

ENHANCING EFFICIENCY IN HEALTHCARE INFRASTRUCTURE INVESTMENTS: INSIGHTS FROM THE INTRODUCTION OF PROTON THERAPY IN CATALONIA

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INTRODUCTION

- ✓ Healthcare infrastructure investments significantly impact the efficiency of health systems, requiring robust decision-making frameworks.
- ✓ Economic evaluation methods like cost-benefit analysis (CBA) and cost-utility analysis (CUA) are critical tools for optimizing resource allocation in healthcare.
- ✓ In Catalonia, a Spanish region, economic evaluation is now a mandatory step for healthcare projects exceeding €10 million, aligning with both local and European guidelines.
- ✓ This study explores the integration of economic evaluation into healthcare infrastructure planning, using proton therapy as a case study.

OBJECTIVE

To develop and implement a methodological framework for integrating economic evaluation into healthcare infrastructure investments, with a focus on improving decision-making and resource efficiency within the Catalan Health Service.

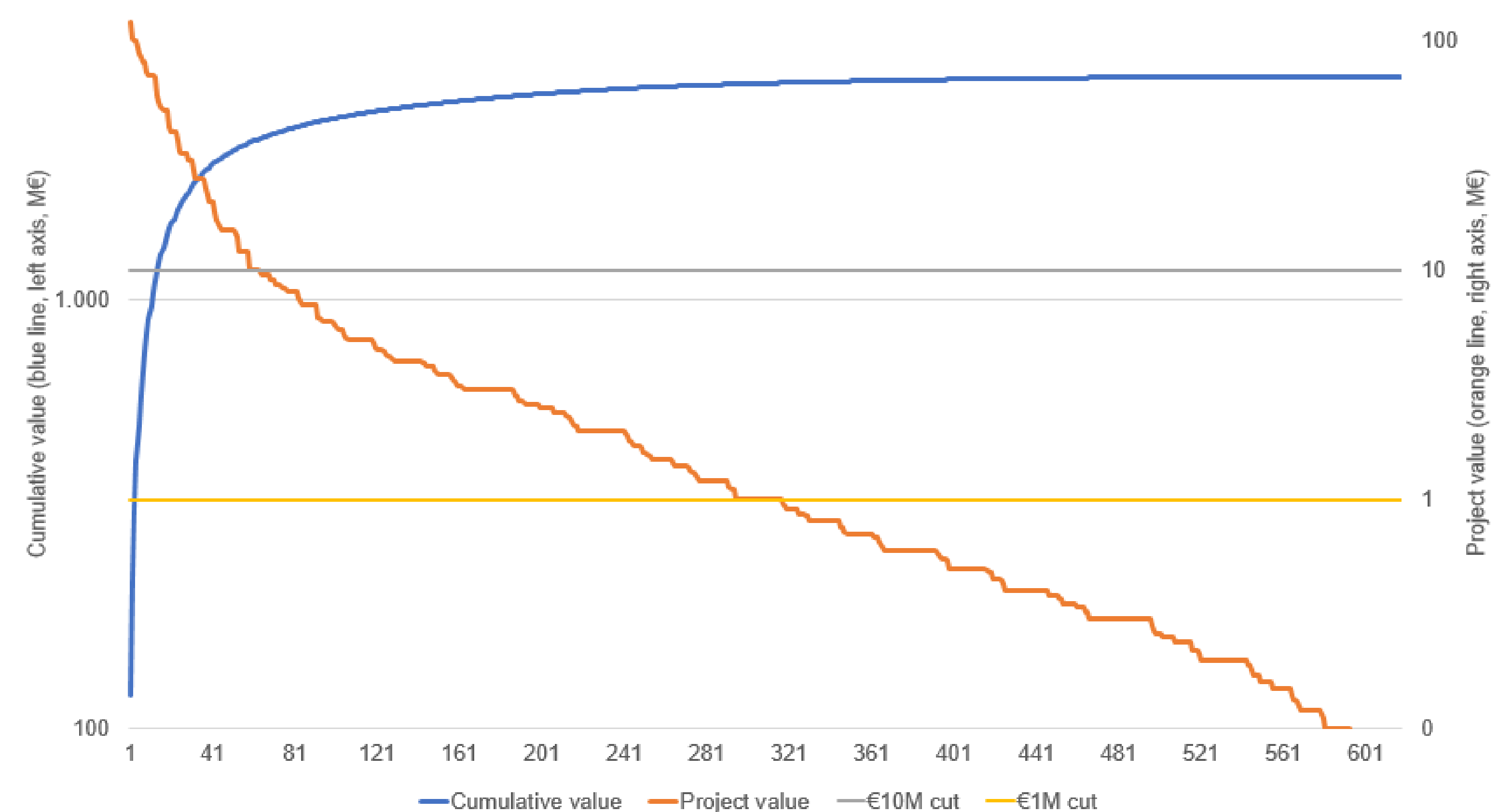
METHOD

- ✓ **Theoretical Framework:** Based on human capital and economic theories, applying cost-benefit analysis (CBA) and cost-utility analysis (CUA) to healthcare investments.
- ✓ **Study Design:** A two-phase approach: first, analysing existing prioritization frameworks and data to determine when economic evaluation is necessary; second, applying the proposed methodology to proton therapy.
- ✓ **Data Collection:** Combined clinical, economic, and infrastructure data to perform detailed analyses of costs and health-related benefits.
- ✓ **Evaluation Tools:** Conducted a SWOT analysis of current practices, reviewed infrastructure investment data, and applied CBA and CUA to specific healthcare projects.

RESULTS

- ✓ Based on the analysis of infrastructure investment data, **projects should be categorized into four groups** by size: 50% under €1M, 40% between €1M and €10M, and 10% exceeding €10M, including strategic projects over €220M. This categorization helps guide prioritization for resource allocation.
- ✓ The cost-benefit analysis (CBA) demonstrated that the investment in two proton therapy machines would result in significant cost savings. Over a 20-year period, the net present value (NPV) of the investment would yield **savings of €294.04 million** compared to the alternative of sending patients abroad.
- ✓ The cost-utility analysis (CUA) confirmed the cost-effectiveness of proton therapy, particularly for paediatric and specific adult cancers, showing a mean gain of **2.5 QALYs per patient**.
- ✓ Sensitivity analyses highlighted the **potential bottleneck in capacity by 2034**, emphasizing the need for future infrastructure expansions to meet growing demand.
- ✓ Implementation of economic evaluation criteria in healthcare infrastructure investments enhances transparency and ensures efficient use of public fund.

Graph 1. Projects distribution according to their amount (Million € 2023)



- ✓ As a result of this project, the regional Ministry of Health has made the following decisions:
 - In 2024, a multidisciplinary team was established to develop transparent prioritization criteria for healthcare infrastructure investments. These criteria are based on the initial recommendations from Phase 0 of the project.
 - The analysis of proton therapy capacity highlighted that the two machines planned for Catalonia, with a maximum capacity of 400 patients per year, will not meet the growing demand beyond 2034.
 - A proposal has been made to conduct an efficiency evaluation for the purchase of a third proton therapy machine to address the anticipated demand increase.

CONCLUSIONS

- ✓ The integration of economic evaluation methods into healthcare infrastructure decision-making processes provides robust evidence to support efficient resource allocation.
- ✓ The results underscore the economic and clinical value of proton therapy, demonstrating its potential to improve patient outcomes while reducing healthcare costs.
- ✓ The findings advocate for the systematic application of CBA and CUA in future healthcare infrastructure projects, particularly for large-scale investments.
- ✓ Periodic re-evaluation of infrastructure investments is crucial to adapt to evolving healthcare needs and ensure long-term sustainability.

CONTACT
INFORMATION

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