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ORIGINAL RESEARCH ARTICLE

Integrating MCDA and economic evaluation into a rule-based framework for hospital-level health technology assessment

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ABSTRACT

Introduction: Health Technology Assessment (HTA) supports evidence-based decision-making, but integrating economic evaluation within Multi-Criteria Decision Analysis (MCDA) remains challenging in hospital-level HTA. This study developed and preliminarily applied an integrated decision-support framework combining MCDA, economic evaluation, and contextualized evidence assessment to support adoption recommendations.

Methods: A pragmatic digital framework integrated MCDA with Budget Impact Analysis (BIA) and Cost-Consequence Analysis (CCA) within a rule-based decision matrix. The economic module estimated cost per patient, incremental cost, budget impact, cost-consequence outputs, and, when appropriate, a supportive soft ICER. Evidence was assessed through structured critical appraisal, Summary of Findings tables, and outcome relevance, using a GRADE-informed approach mapped onto the predefined 0-1-3-5-7-9 MCDA evidence scale. Operational robustness was assessed through Failure Mode and Effects Analysis (FMEA) and self-audit controls.

Results: In a case study comparing disposable and reusable continence care systems, the disposable option showed a lower MCDA score than the current standard (2.60 vs 4.80; ΔMCDA = -2.20) and a higher cost per patient (€1.00 vs €0.65; incremental cost €0.35). Although the 3-year budget impact was €2,634 and remained within the institutional affordability threshold, the technology was classified as dominated because it generated lower value at a higher cost. The final recommendation was not favorable for routine adoption.

Conclusion: The framework supports transparent integration of MCDA and economic evaluation in hospital-level HTA and helps distinguish affordability from overall value. The case study suggests that technologies should not be adopted solely because their budget impact is acceptable when the value-risk profile is unfavorable. Further validation across technologies and settings is required.

Keywords: Budget Impact Analysis, Decision support, Health Technology Assessment, Hospital-based HTA, Multi-Criteria Decision Analysis, Medical devices

Introduction

Health Technology Assessment (HTA) is increasingly recognized as a key tool to support evidence-based decision-making in healthcare systems (1,2). Among the available approaches, Multi-Criteria Decision Analysis (MCDA) has gained relevance for its ability to integrate multiple dimensions of value, including clinical effectiveness, safety, organizational impact, and patient-related outcomes (3-5).

Recent regulatory developments at the European level have further strengthened the role of HTA: the introduction of Joint Clinical Assessments (JCA) under Regulation (EU) 2021/2282 establishes a common framework for the clinical evaluation of health technologies across Member States, making HTA a mandatory component in the assessment process.

In Italy, the National HTA Program for medical devices supports systematic evaluation to inform procurement and adoption decisions, making HTA a mandatory component in the assessment process (7). Within this framework, regional platforms such as RATEC (Richieste di Acquisto TECnologie sanitarie) provide structured tools for assessing value and risk through MCDA-based approaches (8). However, regional platforms are primarily designed for standardized evaluations and may not fully capture local operational constraints, budget impact, implementation issues, and explicit decision rules required at the institutional level.

To address this gap, our institution developed an independent but complementary decision-support framework, designed to extend the regional model by integrating

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structured economic evaluation and explicit decision rules into the hospital assessment process. The framework is not intended to replace regional HTA procedures, but to support transparent institutional decision-making when local operational and economic variables are relevant. It should therefore be interpreted as a hospital-level HTA decision-support tool rather than as a comprehensive HTA report covering all nine domains of the EUnetHTA Core Model.

The digital application was designed to reduce the risk of data inconsistency and formula manipulation by restricting user input to predefined editable fields, automating recurrent variables, and standardizing data entry. The software and process were not externally validated as a decision model; rather, their operational robustness was assessed through Failure Mode and Effects Analysis (FMEA), and self-audit controls focused on input, calculation, and output risks.

This study presents the development and preliminary application of a pragmatic framework integrating MCDA with structured economic evaluation, with the aim of supporting hospital-level decisions on health technology adoption.

Methods

This study describes the development and preliminary implementation of an integrated decision-support framework combining MCDA with structured economic evaluation for the assessment of medical technologies at the institutional level.

Framework design and conceptual alignment

The framework was developed to ensure methodological consistency with established HTA standards while addressing operational gaps observed in real-world decision-making processes.

The methodological framework included the EUnetHTA Core Model®, ISPOR good practice guidance for Budget Impact Analysis (BIA), and key methodological contributions on MCDA in healthcare decision-making (1,4,9-11).

Evaluation criteria were aligned with core HTA domains, including clinical effectiveness, safety, organizational impact, patient-related outcomes, and economic consequences. Criteria and sub-criteria were structured to allow granular assessment and to preserve consistency with the regional MCDA logic used in RATEC (Table 1).

Each criterion was further structured into sub-criteria, allowing a more granular and operational assessment. The weighting system applied to both criteria and sub-criteria was derived from a regional stakeholder-based process and may be locally calibrated when institutional priorities require explicit adaptation.

The criteria and weights used in the MCDA component were not developed de novo by the authors. They were derived from the regional RATEC framework, in which criteria and relative weights were defined through a structured regional consultation involving members of the Medical Device Assessment Units across healthcare organizations in the Veneto Region (Table 2). Therefore, the institutional application preserves the regional multi-criteria structure and implements it locally within a digital decision-support environment.

The economic module was developed as an institutional extension of the RATEC-aligned framework. Its criteria were designed to remain conceptually coherent with the regional value–risk domains, while explicitly incorporating local economic and organizational variables relevant to hospital decision-making, including budget impact, cost per patient, sustainability thresholds, and the relationship between incremental cost and incremental MCDA value. Thus, economic output does not replace the regional MCDA structure, but complements it by operationalizing the economic dimension within the local decision process.

MCDA structure and value—risk assessment

The value–risk assessment was conducted using an MCDA structure aligned with the regional platform (RATEC) model.

The institutional framework preserves the A × B × C logic while adding operational layers that are not fully represented in the regional platform, particularly the integration of local economic evaluation and explicit decision rules.

For each technology, criterion-level MCDA scores are calculated as weighted sums. For each alternative, the aggregate MCDA score is calculated as $MCDA = \Sigma(wj \times Sj)$, where wj is the criterion weight and Sj is the criterion-level score assigned to the alternative. The incremental MCDA value is calculated as $\Delta MCDA = MCDA_{new} - MCDA_{standard}$. In the case study, this calculation generated an aggregate MCDA score of 2.60 for the new technology and 4.80 for the current standard.

The value–risk plot is a related but distinct graphical output. For each subcriterion, the contribution is calculated as $Ci = Ai \times Bi \times wi \times Wd$, where Ai is the direction and magnitude of impact, Bi is the evidence/contextual-validity coefficient, wi is the subcriterion weight, and Wd is the domain weight. Contributions aligned with expected benefit are aggregated into the value coordinate, whereas contributions representing uncertainty, implementation burden, or negative consequences are aggregated into the risk coordinate. Therefore, the aggregate MCDA scores and the value–risk coordinates are derived from the same scoring logic but are not expected to be numerically identical.

Contextualized evidence assessment

A specific methodological refinement introduced by the institutional framework concerns component B, namely the assessment of evidence certainty and contextual validity. In the regional RATEC model, evidence scoring is operationally based on predefined evidence hierarchies and Saaty-type scales. This approach provides a standardized and pragmatic scoring structure for regional assessments.

In the institutional framework, this structure is preserved, but the assignment of component B is further supported by a GRADE-informed appraisal process (12). Summary of Findings tables are used to synthesize the available evidence and to make explicit the certainty of evidence, the relevance of outcomes, and the applicability of findings to the local decision problem. This allows the assessment to move beyond study design alone and to consider risk of bias, consistency, precision, directness, and contextual relevance.

TABLE 1 - Core scoring structure used in the MCDA framework

Component	Meaning	Operationalization
A - Impact	Direction and magnitude of expected impact	Positive (+1), neutral (0) or negative (-1) effect on each criterion, expressed on a predefined numerical scale.
B - Evidence certainty/contextual validity	Reliability and applicability of evidence supporting the impact judgment	GRADE-informed critical appraisal based on Summary of Findings tables, considering risk of bias, consistency, precision, directness and relevance to the local outcome; mapped onto the predefined 0–1–3–5–7–9 scale to support the numerical assignment of component B.
C - Weight	Relative importance of the criterion	Stakeholder-derived weight, aligned with regional HTA priorities and potentially calibrated at the institutional level.
MCDA score	Weighted value contribution	Calculated as A × B × C and aggregated across criteria; aggregate scores support comparison between alternatives.

TABLE 2 - Source and role of criteria, weights, and scoring components in the framework

Component	Source	Role in the framework
MCDA criteria	RATEC regional framework	Define the value–risk assessment domains
MCDA weights	Regional consultation involving members of Medical Device Assessment Units across healthcare organizations in the Veneto Region	Express the relative importance of each domain
A — Impact	Local assessment	Direction and magnitude of expected impact
B — Evidence	Contextualized evidence appraisal, supported by GRADE-informed Summary of Findings tables	Certainty, relevance, and contextual applicability of available evidence
C — Weight	RATEC-derived regional weights	Relative importance of the criterion
ECONOMIC_MCDA criteria	Institutional extension coherent with RATEC	Economic and organizational sustainability assessment
Decision rules	Local institutional framework	Translation of MCDA + economic outputs into a recommendation

Accordingly, randomized controlled evidence may be downgraded when it is affected by methodological limitations or when it is not directly applicable to the specific outcome under assessment. Conversely, non-randomized or lower-level evidence may be considered more informative when it is consistent, directly relevant, and strongly aligned with the local decision context.

GRADE is therefore not used to replace the MCDA structure or the RATEC-derived scoring logic, but to make the assignment of component B more transparent, reproducible, and context-sensitive. The Saaty scale remains conceptually appropriate for preference elicitation and weighting procedures, whereas evidence certainty is assessed through structured critical appraisal rather than through pairwise comparisons.

Because the regional MCDA structure requires component B to be expressed on an ordinal numerical scale, GRADE certainty ratings were mapped onto the predefined 0–1–3–5–7–9 scale. High-certainty evidence was assigned a B value of 9, moderate-certainty evidence a value of 7, low-certainty evidence a value of 5, and very-low-certainty evidence a value of 3. A value of 1 was reserved for evidence based only on indirect rationale, biological plausibility, or unstructured expert opinion, while 0 indicated absence of assessable evidence (Table 3). This mapping was used only to operationalize GRADE-informed evidence appraisal within the MCDA calculation and should not be interpreted as an official numerical GRADE score.

Integration of economic evaluation

The economic module integrates BIA and Cost-Consequence Analysis (CCA) into the institutional decision process. Economic parameters include acquisition costs, consumption volumes, expected adoption rates, time horizon,

and, when relevant, local organizational costs such as reprocessing, storage, or implementation requirements. Unlike approaches in which economic considerations are developed outside the MCDA platform and subsequently entered as a summarized cost input, the proposed application embeds the economic assessment within the decision-support workflow.

Starting from elementary economic inputs, such as unit price, expected volumes, and local organizational assumptions, the application progressively derives cost per patient, incremental cost, budget impact over the selected time horizon, cost-consequence outputs, and, when appropriate, the soft ICER. In this way, the economic dimension is not treated as an external judgment added to the MCDA, but as a structured analytical pathway integrated into the same digital environment that generates the final recommendation.

Soft ICER interpretation was based on the joint direction of incremental cost and incremental MCDA value rather than on a universal willingness-to-pay threshold. Table 4 summarizes the predefined interpretive scenarios used in the framework.

The soft ICER was calculated as ΔCost/ΔMCDA, where ΔCost represents the incremental cost per patient and ΔMCDA represents the difference between the weighted aggregate MCDA score of the new technology and the current standard. Because MCDA scores are dimensionless and institution-specific, the soft ICER is not comparable with conventional cost-effectiveness ratios based on QALYs and should not be interpreted against a universal willingness-to-pay threshold. Its interpretation was therefore based on the joint direction of ΔCost and ΔMCDA. When a technology generates a higher MCDA value at lower cost, it is considered dominant, and the soft ICER is not required; when it generates a lower MCDA value at higher cost, it is considered dominated, and the soft ICER is not applicable. In trade-off scenarios, where both cost and MCDA value increase or decrease, the soft ICER may be interpreted cautiously as an internal indicator of cost per unit

TABLE 3 - Operational mapping between GRADE certainty and MCDA evidence component B

Evidence assessment	B coefficient	Operational meaning
High GRADE certainty	9	Evidence strongly supports the expected impact
Moderate GRADE certainty	7	Evidence supports the expected impact with moderate uncertainty
Low GRADE certainty	5	Evidence provides limited but usable support
Very low GRADE certainty	3	Evidence is highly uncertain
Indirect rationale/expert opinion only	1	Minimal evidentiary support
No assessable evidence	0	No usable evidence supporting the impact judgment

TABLE 4 - Interpretive framework for the soft ICER

Incremental cost (ΔCost)	Incremental MCDA value (ΔMCDA)	Scenario	Interpretation	Role in decision-making
< 0	**> 0**	**Dominant**	The new technology costs less and provides greater value.	Soft ICER not needed; the economic-value profile is favorable.
> 0	**< 0**	**Dominated**	The new technology costs more and provides lower value.	Soft ICER not applicable; the economic-value profile is unfavorable.
> 0	**> 0**	**Cost–value trade-off**	The new technology costs more but also provides greater value.	Soft ICER may be interpreted cautiously as the additional cost per unit of MCDA value gained.
< 0	**< 0**	**Saving–value trade-off**	The new technology costs less but also provides lower value.	Soft ICER may be interpreted cautiously as the savings per unit of MCDA value lost.
≈ 0	**Any**	**Cost-neutral**	Incremental cost is negligible.	The decision is driven mainly by MCDA and CCA results.
Any	**≈ 0**	**Value-neutral**	Incremental MCDA difference is negligible.	Soft ICER is unstable or poorly informative; the decision is driven mainly by BIA, CCA and contextual factors.

ΔCost, incremental cost per patient; ΔMCDA, incremental difference in weighted aggregate MCDA value; BIA, Budget Impact Analysis; CCA, Cost-Consequence Analysis.

of MCDA value gained or savings per unit of MCDA value lost. These categories support interpretation but do not replace the final rule-based recommendation.

Decision rules and recommendation hierarchy

The final recommendation is generated hierarchically. First, the MCDA value-risk profile identifies whether the new technology provides additional value and whether relevant risks are present. Second, BIA assesses affordability within local budget thresholds. Third, CCA describes the direction of consequences across clinical, organizational, patient-related, and economic dimensions. Finally, the soft ICER is used only as a supportive interpretive indicator when a meaningful cost-value trade-off exists.

This hierarchy prevents an affordable technology from being recommended when its overall value-risk profile is unfavorable, and conversely prevents a high-value technology from being rejected solely on the basis of unit price when broader consequences support adoption. Figure 2 summarizes the conceptual architecture of the framework.

Digital implementation and operational risk assessment

The framework was implemented through a digital application supporting structured data entry, automated calculations, and standardized outputs. A structured FMEA was conducted to assess operational robustness and to identify potential failure modes across data input, calculation logic, and decision output generation.

Mitigation measures included predefined editable fields, protected calculation cells, validation rules, automation of recurrent variables, standardization of data-entry formats and internal consistency checks. These controls support process reliability but do not constitute external validation of the methodological framework or of the correctness of the resulting decisions.

Results

The framework was applied to a real-world case study concerning continence care systems. The assessment compared the current standard, represented by reusable and

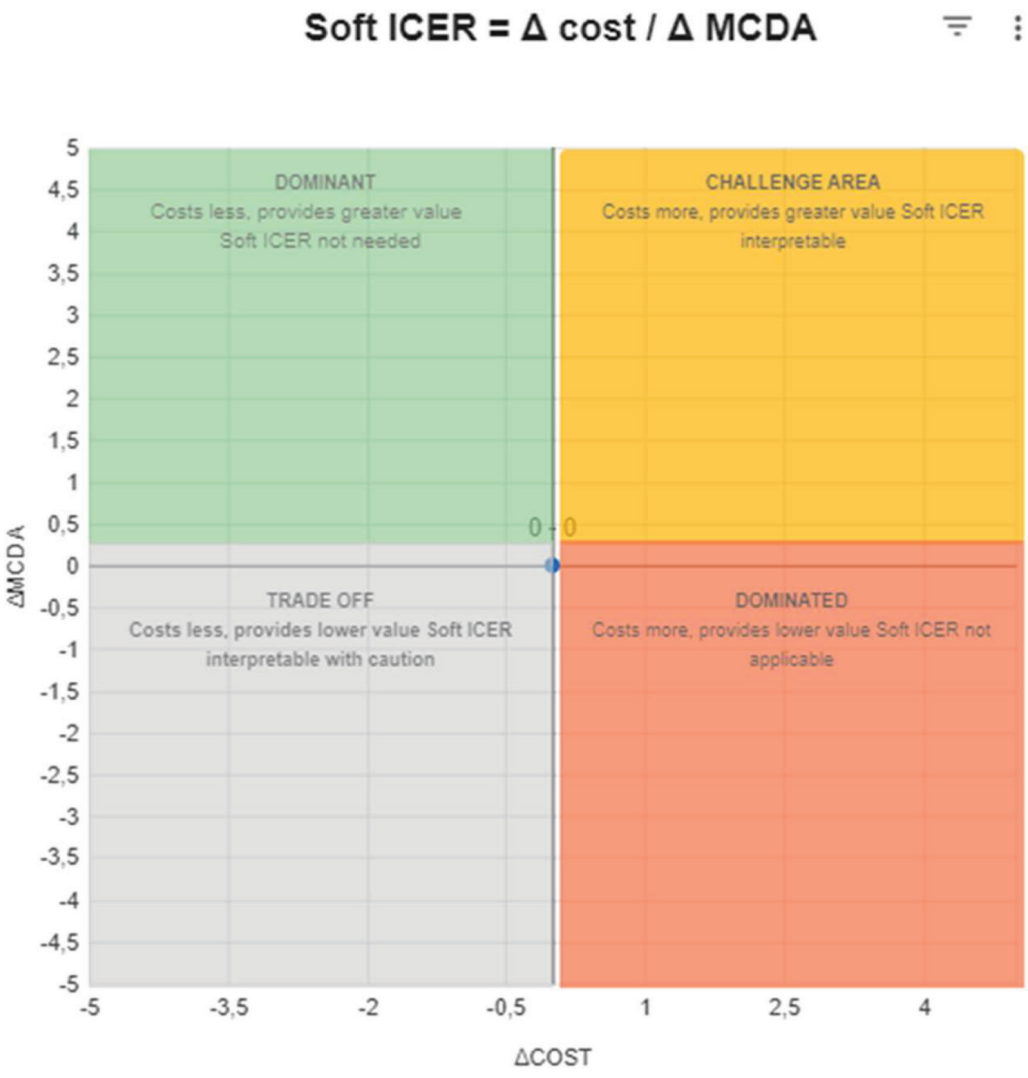


FIGURE 1 - Soft ICER interpretive quadrant framework. The diagram illustrates the predefined interpretive scenarios based on the joint direction of incremental cost (ΔCost) and incremental MCDA value (ΔMCDA).

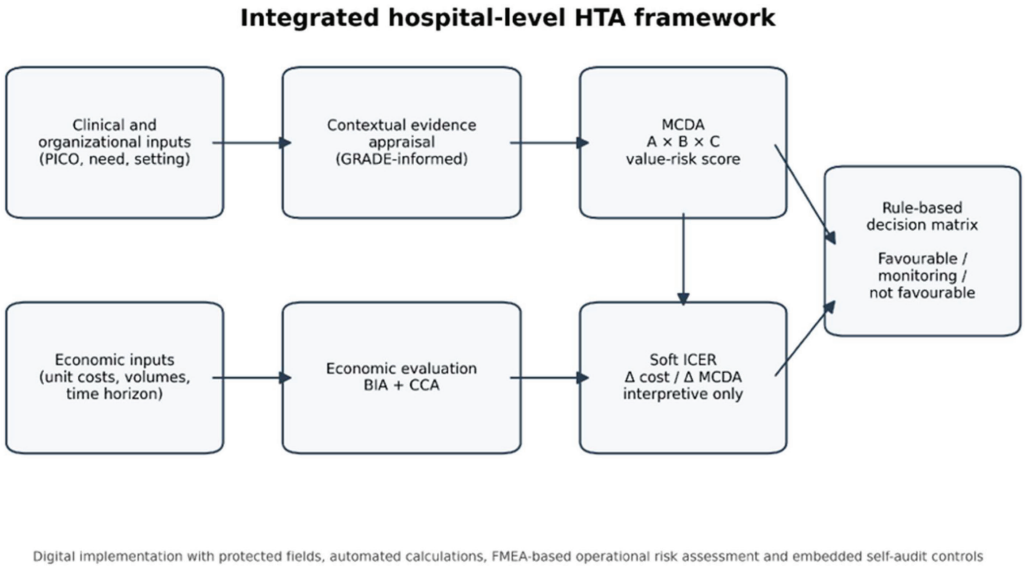


FIGURE 2 - Overview of the integrated hospital-level HTA framework. The model combines MCDA, contextual evidence appraisal, BIA, CCA, and a supportive soft ICER indicator within a rule-based decision matrix.

reprocessable bedpans, with a disposable kit intended for single-patient use.

Case study definition and data collection

The evaluation was conducted in a clinical setting where reusable bedpans require cleaning and reprocessing, while the new option involved a disposable solution. The PICO was defined as follows: patients with reduced mobility; disposable kit for excreta collection; reusable bedpan/urinal as comparator; and reduction in potential cross-contamination risk, assessed through documented reprocessing requirements, staff-reported operational issues, and availability of evidence supporting infection-control benefit, as the target outcome.

Local feedback from healthcare professionals was incorporated to capture usability, hygiene management, workflow, and patient-comfort issues.

MCDA value–risk assessment

The MCDA analysis did not support routine adoption of the disposable system.

The current standard obtained an MCDA score of 4.80, whereas the new technology obtained a score of 2.60, corresponding to ΔMCDA = -2.20. The value-risk plot positioned the new technology in the unfavorable area, with a risk score of 5.43 and a value score of -0.08 (Fig. 3).

Economic evaluation

The economic assessment showed that the disposable solution was not economically dominant. The cost per patient was €1.00 for the new technology and €0.65 for the current standard, with an incremental cost of €0.35 per patient. The local model also considered an initial acquisition cost of €1,500 for disposable bedpans and a reprocessing-cost assumption of €0.60 for the current standard. The 3-year budget impact was €2,634 and remained within the institutional affordability threshold. However, affordability did not change the overall recommendation because the new technology generated lower MCDA value at a higher cost (Fig. 4).

Soft ICER and dominance interpretation

Because the new technology was associated with higher incremental cost and lower incremental MCDA value, it was classified as a dominated option. In this situation the soft ICER is not informative and was therefore considered not applicable. The result illustrates the role of the soft ICER as an interpretive tool rather than a stand-alone decision rule (Fig. 5).

Cost-consequence interpretation and final decision

The CCA showed a mixed profile. Potential theoretical advantages were identified in safety, mainly related to reduced risk of cross-contamination. However, the disposable option performed worse in patient comfort, operator time, training requirements, organizational impact, and direct costs. Several dimensions were neutral, including clinical effectiveness, procedure time, space or instrumentation, indirect costs, and recommended use. Overall, the CCA did not offset the negative MCDA and dominance findings.

The final rule-based recommendation was therefore not favorable for routine adoption. Selective use could be considered only in clearly defined subgroups or settings, such as patients at particularly high infectious risk, and should be accompanied by additional evidence collection, staff training, and reassessment of operational procedures.

Discussion

This study presents the development and preliminary application of an integrated decision-making framework combining MCDA with economic evaluation within a structured hospital

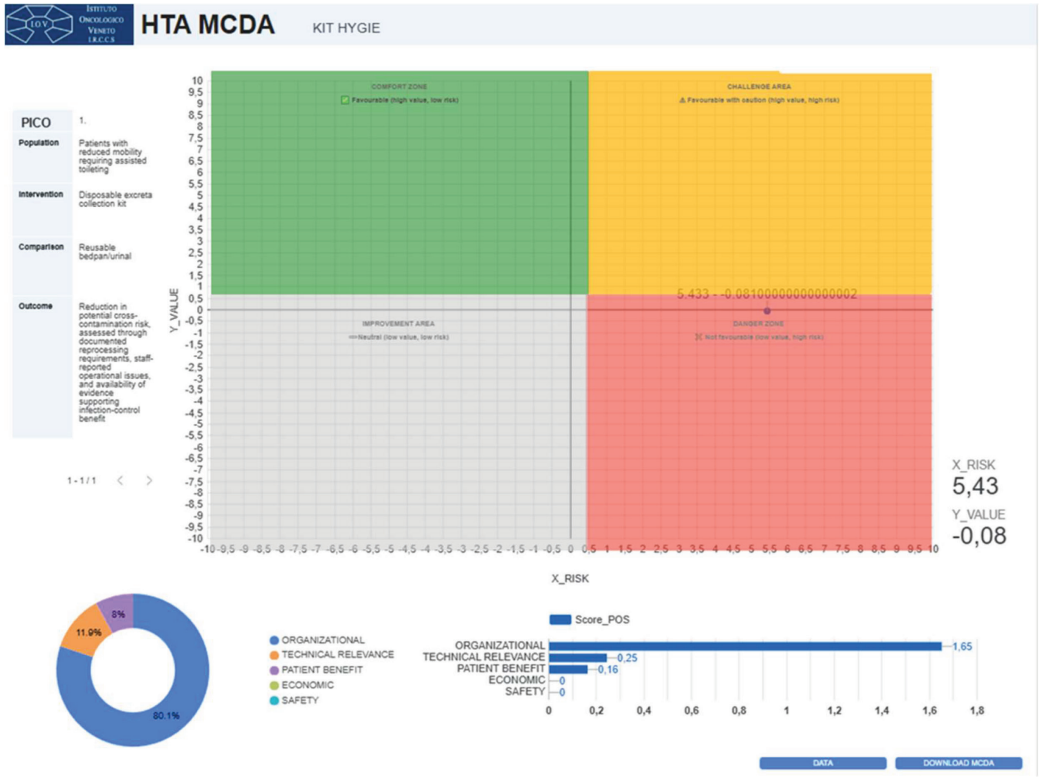
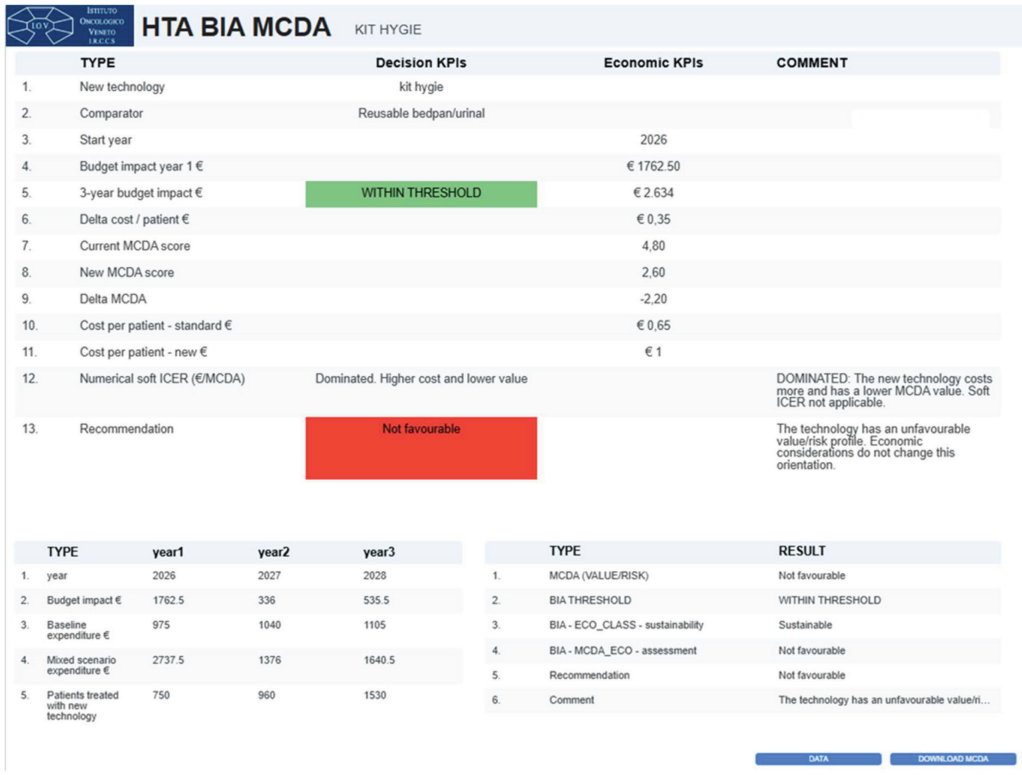


FIGURE 3 - Value-risk MCDA output for the Kit Hygie case study. The new technology was positioned in the unfavorable area, with higher risk and low value (risk score 5.43; value score -0.08).



	TYPE	Decision KPIs	Economic KPIs	COMMENT
1.	New technology	kit hygie		
2.	Comparator	Reusable bedpan/urinal		
3.	Start year		2026	
4.	Budget impact year 1 €		€ 1762.50	
5.	3-year budget impact €	WITHIN THRESHOLD	€ 2.634	
6.	Delta cost / patient €		€ 0,35	
7.	Current MCDA score		4,80	
8.	New MCDA score		2,60	
9.	Delta MCDA		-2,20	
10.	Cost per patient - standard €		€ 0,65	
11.	Cost per patient - new €		€ 1	
12.	Numerical soft ICER (€/MCDA)	Dominated. Higher cost and lower value		DOMINATED: The new technology costs more and has a lower MCDA value. Soft ICER not applicable.
13.	Recommendation	Not favourable		The technology has an unfavourable value/risk profile. Economic considerations do not change this orientation.

	TYPE	year1	year2	year3
1.	year	2026	2027	2028
2.	Budget impact €	1762.5	336	535.5
3.	Baseline expenditure €	975	1040	1105
4.	Mixed scenario expenditure €	2737.5	1376	1640.5
5.	Patients treated with new technology	750	960	1530

	TYPE	RESULT
1.	MCDA (VALUE/RISK)	Not favourable
2.	BIA THRESHOLD	WITHIN THRESHOLD
3.	BIA - ECO_CLASS - sustainability	Sustainable
4.	BIA - MCDA_ECO - assessment	Not favourable
5.	Recommendation	Not favourable
6.	Comment	The technology has an unfavourable value/ri...

DATA DOWNLOAD MCDA

FIGURE 4 - Economic summary and integrated recommendation. The 3-year budget impact was within the threshold, but the new technology was not favorable because it had a higher cost and a lower MCDA value.

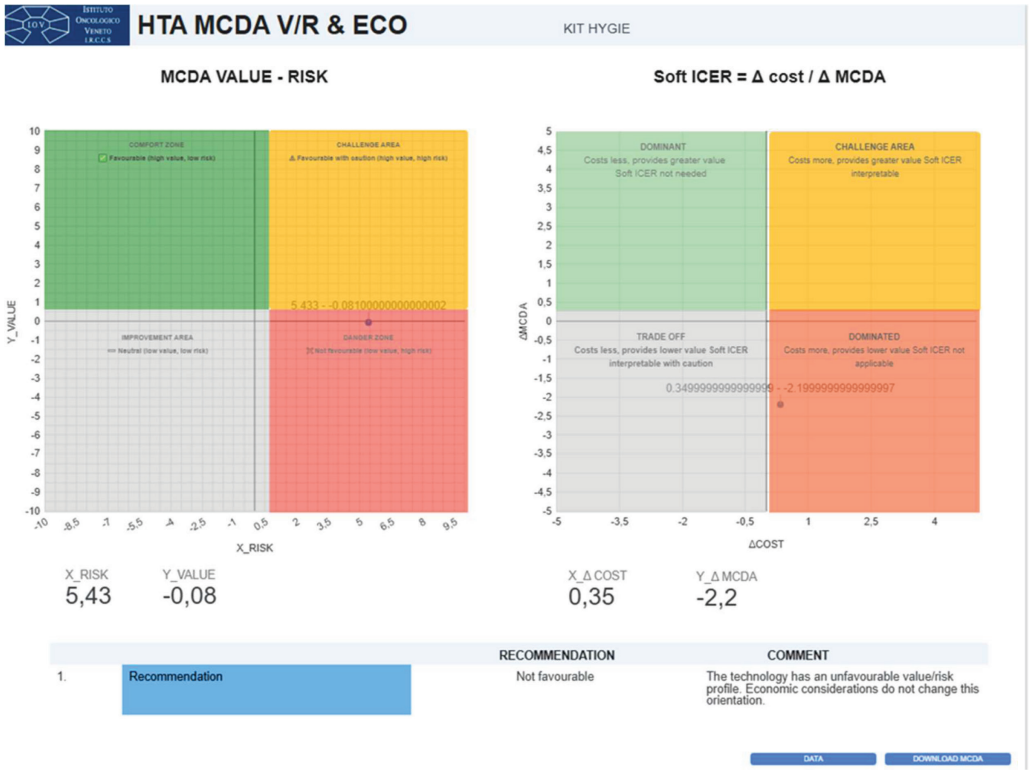


FIGURE 5 - Soft ICER interpretive framework. The new technology falls in the dominated quadrant because it costs more and provides a lower MCDA value than the comparator.

HTA pathway. The case study demonstrates the practical value of explicitly separating affordability from overall value.

In the Kit Hygie assessment, the 3-year BIA remained within the institutional threshold. Nevertheless, the new technology was not recommended because it produced a lower MCDA score and a higher cost per patient than the current standard. This is a relevant finding because it shows that a technology may be financially sustainable in budget-impact terms while still being unfavourable when assessed across clinical, organizational, patient-related, and economic domains.

The soft ICER was deliberately interpreted with caution. Unlike conventional ICERs based on QALYs or other health outcomes, this indicator relates cost variation to a dimensionless MCDA score. Its interpretation is therefore institution-specific and should not be used for comparisons across technologies, hospitals, or settings without recalibration. Moreover, when a technology is dominated, as in this case, calculating a ratio is unnecessary and potentially misleading.

The framework also clarifies the relationship among BIA, CCA, economic MCDA, and soft ICER. BIA addresses affordability; CCA describes the direction of consequences across relevant domains; MCDA summarizes weighted value and risk; and the soft ICER supports interpretation only when a true cost-value trade-off exists. None of these outputs should be interpreted in isolation. This represents a key operational difference from workflows in which economic evaluation is performed in parallel and only a final cost estimate is entered into the decision platform. In the present framework, the economic assessment is generated within the application from basic price and utilization inputs, thereby improving traceability of the assumptions leading from price to decision-relevant cost.

A relevant methodological feature is the contextualized assessment of evidence within component B of the MCDA. This represents a targeted refinement of the regional MCDA logic rather than a departure from it. The institutional framework preserves the RATEC-derived criteria and weighting structure, while using GRADE-informed Summary of Findings tables to support a more explicit and context-sensitive assignment of the evidence component. This approach avoids assigning evidence scores solely on the basis of study design and instead considers certainty, directness, and relevance to the specific local decision problem. In order to operationalize this appraisal within the MCDA calculation, GRADE certainty categories were mapped onto the predefined 0–1–3–5–7–9 evidence scale. Further work is required to validate this mapping and to assess its impact across different technologies and decision contexts.

The FMEA strengthened the operational reliability of the digital tool by identifying and mitigating risks related to data input, formula protection, and output consistency. However, FMEA should not be interpreted as validation of the methodological framework itself or as proof of correctness of the decisions generated. External validation, comparison with independent HTA assessments and application to a larger number of real-world cases are still required.

In the present case, because the new technology was both more costly and associated with a lower MCDA value, the recommendation was primarily driven by an unfavorable

dominance profile rather than by marginal variations in the soft ICER. However, formal sensitivity analyses on criteria weights, reprocessing-cost assumptions, and implementation scenarios should be incorporated in future applications of the framework.

This preliminary application is based on a single case study and therefore does not demonstrate generalizability. Rather, it suggests that the framework may be scalable because of its modular structure and explicit decision rules. Future research should test the model across multiple technologies, clinical settings and institutional contexts, and should include sensitivity analyses on criteria weights, reprocessing-cost assumptions, and implementation scenarios.

Relationship with the EUnetHTA Core Model domains

An important limitation of the present study concerns its relationship with the full EUnetHTA Core Model. The framework should not be interpreted as a comprehensive HTA report covering all nine EUnetHTA domains, but rather as a hospital-level decision-support framework focused on structured MCDA, contextual evidence appraisal, economic evaluation, operational consequences, and explicit recommendation rules. It covers or partially addresses several domains relevant to hospital-level decisions, including safety, clinical effectiveness, costs and economic evaluation, organizational aspects, and patient-related consequences. However, ethical analysis and legal aspects were not systematically assessed, and the description of the health problem, technical characteristics, and broader social aspects was limited to the information required for the institutional decision problem.

To make this boundary explicit, Table 5 maps the proposed framework against the nine EUnetHTA Core Model domains. Future applications intended to represent full HTA reports should prospectively structure data collection and reporting according to the complete nine-domain EUnetHTA framework, including systematic ethical, legal, and broader social analyses. The present study should therefore be considered a methodological and operational contribution to hospital-level HTA decision support, not a substitute for a comprehensive HTA report.

TABLE 5 - Relationship between the proposed framework and the nine EUnetHTA Core Model domains

EUnetHTA Core Model domain	Coverage in the proposed framework	Comment
1. Health problem and current use of the technology	Partially covered	Addressed through PICO definition, comparator selection, and local institutional context; not reported as a full epidemiological or burden-of-disease assessment.
2. Description and technical characteristics	Partially covered	Included only to the extent required to define the technology and comparator in the case study; not developed as a full technical assessment.
3. Safety	Covered	Addressed through MCDA/CCA dimensions and contextual evidence appraisal, including potential cross-contamination risk and hygiene-management implications.
4. Clinical effectiveness	Partially covered	Included through MCDA and evidence assessment; the case study did not include direct comparative clinical-effectiveness endpoints.
5. Costs and economic evaluation	Covered	Explicitly addressed through cost per patient, incremental cost, BIA, CCA, sustainability thresholds, and soft ICER interpretation.
6. Ethical analysis	Not systematically covered	Not formally assessed; should be included in future comprehensive HTA reports.
7. Organizational aspects	Covered	Addressed through workflow, reprocessing requirements, training, operational impact, and local implementation issues.
8. Patient and social aspects	Partially covered	Patient comfort and usability were considered; broader social aspects were not systematically assessed.
9. Legal aspects	Not systematically covered	Not formally assessed; should be included in future comprehensive HTA reports.

Conclusions

The integrated MCDA-economic framework provides a transparent and reproducible approach for hospital-level HTA decision support. In the case study, the framework produced an unfavorable recommendation for routine adoption of the disposable continence care system because the new technology had a lower MCDA value and higher cost than the reusable standard, despite a 3-year budget impact within the institutional threshold. These findings underline the importance of integrating economic sustainability with multidimensional value assessment. Affordability alone should not determine adoption when the overall value-risk profile is unfavorable.

The framework should be considered a preliminary, context-sensitive decision-support model requiring further validation across additional technologies and settings. Future applications intended as comprehensive HTA reports should prospectively cover the full EUnetHTA Core Model domain structure.

Disclosures

Conflicts of interest: The authors declare no conflicts of interest related to the technologies assessed in this manuscript.

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Authors' contributions: GF, NP: Conceptualization/methodology/formal analysis/data curation/writing—original draft/visualization; GF, NP: Formal analysis/methodology/data curation; GP, NP, FC, GZ: Investigation/methodology/writing—review & editing; GF, PS, MC: Supervision/validation/project administration/writing – review & editing. All authors read and approved the final version of the manuscript.

Data Availability Statement: The data underlying the findings described in this manuscript are deposited in the Zenodo repository within the Veneto Institute of Oncology IOV IRCCS community, but they are not publicly available. The anonymized datasets are available from the corresponding author G.Z. (giorgia.zorzetto@iov.veneto.it) upon reasonable request.

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