority for Public Contracts (AVCP) contained in the publication 'Analysis of evaluation techniques for selecting the project implementation model: the Public Sector Comparator method and Value for Money analysis', it is estimated that the proposed PPP contract results in the transfer of the following risks, for a total value of construction risk of 151.908.328 €, and a value of maintenance of 34.010.618 €

Construction Cost Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	454.815.352 €	0	0	25%	0
Slight Increase	477.556.120 €	5%	22.740.768 €	30%	6.822.230 €
Moderate Increase	545.778.422 €	20%	90.963.070 €	33%	30.017.813 €
Significant Increase	591.259.958 €	30%	136.444.606 €	12%	16.373.353 €

Time Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	454.815.352 €	0	- €	23%	- €
Slight Increase	477.556.120 €	5%	22.740.768 €	2%	454.815 €
Moderate Increase	545.778.422 €	20%	90.963.070 €	9%	8.186.676 €
Significant Increase	591.259.958 €	30%	136.444.606 €	66%	90.053.440 €

Maintenance Risk	Mantainance Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	156.730.958 €	0	- €	23%	- €
Slight Increase	164.567.506 €	5%	7.836.548 €	2%	156.731 €
Moderate Increase	188.077.149 €	20%	31.346.192 €	9%	2.821.157 €
Significant Increase	203.750.245 €	30%	47.019.287 €	66%	31.032.730 €

Now that all the needed data has been calculated, the last operation to be done is the construction of the whole Value for Money structure.

PPP		APPALTO TRADIZIONALE	
RAW PPP	444.063.777 €	RAW MUTUO	412.282.604 €
RAW MAINTENENCE	156.730.958 €	RAW MAINTENENCE	122.720.340 €
RAW PSC	600.794.735 €	RAW PSC	535.002.944 €
		CONSTRUCTION RISK	151.908.328 €
		MAINTENENCE RISK	34.010.618 €
		TOT TRANSFERRED RISK	185.918.945 €
TOTAL	600.794.735 €	TOTAL	720.921.890 €

Results show that the net present cost of the PPP option amounts to 600.794.735 €, compared to 720.921.890 € under traditional procurement, generating a VfM gain of 120.127.155 €.

These results suggest that the PPP scheme provides a more efficient allocation of risks and lower overall lifecycle costs, thus representing the economically preferable procurement strategy for the project.

Value for Society:

Value for Society was estimated by applying the model based on additional bed capacity and earlier delivery.

For the estimation of the advance period of PPP construction ultimation we can take from literature the estimation of 25% from Raisbeck P., Duffield C., & Xu M. (2010). It is a more conservative estimation of the time difference between the two models with respect to many other estimations, which will ensure that the outcome does not overestimate the social benefits of the PPP model.

The new hospital provides an increase of $\Delta N = 30$ beds compared to the existing facility. Assuming an average occupancy rate $U = 80\%$ and an advance period $T = 456$ days (25% of 5 years), the number of additional bed-days during the advance period is calculated as:

Additional bed-days = $\Delta N \times U \times T$ = 10.944 bed/days

Multiplying this value by the estimated social value per bed-day ($V = 500$ €), the total social benefit generated by the earlier availability of the hospital amounts to 5.472.000 €.

V was estimated taking into consideration the cost of one day of hospitalization, which represents the minimum value of the service linked to the availability of beds.

This result highlights how time savings translate into tangible social gains in terms of increased healthcare capacity and improved access to services for the local community.

Overall, the findings indicate that the PPP solution not only achieves positive Value for Money but also generates additional Value for Society through earlier service availability. The combination of financial efficiency and social benefits reinforces the suitability of the PPP model for healthcare infrastructure projects, with a total estimated increase in benefits equal to 125.599.155 €

4.5 Analysis of Case 2

The second case study examines a hospital infrastructure project that aims to modernize the healthcare infrastructure and expand service capacity in order to address increasing healthcare demand and improve the efficiency of hospital services.

The new facility has been designed as a multifunctional hospital structure, integrating inpatient care units, diagnostic services, surgical departments, and outpatient activities within a modern healthcare environment. The project is intended to replace or upgrade existing facilities that were no longer able to meet current operational and technological requirements.

A key characteristic of the project is the increase in bed capacity, with the new hospital providing 40 additional beds compared to the existing infrastructure. This expansion is expected to significantly improve the ability of the local healthcare system to deliver inpatient services and reduce potential capacity constraints.

The overall investment associated with the project amounts to 218.977.000 € and includes construction costs, installation of medical technologies, and long-term infrastructure maintenance. As in the previous case, the concession fee paid by the public authority includes both investment remuneration and service-related components linked to maintenance and technical facility management.

Due to its scale and service expansion objectives, the project provides a suitable case for evaluating both financial efficiency and social benefits associated with PPP-based hospital development.

Value for money:

The first step of the analysis of the case consists in calculating the Value for Money through the Public Sector Comparator model. The PSC was calculated as the sum of base costs, competitive neutrality adjustments, retained risks, transferred risks, and shared risks. To build the analysis it will be taken as reference the document called "Analisi delle tecniche di valutazione per la scelta del modello di realizzazione dell'intervento: il metodo del Public Sector Comparator e l'analisi del valore" disposed by Autorità per la Vigilanza sui Contratti Pubblici (AVCP) and Unità Tecnica Finanza di Progetto (UTFP).

The PSC is calculated as it follows:

PSC= raw PSC + Competitive neutrality + Retained risk + Transferred risk

- Raw Public Sector Comparator (Raw PSC): this includes the cost of the investment and all operating costs, both direct and indirect, associated with the construction, maintenance, and management of the infrastructure under traditional public procurement.

- Competitive neutrality adjustment: this consists of removing any competitive advantage that the public authority might obtain in the construction and management of the infrastructure under traditional procurement. The adjustment ensures a fair comparison between the public and the PPP option by neutralizing differences arising from tax treatment, financing conditions, or regulatory privileges.
- Transferable risk: this refers to the risks associated with events that may affect the construction and operation of the project and that can be contractually allocated to the private partner under a PPP scheme. Transferable risks may include, for example, construction cost overruns, schedule delays, operational performance risks, and demand risks.
- Retained risk: this represents the portion of risk that cannot be transferred to the private sector and therefore remains with public authority under both procurement models. An example of retained risk includes legislative or regulatory changes that may impact on the execution or management of the infrastructure.

Raw PSC:

For the calculation of the Raw Public Sector Comparator (PSC), it is necessary to construct a financial plan for both the PPP option and the traditional procurement alternative

Regarding the PPP scenario, considering total investment costs amounting to 218.977.000 €, the present value of the total payments amounts to 209.542.595 €.

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Payment	Discounted Payment
0				218.977.000 €	
1	15.100.000 €	4.769.732 €	10.330.268 €	214.207.268 €	12.283.860 €
2	15.100.000 €	4.994.745 €	10.105.255 €	209.212.523 €	11.868.464 €
3	15.100.000 €	5.230.373 €	9.869.627 €	203.982.150 €	11.467.114 €
4	15.100.000 €	5.477.116 €	9.622.884 €	198.505.034 €	11.079.338 €
5	15.100.000 €	5.735.500 €	9.364.500 €	192.769.534 €	10.704.674 €
6	15.100.000 €	6.006.073 €	9.093.927 €	186.763.462 €	10.342.680 €
7	15.100.000 €	6.289.410 €	8.810.590 €	180.474.052 €	9.992.928 €
8	15.100.000 €	6.586.114 €	8.513.886 €	173.887.938 €	9.655.003 €
9	15.100.000 €	6.896.814 €	8.203.186 €	166.991.124 €	9.328.505 €
10	15.100.000 €	7.222.172 €	7.877.828 €	159.768.951 €	9.013.048 €
11	15.100.000 €	7.562.879 €	7.537.121 €	152.206.072 €	8.708.259 €
12	15.100.000 €	7.919.659 €	7.180.341 €	144.286.413 €	8.413.777 €
13	15.100.000 €	8.293.270 €	6.806.730 €	135.993.143 €	8.129.253 €
14	15.100.000 €	8.684.506 €	6.415.494 €	127.308.636 €	7.854.351 €
15	15.100.000 €	9.094.199 €	6.005.801 €	118.214.437 €	7.588.745 €
16	15.100.000 €	9.523.219 €	5.576.781 €	108.691.219 €	7.332.121 €
17	15.100.000 €	9.972.478 €	5.127.522 €	98.718.741 €	7.084.175 €
18	15.100.000 €	10.442.931 €	4.657.069 €	88.275.810 €	6.844.613 €
19	15.100.000 €	10.935.577 €	4.164.423 €	77.340.232 €	6.613.153 €
20	15.100.000 €	11.451.465 €	3.648.535 €	65.888.768 €	6.389.520 €
21	15.100.000 €	11.991.689 €	3.108.311 €	53.897.079 €	6.173.449 €
22	15.100.000 €	12.557.398 €	2.542.602 €	41.339.680 €	5.964.685 €
23	15.100.000 €	13.149.795 €	1.950.205 €	28.189.885 €	5.762.981 €
24	15.100.000 €	13.770.139 €	1.329.861 €	14.419.746 €	5.568.097 €
25	15.100.000 €	14.419.747 €	680.253 €	- 0 €	5.379.804 €

Considering the traditional procurement, for the purpose of comparison with the proposed solution, a Financial Amortization Plan has been developed for the same operation financed through Cassa Depositi e Prestiti (CDP), with a fixed interest rate of 4%. The present value of total payments amounts to 194.515.859 €.

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Payment	Discounted Payment
0				218.977.000 €	
1	14.017.148 €	5.258.068 €	8.759.080 €	213.718.932 €	11.402.959 €
2	14.017.148 €	5.468.390 €	8.548.757 €	208.250.542 €	11.017.351 €
3	14.017.148 €	5.687.126 €	8.330.022 €	202.563.416 €	10.644.784 €
4	14.017.148 €	5.914.611 €	8.102.537 €	196.648.805 €	10.284.815 €
5	14.017.148 €	6.151.195 €	7.865.952 €	190.497.610 €	9.937.020 €
6	14.017.148 €	6.397.243 €	7.619.904 €	184.100.367 €	9.600.985 €
7	14.017.148 €	6.653.133 €	7.364.015 €	177.447.234 €	9.276.314 €
8	14.017.148 €	6.919.258 €	7.097.889 €	170.527.976 €	8.962.622 €
9	14.017.148 €	7.196.029 €	6.821.119 €	163.331.947 €	8.659.539 €
10	14.017.148 €	7.483.870 €	6.533.278 €	155.848.077 €	8.366.704 €
11	14.017.148 €	7.783.224 €	6.233.923 €	148.064.853 €	8.083.772 €
12	14.017.148 €	8.094.553 €	5.922.594 €	139.970.299 €	7.810.408 €
13	14.017.148 €	8.418.336 €	5.598.812 €	131.551.964 €	7.546.288 €
14	14.017.148 €	8.755.069 €	5.262.079 €	122.796.895 €	7.291.099 €
15	14.017.148 €	9.105.272 €	4.911.876 €	113.691.623 €	7.044.540 €
16	14.017.148 €	9.469.483 €	4.547.665 €	104.222.140 €	6.806.319 €
17	14.017.148 €	9.848.262 €	4.168.886 €	94.373.878 €	6.576.154 €
18	14.017.148 €	10.242.192 €	3.774.955 €	84.131.686 €	6.353.772 €
19	14.017.148 €	10.651.880 €	3.365.267 €	73.479.806 €	6.138.910 €
20	14.017.148 €	11.077.955 €	2.939.192 €	62.401.851 €	5.931.314 €
21	14.017.148 €	11.521.074 €	2.496.074 €	50.880.777 €	5.730.738 €
22	14.017.148 €	11.981.916 €	2.035.231 €	38.898.861 €	5.536.945 €
23	14.017.148 €	12.461.193 €	1.555.954 €	26.437.667 €	5.349.705 €
24	14.017.148 €	12.959.641 €	1.057.507 €	13.478.027 €	5.168.797 €
25	14.017.148 €	13.478.027 €	539.121 €	0 €	4.994.007 €

After this the operating costs must be discounted, with a total amounting to 323.070.250 €

Payment N.	Payment	Discounted Payment
1	19.452.000 €	15.824.215 €
2	19.783.000 €	15.549.259 €
3	20.119.000 €	15.278.601 €
4	20.451.000 €	15.005.532 €
5	20.809.000 €	14.751.892 €
6	21.163.000 €	14.495.506 €
7	21.523.000 €	14.243.562 €
8	21.889.000 €	13.995.918 €
9	22.261.000 €	13.752.440 €
10	22.639.000 €	13.513.007 €
11	23.024.000 €	13.278.077 €
12	23.415.000 €	13.046.926 €
13	23.814.000 €	12.820.532 €
14	24.218.000 €	12.597.131 €
15	24.630.000 €	12.378.198 €
16	25.049.000 €	12.163.066 €
17	25.475.000 €	11.951.612 €
18	25.908.000 €	11.743.724 €
19	26.348.000 €	11.539.295 €
20	26.796.000 €	11.338.647 €
21	27.252.000 €	11.141.644 €
22	27.715.000 €	10.947.764 €
23	28.186.000 €	10.757.309 €
24	28.665.000 €	10.570.166 €
25	29.152.000 €	10.386.228 €

In order to determine the public RAW Performance, it is necessary to adjust the indicator for any competitive advantage (or disadvantage) that the public entity may hold over the private sector in terms of tax benefits, guarantees, increased revenues, etc. The removal of competitive advantage factors allows for a neutral position, making the resulting values comparable. The operational costs RAW will be determined by considering the operating costs incurred, net of the operational risk value, in a state of neutrality and with a balanced budget objective, where operating revenues are equal to operating costs.

Risk allocation:

In light of the considerations set out above and in accordance with the guidelines of the Supervisory Authority for Public Contracts (AVCP) contained in the publication 'Analysis of evaluation techniques for selecting the project implementation model: the Public Sector

Comparator method and Value for Money analysis', it is estimated that the proposed PPP contract results in the transfer of the following risks, for a total value of construction risk of 60.814.386 €, and a value of maintenance of 70.106.244 €

Construction Cost Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	182.079.000 €	0%	- €	25%	- €
Slight Increase	191.182.950 €	5%	9.103.950 €	30%	2.731.185 €
Moderate Increase	218.494.800 €	20%	36.415.800 €	33%	12.017.214 €
Significant Increase	236.702.700 €	30%	54.623.700 €	12%	6.554.844 €

Time Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	182.079.000 €	0%	- €	23%	- €
Slight Increase	191.182.950 €	5%	9.103.950 €	2%	182.079 €
Moderate Increase	218.494.800 €	20%	36.415.800 €	9%	3.277.422 €
Significant Increase	236.702.700 €	30%	54.623.700 €	66%	36.051.642 €

Maintenence Risk	Maintenance Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	12.597.131 €	0	- €	23%	- €
Slight Increase	339.223.763 €	5%	16.153.513 €	2%	323.070 €
Moderate Increase	387.684.300 €	20%	64.614.050 €	9%	5.815.265 €
Significant Increase	419.991.325 €	30%	96.921.075 €	66%	63.967.910 €

Now that all the needed data has been calculated, the last operation to be done is the construction of the whole Value for Money structure.

PPP		APPALTO TRADIZIONALE	
RAW PPP	209.542.595 €	RAW MUTUO	194.515.859 €
RAW MAINTENENCE	323.070.250 €	RAW MAINTENENCE	252.964.006 €
RAW PSC	532.612.845 €	RAW PSC	447.479.865 €
		CONSTRUCTION RISK	60.814.386 €
		MAINTENENCE RISK	70.106.244 €
		TOT TRANFERRED RISK	130.920.630 €
TOTAL	532.612.845 €	TOTAL	578.400.496 €

Results show that the net present cost of the PPP option amounts to 532.612.845 €, compared to 578.400.496 € under traditional procurement, generating a VfM gain of 45.787.650 €

These results suggest that the PPP scheme provides a more efficient allocation of risks and lower overall lifecycle costs, thus representing the economically preferable procurement strategy for the project.

Value for Society:

Value for Society was estimated by applying the model based on additional bed capacity and earlier delivery.

For the estimation of the advance period of PPP construction ultimation we can take from literature the estimation of 25% from Raisbeck P., Duffield C., & Xu M. (2010). It is a more conservative estimation of the time difference between the two models with respect to many other estimations, which will ensure that the outcome does not overestimate the social benefits of the PPP model.

The new hospital provides an increase of $\Delta N = 40$ beds compared to the existing facility. Assuming an average occupancy rate $U = 80\%$ and an advance period $T = 456$ days (25% of 5 years), the number of additional bed-days during the advance period is calculated as:

Additional bed-days = $\Delta N \times U \times T$ = 14.592 bed/days

Multiplying this value by the estimated social value per bed-day (V = 500 €), the total social benefit generated by the earlier availability of the hospital amounts to 7.296.000 €.

V was estimated taking into consideration the cost of one day of hospitalization, which represents the minimum value of the service linked to the availability of beds.

This result highlights how time savings translate into tangible social gains in terms of increased healthcare capacity and improved access to services for the local community.

Overall, the findings indicate that the PPP solution not only achieves positive Value for Money but also generates additional Value for Society through earlier service availability. The combination of financial efficiency and social benefits reinforces the suitability of the PPP model for healthcare infrastructure projects, with a total estimated increase in benefits equal to 53.083.650 €.

4.6 Analysis of Case 3

The new hospital is designed as a modern healthcare complex capable of integrating a wide range of medical services, including inpatient care, surgical activities, diagnostic imaging, and specialized clinical departments. The project aims to replace outdated facilities and provide a more efficient organizational structure for healthcare delivery.

From a capacity perspective, the new hospital introduces an increase of approximately 25 beds compared to the existing infrastructure. Although the expansion in bed capacity is smaller than in the previous cases, the project is expected to generate important improvements in service quality and operational efficiency.

The overall investment associated with the project amounts to 369.391.000 € and includes construction costs, installation of medical technologies, and long-term infrastructure maintenance. As in the previous cases, the concession fee paid by the public authority includes both investment remuneration and service-related components linked to maintenance and technical facility management.

Value for money:

The first step of the analysis of the case consists in calculating the Value for Money through the Public Sector Comparator model. The PSC was calculated as the sum of base costs, competitive neutrality adjustments, retained risks, transferred risks, and shared risks. To build the analysis it will be taken as reference the document called "Analisi delle tecniche di valutazione per la scelta del modello di realizzazione dell'intervento: il metodo del Public Sector Comparator e l'analisi del valore" disposed by Autorità per la Vigilanza sui Contratti Pubblici (AVCP) and Unità Tecnica Finanza di Progetto (UTFP).

The PSC is calculated as follows:

PSC= raw PSC + Competitive neutrality + Retained risk + Transferred risk

- Raw Public Sector Comparator (Raw PSC): this includes the cost of the investment and all operating costs, both direct and indirect, associated with the construction, maintenance, and management of the infrastructure under traditional public procurement.
- Competitive neutrality adjustment: this consists of removing any competitive advantage that the public authority might obtain in the construction and management of the infrastructure under traditional procurement. The adjustment ensures a fair comparison between the public and the PPP option by neutralizing differences arising from tax treatment, financing conditions, or regulatory privileges.
- Transferable risk: this refers to the risks associated with events that may affect the construction and operation of the project and that can be contractually allocated to the private partner under a PPP scheme. Transferable risks may include, for example, construction cost overruns, schedule delays, operational performance risks, and demand risks.
- Retained risk: this represents the portion of risk that cannot be transferred to the private sector and therefore remains with public authority under both procurement models. An example of retained risk includes legislative or regulatory changes that may impact on the execution or management of the infrastructure.

Raw PSC:

For the calculation of the Raw Public Sector Comparator (PSC), it is necessary to construct a financial plan for both the PPP option and the traditional procurement alternative

Regarding the PPP scenario, considering total investment costs amounting to 369.391.000 €, the present value of the total payment amounts to 315.007.742 €.

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Balance	Discounted Payment
0	- €	- €	- €	369.391.000 €	- €
1	22.700.000 €	9.336.052 €	13.363.948 €	360.054.948 €	18.466.465 €
2	22.700.000 €	9.673.815 €	13.026.185 €	350.381.133 €	17.841.995 €
3	22.700.000 €	10.023.797 €	12.676.203 €	340.357.336 €	17.238.642 €
4	22.700.000 €	10.386.441 €	12.313.559 €	329.970.895 €	16.655.693 €
5	22.700.000 €	10.762.205 €	11.937.795 €	319.208.689 €	16.092.457 €
6	22.700.000 €	11.151.564 €	11.548.436 €	308.057.125 €	15.548.268 €
7	22.700.000 €	11.555.009 €	11.144.991 €	296.502.116 €	15.022.481 €
8	22.700.000 €	11.973.050 €	10.726.950 €	284.529.066 €	14.514.474 €
9	22.700.000 €	12.406.215 €	10.293.785 €	272.122.851 €	14.023.647 €
10	22.700.000 €	12.855.051 €	9.844.949 €	259.267.801 €	13.549.417 €
11	22.700.000 €	13.320.125 €	9.379.875 €	245.947.676 €	13.091.224 €
12	22.700.000 €	13.802.025 €	8.897.975 €	232.145.651 €	12.648.526 €
13	22.700.000 €	14.301.359 €	8.398.641 €	217.844.292 €	12.220.798 €
14	22.700.000 €	14.818.758 €	7.881.242 €	203.025.533 €	11.807.534 €
15	22.700.000 €	15.354.876 €	7.345.124 €	187.670.657 €	11.408.246 €
16	22.700.000 €	15.910.390 €	6.789.610 €	171.760.268 €	11.022.459 €
17	22.700.000 €	16.486.001 €	6.213.999 €	155.274.266 €	10.649.719 €
18	22.700.000 €	17.082.437 €	5.617.563 €	138.191.829 €	10.289.584 €
19	22.700.000 €	17.700.451 €	4.999.549 €	120.491.379 €	9.941.627 €
20	22.700.000 €	18.340.824 €	4.359.176 €	102.150.555 €	9.605.437 €
21	22.700.000 €	19.004.364 €	3.695.636 €	83.146.191 €	9.280.615 €
22	22.700.000 €	19.691.910 €	3.008.090 €	63.454.281 €	8.966.778 €
23	22.700.000 €	20.404.330 €	2.295.670 €	43.049.951 €	8.663.554 €
24	22.700.000 €	21.142.525 €	1.557.475 €	21.907.426 €	8.370.583 €
25	22.700.000 €	21.907.426 €	792.574 €	- 0 €	8.087.520 €

Considering the traditional procurement, for the purpose of comparison with the proposed solution, a Financial Amortization Plan has been developed for the same operation financed through Cassa Depositi e Prestiti (CDP), with a fixed interest rate of 4%. The present value of total payments amounts to 328.127.647 €.

Payment N.	Payment	Principal Payment	Interest Payment	Remining Principal Balance	Discounted Payment
0	- €	- €	- €	369.391.000 €	- €
1	22.700.000 €	9.336.052 €	13.363.948 €	360.054.948 €	18.466.465 €
2	22.700.000 €	9.673.815 €	13.026.185 €	350.381.133 €	17.841.995 €
3	22.700.000 €	10.023.797 €	12.676.203 €	340.357.336 €	17.238.642 €
4	22.700.000 €	10.386.441 €	12.313.559 €	329.970.895 €	16.655.693 €
5	22.700.000 €	10.762.205 €	11.937.795 €	319.208.689 €	16.092.457 €
6	22.700.000 €	11.151.564 €	11.548.436 €	308.057.125 €	15.548.268 €
7	22.700.000 €	11.555.009 €	11.144.991 €	296.502.116 €	15.022.481 €
8	22.700.000 €	11.973.050 €	10.726.950 €	284.529.066 €	14.514.474 €
9	22.700.000 €	12.406.215 €	10.293.785 €	272.122.851 €	14.023.647 €
10	22.700.000 €	12.855.051 €	9.844.949 €	259.267.801 €	13.549.417 €
11	22.700.000 €	13.320.125 €	9.379.875 €	245.947.676 €	13.091.224 €
12	22.700.000 €	13.802.025 €	8.897.975 €	232.145.651 €	12.648.526 €
13	22.700.000 €	14.301.359 €	8.398.641 €	217.844.292 €	12.220.798 €
14	22.700.000 €	14.818.758 €	7.881.242 €	203.025.533 €	11.807.534 €
15	22.700.000 €	15.354.876 €	7.345.124 €	187.670.657 €	11.408.246 €
16	22.700.000 €	15.910.390 €	6.789.610 €	171.760.268 €	11.022.459 €
17	22.700.000 €	16.486.001 €	6.213.999 €	155.274.266 €	10.649.719 €
18	22.700.000 €	17.082.437 €	5.617.563 €	138.191.829 €	10.289.584 €
19	22.700.000 €	17.700.451 €	4.999.549 €	120.491.379 €	9.941.627 €
20	22.700.000 €	18.340.824 €	4.359.176 €	102.150.555 €	9.605.437 €
21	22.700.000 €	19.004.364 €	3.695.636 €	83.146.191 €	9.280.615 €
22	22.700.000 €	19.691.910 €	3.008.090 €	63.454.281 €	8.966.778 €
23	22.700.000 €	20.404.330 €	2.295.670 €	43.049.951 €	8.663.554 €
24	22.700.000 €	21.142.525 €	1.557.475 €	21.907.426 €	8.370.583 €
25	22.700.000 €	21.907.426 €	792.574 €	0	8.087.520 €

After this the operating costs must be discounted, with a total amounting to 385.467.008 €.

Payment N.	Payment	Discounted Payment
1	23.209.000 €	18.880.536 €
2	23.603.000 €	18.551.745 €
3	24.005.000 €	18.229.674 €
4	24.413.000 €	17.912.574 €
5	24.828.000 €	17.601.036 €
6	25.250.000 €	17.294.879 €
7	25.679.000 €	16.993.933 €
8	26.115.000 €	16.698.039 €
9	26.559.000 €	16.407.667 €
10	27.011.000 €	16.122.612 €
11	27.470.000 €	15.842.111 €
12	27.937.000 €	15.566.602 €
13	28.412.000 €	15.295.917 €
14	28.895.000 €	15.029.899 €
15	29.386.000 €	14.768.401 €
16	29.886.000 €	14.511.772 €
17	30.394.000 €	14.259.364 €
18	30.911.000 €	14.011.512 €
19	31.436.000 €	13.767.620 €
20	31.970.000 €	13.528.009 €
21	32.514.000 €	13.292.948 €
22	33.067.000 €	13.061.870 €
23	33.629.000 €	12.834.654 €
24	34.201.000 €	12.611.556 €
25	34.782.000 €	12.392.076 €

In order to determine the public RAW Performance, it is necessary to adjust the indicator for any competitive advantage (or disadvantage) that the public entity may hold over the private sector in terms of tax benefits, guarantees, increased revenues, etc. The removal of competitive advantage factors allows for a neutral position, making the resulting values comparable. The operational costs RAW will be determined by considering the operating costs incurred, net of the operational risk value, in a state of neutrality and with a balanced budget objective, where operating revenues are equal to operating costs.

Risk allocation:

In light of the considerations set out above and in accordance with the guidelines of the Supervisory Authority for Public Contracts (AVCP) contained in the publication 'Analysis of evaluation techniques for selecting the project implementation model: the Public Sector Comparator method and Value for Money analysis', it is estimated that the proposed PPP contract results in the transfer of the following risks, for a total value of construction risk of 115.297.134 €, and a value of maintenance of 83.646.341 €

Construction Cost Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	345.201.000 €	0%	0	25%	0
Slight Increase	362.461.050 €	5%	17.260.050 €	30%	5.178.015 €
Moderate Increase	414.241.200 €	20%	69.040.200 €	33%	22.783.266 €
Significant Increase	448.761.300 €	30%	103.560.300 €	12%	12.427.236 €

Time Overrun Risk	Construction Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	345.201.000 €	0%	0	23%	0
Slight Increase	362.461.050 €	5%	17.260.050 €	2%	345.201 €
Moderate Increase	414.241.200 €	20%	69.040.200 €	9%	6.213.618 €
Significant Increase	448.761.300 €	30%	103.560.300 €	66%	68.349.798 €

Maintenence Risk	Maintenence Cost Increase	Deviation Classes	Impact (Loss Amount)	Probability	Risk Value
No Increase	385.467.008 €	0%	0	23%	0
Slight Increase	404.740.359 €	5%	19.273.350 €	2%	385.467 €
Moderate Increase	462.560.410 €	20%	77.093.402 €	9%	6.938.406 €
Significant Increase	501.107.111 €	30%	115.640.102 €	66%	76.322.468 €

Now that all the needed data has been calculated, the last operation to be done is the construction of the whole Value for Money structure.

PPP		TRADITIONAL PROCUREMENT	
RAW PPP	315.007.742 €	RAW MUTUO	328.127.647 €
RAW MAINTENENCE	385.467.008 €	RAW MAINTENENCE	301.820.667 €
RAW PSC	700.474.750 €	RAW PSC	629.948.314 €
		CONSTRUCTION RISK	115.297.134 €
		MAINTENENCE RISK	83.646.341 €
		TOT TRANSFERRED RISK	198.943.475 €
TOTAL	700.474.750 €	TOTAL	828.891.789 €

Results show that the net present cost of the PPP option amounts to 700.474.750 €, compared to 828.891.789 € under traditional procurement, generating a VfM gain of 128.417.039 € .

These results suggest that the PPP scheme provides a more efficient allocation of risks and lower overall lifecycle costs, thus representing the economically preferable procurement strategy for the project.

Value for Society:

Value for Society was estimated by applying the model based on additional bed capacity and earlier delivery.

For the estimation of the advance period of PPP construction ultimation we can take from literature the estimation of 25% from Raisbeck P., Duffield C., & Xu M. (2010). It is a more conservative estimation of the time difference between the two models with respect to many other estimations, which will ensure that the outcome does not overestimate the social benefits of the PPP model.

The new hospital provides an increase of $\Delta N = 25$ beds compared to the existing facility. Assuming an average occupancy rate $U = 80\%$ and an advance period $T = 456$ days (25% of 5 years), the number of additional bed-days during the advance period is calculated as:

Additional bed-days = $\Delta N \times U \times T$ = 9.120 bed/days

Multiplying this value by the estimated social value per bed-day ($V = 500$ €), the total social benefit generated by the earlier availability of the hospital amounts to 4.560.000 €.

V was estimated taking into consideration the cost of one day of hospitalization, which represents the minimum value of the service linked to the availability of beds.

This result highlights how time savings translate into tangible social gains in terms of increased healthcare capacity and improved access to services for the local community.

Overall, the findings indicate that the PPP solution not only achieves positive Value for Money but also generates additional Value for Society through earlier service availability. The combination of financial efficiency and social benefits reinforces the suitability of the PPP model for healthcare infrastructure projects, with a total estimated increase in benefits equal to 132.977.039 €.

Chapter 5: Discussion

The empirical application of the integrated Value for Money (VfM) and Value for Society (VfS) framework to the three hospital infrastructure projects provides consistent and meaningful evidence regarding the performance of the PPP procurement model.

Across all case studies, the PPP option demonstrates both economic convenience and measurable additional social value. However, the magnitude and structure of these benefits vary, offering important insights into the determinants of public value creation in healthcare infrastructure projects.

5.1 Analysis of Value for Money

The Value for Money results show positive differentials in all three cases:

- Case 1: €120,127,155
- Case 2: €45,787,650
- Case 3: €128,417,039

The consistency of positive VfM across projects suggests that the PPP model, under the contractual and financial conditions analyzed, represents the economically preferable procurement strategy.

A closer examination of the PSC structure reveals that the primary driver of VfM gains is not the financing mechanism per se, but the transfer of construction and maintenance risks to the private partner.

The value of transferred risks amounts to:

- Case 1: €185.9 million

- Case 2: €130.9 million
- Case 3: €198.9 million

This confirms a fundamental principle widely discussed in PPP literature: the economic advantage of PPP arrangements emerges when risks are efficiently allocated to the party best able to manage them.

In Cases 1 and 3, which present larger lifecycle costs and higher exposure to construction uncertainty, the magnitude of risk transfer is substantial, leading to higher VfM gains. Case 2, characterized by comparatively lower risk exposure, generates a smaller but still positive VfM differential.

This pattern supports the hypothesis that PPP procurement tends to be more advantageous in projects where construction complexity is significant, lifecycle integration improves long-term cost control and performance-based contracts reduce inefficiencies and opportunistic behaviors.

5.2 Analysis of Value for Society

The Value for Society component, estimated through the simplified model based on additional bed capacity and earlier delivery, produces the following results:

- **Case 1:** €5.472.000
- **Case 2:** €7.296.000
- **Case 3:** €4.560.000

Although quantitatively smaller than the VfM component, these values represent tangible social gains generated by the earlier availability of healthcare services.

The VfS results depend on three key parameters:

- Additional bed capacity (ΔN),
- Average occupancy rate ($U = 80\%$),
- Advance period ($T = 456$ days, corresponding to 25% of construction time).

Case 2 generates the highest social benefit due to the largest increase in bed capacity (40 beds), despite presenting the lowest VfM gain. Conversely, Case 3 shows the highest VfM but a more limited VfS value due to smaller additional capacity.

This divergence highlights an important analytical insight: financial efficiency and social capacity expansion are not necessarily correlated.

A project may generate substantial financial savings through risk transfer while providing relatively limited additional service capacity, and vice versa.

5.3 Analysis of Total Value

When combining VfM and VfS, the total estimated benefit of the PPP option amounts to:

CASE	Value for Money	Value for Society	Total Value
1	120.127.155 €	5.472.000 €	125.599.155 €
2	45.787.650 €	7.296.000 €	53.083.650 €
3	128.417.039 €	4.560.000 €	132.977.039 €

The integration of the VfS component does not alter the ranking determined by VfM, but it strengthens the overall assessment by incorporating a dimension traditionally excluded from financial appraisal.

From a policy perspective, this combined approach offers a more comprehensive representation of public value creation:

- VfM captures economic efficiency and optimal risk allocation.
- VfS captures the social implications of time savings in essential services.

The results suggest that PPP procurement in healthcare may generate value not only through financial optimization but also through accelerated service provision, which is particularly relevant in contexts characterized by high demand pressure.

5.4 Robustness and Sensitivity Considerations

The robustness of the results depends on several assumptions:

Time Advantage Assumption

The estimation of a 25% reduction in construction time, derived from literature, has been intentionally selected as a conservative parameter. If the time differential were lower, the VfS component would decrease proportionally; if higher, the social benefit would increase significantly.

Occupancy Rate and Social Value Proxy

The model assumes:

- An 80% occupancy rate,
- A social value proxy of €500 per bed-day.

Both parameters directly influence the magnitude of VfS. However, even under moderate adjustments, the sign of the social benefit remains positive, indicating structural robustness of the result.

Partial Scope of Social Value

It is important to emphasize that the proposed model captures only the capacity-related dimension of social value. It does not account for:

- Improvements in healthcare quality,
- Reduction in waiting times,
- Long-term health outcomes,
- Distributional equity effects.

Therefore, the estimated VfS should be interpreted as a minimum measurable social benefit, rather than a comprehensive welfare evaluation.

Chapter 6: Conclusions

6.1 Methodological Contribution

A final consideration concerns the methodological contribution of the Value for Society (VfS) approach in comparison with the more established Value for Money (VfM) framework. From a strictly administrative perspective the introduction of VfS does not necessarily alter the outcome of the evaluation. In many cases, the results remain consistent with those obtained through the VfM analysis, as the financial structure of the project and the allocation of risks between public and private partners continue to be the main determinants in the procurement decision. Nevertheless, VfS provides an important methodological extension, as it broadens the scope of the assessment by explicitly considering the social, environmental, and territorial impacts generated by the project over the long term.

In this sense, the primary value of VfS lies less in changing the final procurement decision and more in improving the comprehensiveness and transparency of the public decision-making process. By incorporating dimensions that are typically not reflected in financial cash flows, such as accessibility of services, user well-being, environmental performance, and broader societal benefits, VfS enables a more holistic evaluation of infrastructure investments. This perspective is particularly relevant in the case of healthcare infrastructure projects, where the value created by the investment extends beyond financial efficiency and directly affects the quality and inclusiveness of public services.

At the same time, adopting a VfS perspective may reveal potential divergences with evaluations based solely on VfM. Such situations may arise when a project configuration that appears financially advantageous generates less favorable social or environmental outcomes, or conversely when relevant societal benefits, often difficult to monetize, are not fully captured by traditional financial metrics. In these cases, the combined use of VfM and VfS helps highlight possible trade-offs between economic efficiency and broader social value, providing public decision-makers with a more comprehensive analytical basis for guiding infrastructure investment choices.

Traditional Public Sector Comparator analyses focus primarily on financial cost efficiency. By introducing a simplified and replicable VfS model, this study expands procurement assessment toward a broader concept of public value.

The proposed framework demonstrates that:

1. Time savings can be operationalized and monetized.
2. Social value can be approximated through transparent and available data.
3. Financial and social performance can be jointly assessed without compromising analytical clarity.

This approach contributes to the ongoing debate on how to move beyond purely budgetary evaluation criteria in public infrastructure decision-making.

6.2 Future research directions

This work also opens several avenues for future research. First, further studies could focus on the development and refinement of methodological frameworks for measuring Value for Society (VfS) in PPP projects. In particular, one of the main challenges concerns the identification, quantification, and, where possible, monetization of social and environmental impacts associated with infrastructure investments. Developing more standardized sets of indicators and evaluation procedures would help improve the robustness and comparability of VfS assessments across projects and sectors.

A second area of research concerns the hypothesis that PPP procurement may lead to shorter construction times compared with traditional public procurement. Delivery time is often cited as one of the potential advantages of PPPs, as the integration of design, construction, financing, and operation within a single contractual structure may create stronger incentives for timely completion. However, empirical evidence on this aspect remains limited and sometimes inconclusive, partly due to differences in project characteristics, regulatory environments, and procurement procedures. Future studies could therefore focus on systematic empirical analyses comparing construction timelines of PPP and traditionally procured infrastructure projects across sectors and countries. Such research could help clarify whether PPPs effectively contribute to faster project delivery and under which institutional or contractual conditions this advantage is most likely to emerge.

Finally, future research could further investigate the application of the VfS framework to a broader range of case studies. While this work focuses on healthcare infrastructure, applying the same methodology to other types of PPP projects—such as transportation, education, or social housing—could help assess whether the added value of the VfS approach varies depending on the characteristics of the sector, the nature of the services provided, and the types of stakeholders involved. Comparative analyses across sectors and countries could also contribute to understanding how institutional contexts and policy priorities influence the relevance of societal value considerations in PPP evaluations.

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