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A GOVERNANCE-EMBEDDED DECISION-SUPPORT FRAMEWORK FOR SUSTAINABLE PROJECT PORTFOLIO SELECTION IN THE WESTERN BALKANS

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Abstract: Sustainable project portfolio management increasingly requires organizations to move beyond project-by-project appraisal and to justify portfolio choices through transparent, strategy-oriented, and ESG-sensitive decision logic. This paper develops a governance-embedded decision-support framework for sustainable project portfolio selection in industrial systems in the Western Balkans. Building on literature from strategic project management, project portfolio management, sustainability, ESG, multi-criteria decision-making, and multi-objective optimization, the study reframes the central challenge as an evaluation-optimization gap: sustainability criteria are often defined and used for project scoring, while fewer approaches show how these scores become feasible portfolio configurations under budget, capacity, timing, risk, and policy constraints. The proposed framework connects strategic screening, sustainability criteria operationalization, MCDM-based evaluation, Pareto-oriented MOO, backlog management, and periodic portfolio rebalancing. The contribution is conceptual and methodological: it offers an integrated architecture for turning sustainability priorities into defensible portfolio-level decisions in a regional context shaped by modernization needs, energy-transition pressure, capital limitations, and increasing alignment with European sustainability expectations

Keywords: project portfolio management; sustainability; ESG; strategic alignment; MCDM; multi-objective optimization; Western Balkans

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1. INTRODUCTION

Strategic Project Management (SPM) and Project Portfolio Management (PPM) are increasingly understood as mechanisms through which organizations translate strategic intent into a coherent set of projects and programs. In this perspective, portfolio decisions are not only technical allocation decisions; they are governance decisions that determine which strategic options receive scarce resources and which initiatives are postponed, redesigned, or rejected (Artto et al., 2008; Martinsuo, 2013; Project Management Institute, 2017).

At the same time, sustainability and ESG considerations have changed the meaning of portfolio value. Environmental performance, social legitimacy, governance quality, and long-term resilience are no longer peripheral reporting categories. They increasingly influence investment decisions, stakeholder acceptance, regulatory exposure, and access to finance (Silvius & Schipper, 2014; Silvius, 2017; European Parliament and Council, 2022).

The methodological problem is that sustainable portfolio selection is simultaneously a multi-criteria and a multi-objective problem. Projects differ in expected benefits, costs, risks, durations, environmental effects, social implications, and strategic relevance. Portfolio managers must therefore select combinations of projects under real resource constraints rather than simply rank individual proposals (Archer & Ghasemzadeh, 1999; Killen et al., 2008; Deb et al., 2002).

This paper argues that the unresolved issue is not the recognition of sustainability as relevant to PPM, but the insufficient integration of sustainability criteria into formal portfolio design. The aim is to develop a governance-embedded decision-support framework that links sustainability evaluation with optimization and rebalancing. Compared with a general literature review, this version places stronger emphasis on the framework as a decision architecture suitable for industrial systems in the Western Balkans.

2. REVIEW APPROACH AND ANALYTICAL POSITIONING

The paper adopts a structured literature-based conceptual approach. The review does not claim to be a full systematic review; rather, it synthesizes the literature streams that are most directly relevant for connecting strategic alignment, portfolio governance, sustainability, ESG logic, multicriteria evaluation, and portfolio optimization.

The analytical emphasis is placed on peer-reviewed studies, standards, foundational books, and selected policy sources that explain three connected issues: how sustainability criteria are defined in project settings; how portfolio decisions are governed and periodically reviewed; and how formal evaluation and optimization methods can be combined in one decision architecture (Project Management Institute, 2017; European Commission, 2020; European Parliament and Council, 2022).

The guiding question is: how can sustainability and ESG criteria be translated from general principles and indicators into defensible portfolio-level decisions under real constraints? This question structures the paper and justifies the need for an integrated MCDM-MOO framework rather than a stand-alone scoring model.

3. THEORETICAL FOUNDATIONS

3.1. Strategic project management and strategic alignment

Strategic project management treats projects and programs as vehicles for strategy execution rather than isolated delivery units. Project strategy is derived from organizational strategy, while portfolio selection determines how scarce financial, technical, and managerial resources are allocated across competing strategic alternatives (Artto et al., 2008; Project Management Institute, 2017).

From a dynamic capability perspective, SPM also reflects the organization's ability to reconfigure priorities, resources, and sequencing decisions when conditions change. This is especially important for industrial organizations that face technological transition, regulatory volatility, supply-chain disruptions, and sustainability-related pressure (Müller et al., 2008; Martinsuo, 2013; Killen & Hunt, 2013).

3.2. Strategic project management and strategic alignment

PPM encompasses the identification, evaluation, prioritization, selection, balancing, and review of a set of projects and programs intended to achieve strategic goals under constrained resources. Unlike single-project appraisal, PPM is concerned with the logic of the whole portfolio: balance, value, risk exposure, timing, interdependencies, and strategic coherence (Archer & Ghasemzadeh, 1999; Martinsuo, 2013; Project Management Institute, 2017).

Portfolio governance provides the decision rules that make this process transparent and repeatable. It defines criteria, roles, approval thresholds, escalation paths, review frequencies, and rebalancing mechanisms. Without governance, sustainability criteria may be added to templates but remain weakly connected to real portfolio choices (Müller et al., 2008; Killen & Hunt, 2013).

3.3. Sustainability, ESG, and portfolio value

The sustainability literature broadens the meaning of success beyond short-term financial return. In a portfolio context, this means that strategic fit, economic value, environmental performance, social responsibility, compliance exposure, and long-term resilience become part of the value logic used to compare alternatives (Silvius & Schipper, 2014; Silvius, 2017; Kivilä et al., 2017).

For portfolio decision making, the practical implication is that economic, environmental, social, and governance dimensions must be represented in a way that allows comparison across heterogeneous projects. Sustainability and ESG therefore move from general principles to operational decision criteria only when they are translated into measurable indicators, thresholds, and decision rules (Martinsuo & Killen, 2014).

4. SUSTAINABILITY INTEGRATION IN PROJECT PORTFOLIO MANAGEMENT

Although sustainability is increasingly recognized in project management research and practice, formal integration at the portfolio level remains uneven. Many organizations express sustainability ambitions in strategies or reports, but continue to select projects mainly through financial, compliance, or short-term operational criteria (Silvius, 2017; Kivilä et al., 2017).

A central challenge is operationalization. In industrial portfolios, sustainability criteria may include carbon intensity, energy efficiency, resource circularity, occupational safety, local employment effects, compliance exposure, stakeholder acceptability, and supply-chain governance. These indicators need scales, weights, data sources, and thresholds before they can be used in portfolio decisions (Silvius & Schipper, 2014; European Commission, 2020; European Parliament and Council, 2022).

However, once sustainability is translated into criteria, a second problem emerges: ranking projects is not the same as constructing a portfolio. Portfolio decisions are combinatorial and constrained. Organizations must select sets of projects that fit budgets, capacities, time windows, dependencies, and risk limits while also respecting strategic and ESG priorities (Archer & Ghasemzadeh, 1999; Killen et al., 2008; Deb et al., 2002).

4.1. Why the Western Balkans context matters

The Western Balkans provide a relevant context for this discussion because industrial organizations in the region face simultaneous pressures of modernization, energy transition, environmental upgrading, and international market integration. These pressures are shaped by the Green Agenda for the Western Balkans, EU-related reform dynamics, and sustainability expectations in trade and finance (European Commission, 2020; Regional Cooperation Council, 2020; European Commission, 2023).

Under these conditions, portfolio decisions often involve difficult trade-offs: competitiveness versus compliance, short-term liquidity versus long-term resilience, modernization projects versus environmental investments, and local operational urgency versus broader sustainability goals. A defensible portfolio framework is therefore valuable because it makes trade-offs explicit and supports transparent justification of selected and postponed initiatives.

5. METHODOLOGICAL BASIS FOR SUSTAINABLE PORTFOLIO DESIGN

MCDM methods are useful because they structure criteria, assign weights, incorporate stakeholder preferences, and support transparent comparison among heterogeneous project alternatives. They are especially relevant when data combine quantitative measures with expert judgment or qualitative assessments (Saaty, 1980; Martinsuo & Killen, 2014).

Nevertheless, MCDM on its own is usually insufficient for the portfolio problem. Most MCDM procedures produce scores, rankings, or classes of alternatives. Portfolio design, by contrast, requires the selection of feasible combinations of projects that collectively satisfy budgetary, timing, capacity, and policy constraints (Archer & Ghasemzadeh, 1999; Killen et al., 2008).

This is why multi-objective optimization is needed. MOO approaches search for Pareto-efficient combinations of projects and reveal trade-offs among conflicting objectives such as financial return, strategic fit, risk reduction, and ESG performance (Deb et al., 2002). In a

sustainable PPM setting, MCDM can provide legitimacy and structure, while MOO provides combinatorial feasibility and trade-off exploration.

5.1. Gap analysis and contribution logic

The literature suggests a persistent evaluation-optimization gap. Strategic and governance studies explain why portfolio alignment matters, sustainability studies broaden the meaning of value, and MCDM studies improve transparency in project evaluation. However, these streams often stop before the portfolio construction problem is fully addressed. Optimization studies address the combinatorial problem, but may become weakly grounded in stakeholder priorities if they are not connected to an explicit evaluative layer.

Table 1 summarizes the logic that motivates the contribution of this paper.

Table 1. Literature streams and implications for an integrated sustainable PPM framework

Literature stream	**Typical focus**	**Main strength**	**Recurring limitation**	**Implication for this paper**
Strategic and governance literature	Strategy execution, prioritization, governance, review cycles	Explains why portfolio alignment matters	Rarely specifies how ESG criteria are operationalized in selection logic	Governance must be connected to measurable sustainability criteria
Sustainability / ESG literature	Indicators, reporting, stakeholder expectations, triple-bottom-line logic	Broadens the meaning of portfolio value	Often remains at principle or reporting level	Sustainability must be translated into portfolio-ready criteria and thresholds
MCDM studies	Criteria structuring, weighting, project scoring, ranking	Improves transparency and stakeholder inclusion	Usually stops at ranking individual projects	Evaluation must feed into portfolio-level decision rules
MOO / optimization studies	Portfolio construction under constraints, Pareto trade-offs, scheduling	Captures combinatorial portfolio logic	Can be weakly grounded in stakeholder priorities if used alone	Optimization should be anchored in an explicit evaluative layer
Hybrid studies	Combined evaluation and optimization approaches	Most relevant route toward integrative portfolio design	Still limited in governance embedding, backlog logic, and regional contextualization	Supports an iterative governance-embedded MCDM-MOO framework

6. METHODOLOGICAL BASIS FOR SUSTAINABLE PORTFOLIO DESIGN

The proposed framework is designed as an iterative decision-support process. Its central premise is that sustainable portfolio decisions require four linked layers: strategic alignment, an operational sustainability criteria system, MCDM-based evaluation, and MOO-based portfolio optimization. The framework is not intended to replace managerial judgment. Instead, it structures judgment by making assumptions explicit, clarifying trade-offs, and preserving decision traceability.

Figure 1 presents the iterative logic of the framework. The process begins with strategy and portfolio policy, translates sustainability priorities into measurable criteria, evaluates projects through MCDM, optimizes feasible portfolio combinations through MOO, and then returns to governance review through backlog-based re-entry and periodic portfolio rebalancing.

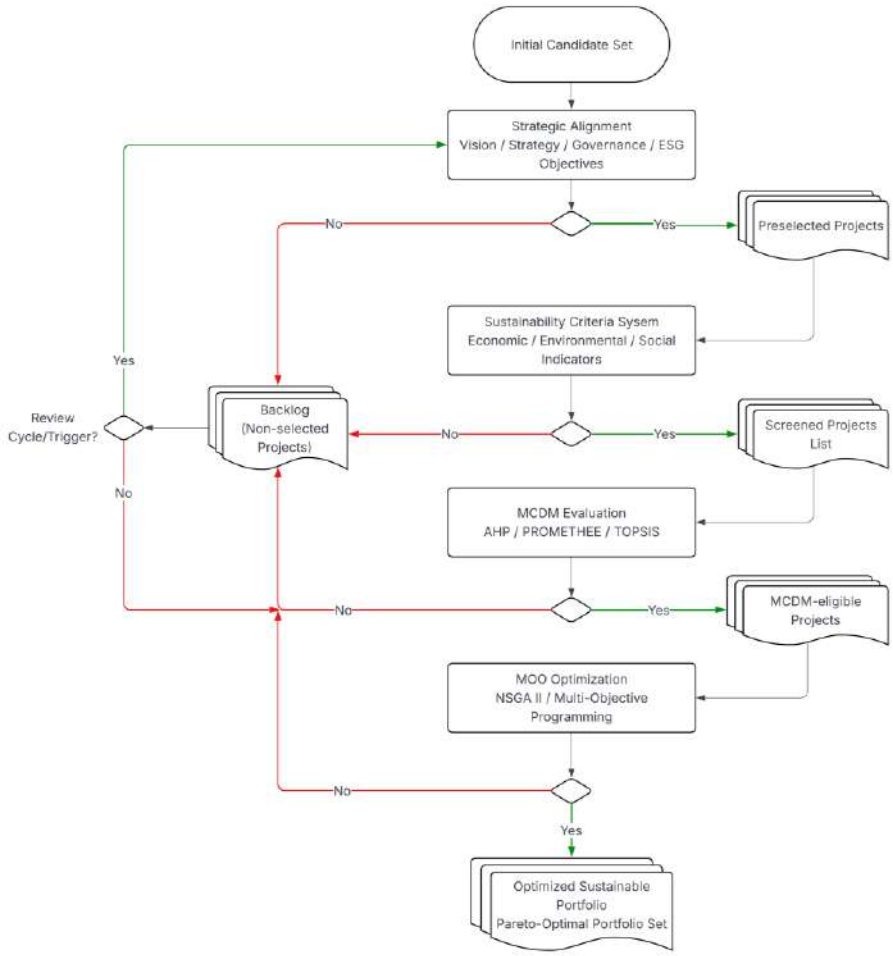


Figure 1. Iterative MCDM-MOO process for sustainable project portfolio selection, including backlog-based re-entry and periodic portfolio rebalancing.

6.1. Gap analysis and contribution logic

- Inputs: strategic objectives and portfolio policies; ESG goals and thresholds; resource constraints; project data on cost, duration, benefits, risk, and interdependencies.
- Stage 1 - strategic alignment and preliminary screening: projects are screened for strategic relevance, mandatory commitments, and governance rules.
- Stage 2 - sustainability criteria system: economic, environmental, social, and governance indicators are translated into scales, thresholds, and data requirements.
- Stage 3 - MCDM evaluation: criteria weights and project scores are determined, resulting in a transparent decision trail and an eligibility set for optimization.
- Stage 4 - MOO optimization: feasible combinations of projects are generated under budget, capacity, timing, dependency, and threshold constraints, producing Pareto-efficient portfolio options.
- Outputs: one or more sustainable portfolio options, explicit trade-off profiles, a documented rationale for choice, and a candidate backlog of non-selected projects.

- Feedback loop: periodic portfolio reviews reassess benefits realization, ESG indicators, risk, and resource availability; backlog projects may re-enter subsequent selection cycles.

6.2. Design principles and conceptual propositions

The framework is based on four design principles. First, sustainable portfolio decisions should integrate strategic fit and ESG performance at the portfolio level, not only at the individual project level. Second, evaluation and optimization should be treated as linked but distinct analytical stages. Third, governance and periodic rebalancing should be embedded in the model rather than treated as afterthoughts. Fourth, non-selected projects should remain visible through a managed backlog so that future cycles can revisit them under changed assumptions.

These principles lead to four conceptual propositions: P1: sustainable portfolio quality increases when strategic alignment and ESG criteria are assessed jointly rather than sequentially. P2: MCDM improves legitimacy and transparency, but does not by itself solve constrained portfolio design. P3: MOO is necessary when organizations face conflicting economic, strategic, and ESG objectives. P4: backlog-based re-entry and periodic rebalancing improve adaptability under uncertainty and regulatory change (Archer & Ghasemzadeh, 1999; Deb et al., 2002; Killen & Hunt, 2013).

6.3. Statement of contribution

The paper contributes by proposing a governance-embedded and iterative MCDM-MOO framework for sustainable project portfolio selection and optimization in industrial systems in the Western Balkans. The framework explicitly incorporates ESG criteria, constrained portfolio construction, backlog-based re-entry, and periodic rebalancing. In this sense, it responds to the evaluation-optimization gap identified in the literature and provides a bridge between strategic intent, sustainability criteria, and formal portfolio design logic (Martinsuo & Killen, 2014; Silvius, 2017).

7. CONCLUSION

This paper developed a conceptual framework for sustainable project portfolio selection and optimization. The literature indicates that sustainability is now firmly present in portfolio-related discourse, but that methodological integration remains incomplete. In many cases, sustainability is acknowledged through principles, indicators, or reporting language without being fully translated into portfolio selection and optimization logic.

The proposed architecture connects strategic alignment and portfolio governance with a sustainability criteria system, an MCDM evaluation layer, and an MOO optimization layer. The purpose is not only to rank projects, but to support defensible portfolio choices under resource constraints and visible trade-offs.

The framework is particularly relevant for industrial systems in the Western Balkans, where organizations must make portfolio decisions under simultaneous pressures of modernization, financing constraints, energy transition, ESG-related expectations, and closer alignment with European policy trajectories (European Commission, 2020; European Commission, 2023; European Parliament and Council, 2022).

Future research should empirically test the framework through sector-specific case studies, develop standardized ESG indicator sets suitable for portfolio use, and compare the performance of alternative hybrid MCDM-MOO configurations in realistic industrial contexts.

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