



ISSN: 2723-9535

Available online at www.HighTechJournal.org

HighTech and Innovation Journal

Vol. 7, No. 1, March, 2026



Managing Projects Effectively: Lean Six Sigma and Agile Methodologies Through the Eyes of Project Managers

David A. Procházka ¹, Imran A. Shahzad ², Kateřina Bočková ^{2*}, Juraj Lovásik ²

¹ Faculty of Business and Information Technology, University of New York in Prague, Londýnská 41, 120 00 Prague, Czech Republic.

² Department of Management and Economics, DTI University, Dubnica nad Váhom, Slovakia.

Received 20 December 2025; Revised 17 February 2026; Accepted 19 February 2026; Published 01 March 2026

Abstract

This study investigates the comparative effectiveness of Lean Six Sigma (LSS) and Agile methodologies from a project management perspective within a multinational service and technology corporation, aiming to identify the most influential determinants of project success and assess their methodological variability. A comparative embedded case study design was employed, examining two real-life projects conducted within Company S: an Agile-driven order management initiative and a Lean Six Sigma-based human resource process optimization project. Data collection combined qualitative and quantitative approaches, including a structured expert workshop, a Multi-Dimensional Criteria Analysis (MDCA) encompassing 68 validated project success criteria clustered into eight affinity categories, a Fishbone diagram for causal analysis, and an evaluation of project documentation and performance metrics. The findings reveal that clearly defined objectives, stakeholder engagement, systematic monitoring, and team competence constitute the most critical success factors across both methodologies. Agile demonstrated superior adaptability, collaborative communication, and client responsiveness, whereas LSS provided stronger goal alignment, process control, error minimization, and regulatory compliance. The results indicate that methodological effectiveness is context-dependent rather than universally hierarchical. The study contributes novel empirical insight by conducting a controlled intra-organizational comparison and advances the discourse by evidencing the strategic value of hybrid frameworks integrating Agile flexibility with LSS structural rigor in complex corporate environments.

Keywords: Agile; Lean Six Sigma; Project Management; Fishbone; Project Methodology.

1. Introduction

Organizations operating in turbulent global environments are confronted with unprecedented pressure to simultaneously reduce operational costs, accelerate delivery cycles, ensure regulatory compliance, and sustain service quality. These pressures have intensified in the aftermath of global disruptions such as the COVID-19 pandemic, supply chain volatility, inflationary dynamics, and accelerated digital transformation [1]. As a result, Project Management (PM) has evolved from a predominantly operational discipline into a strategic capability shaping long-term organizational competitiveness. Contemporary research emphasizes that project success increasingly depends not only on traditional iron triangle criteria (time, cost, scope), but also on adaptability, stakeholder alignment, organizational learning, and leadership engagement [2-4].

Within this context, two dominant methodological paradigms - Lean Six Sigma (LSS) and Agile - have gained widespread adoption across industries. Lean Six Sigma integrates Lean's waste elimination principles with Six Sigma's

* Corresponding author: bockova@dti.sk

 <https://doi.org/10.28991/HIJ-2026-07-01-03>

➤ This is an open access article under the CC-BY license (<https://creativecommons.org/licenses/by/4.0/>).

© Authors retain all copyrights.

statistical rigor and structured DMAIC cycle, emphasizing process stability, defect reduction, and data-driven decision-making [5, 6]. Empirical studies confirm that LSS contributes significantly to quality improvement, operational excellence, and cost efficiency [6, 7]. However, critics argue that LSS may become overly bureaucratic, resource-intensive, and less responsive in highly dynamic environments [8].

Conversely, Agile methodologies, originally rooted in software development, prioritize iterative delivery, customer collaboration, self-organizing teams, and responsiveness to change [9, 10]. Agile approaches have been associated with enhanced stakeholder engagement, faster feedback loops, and increased innovation capacity [11-13]. Nonetheless, Agile implementation may suffer from scope creep, insufficient documentation, ambiguity in long-term planning, and challenges in scaling within large multinational corporations [10, 11, 14]. These tensions reflect a broader theoretical dichotomy between exploitation-oriented process optimization (LSS) and exploration-oriented adaptability (Agile).

Recent scholarship increasingly recognizes that neither methodology offers universal superiority. Comparative analyses suggest that LSS performs best in stable, repetitive, and compliance-driven contexts, whereas Agile excels in environments characterized by uncertainty, evolving requirements, and innovation intensity [8, 15, 16]. Emerging research also proposes hybridization as a promising direction, integrating the structural discipline of LSS with Agile flexibility [17-19]. Such integration aligns with adaptive leadership theories and learning organization frameworks that emphasize contextual responsiveness over methodological orthodoxy [20, 21].

Despite the expanding literature, several gaps remain evident:

- Most empirical studies examine LSS and Agile independently or compare them across different organizations or industries, limiting contextual comparability.
- An existing research is often concentrated in manufacturing or software development sectors, while multinational service corporations - where projects span Human Resources (HR), shared service centers, logistics, and IT - remain underexplored [15, 22].
- The limited attention has been paid to systematically operationalizing and weighting multidimensional project success criteria in order to enable structured cross-methodology comparison. While critical success factors for LSS and Agile have been widely discussed [23-25], comparative intra-organizational evidence remains scarce.

This study addresses these gaps through a controlled embedded case study conducted within Company S, a multinational service and technology enterprise operating in nearly 200 countries. Unlike prior cross-sectional comparisons, the research evaluates two projects implemented within the same organizational culture and governance structure, a Lean Six Sigma project focused on HR process optimization, and an Agile project targeting order management transformation. By controlling for organizational context, leadership environment, and corporate governance structures, the study enables a more valid comparison of methodological performance.

Methodologically, the research introduces a Multi-Dimensional Criteria Analysis (MDCA) framework integrating 68 validated success criteria clustered into eight affinity groups, complemented by a Fishbone (Ishikawa) diagram for causal mapping. This structured evaluation responds to calls for more nuanced project success measurement beyond binary performance assessment [26, 27]. The approach allows not only performance comparison but also identification of complementarities, trade-offs, and potential hybridization pathways. Accordingly, the study is guided by the following research questions:

RQ1: How can Lean Six Sigma and Agile be successfully compared and applied in the project management environment of a global service company?

RQ2: What criteria define project success most effectively, and how do they differ under LSS and Agile approaches?

Although RQ1 combines both comparison and application, the primary analytical dimension of the study is comparative. The application aspect serves as contextual validation within a single organizational setting, enabling a controlled evaluation of methodological performance. Thus, comparison constitutes the core analytical focus, while application provides empirical grounding and practical relevance.

By providing empirical evidence from a multinational service context, this study contributes to project management theory in three ways:

- It advances comparative methodology research by offering a context-controlled intra-organizational design.
- It operationalizes project success through a weighted multi-criteria framework grounded in practitioner consensus.
- It informs the ongoing debate on methodological hybridization by empirically demonstrating that methodological effectiveness is contingent upon alignment between project context and dominant success criteria.

In doing so, the paper responds directly to calls for integrative and evidence-based project governance models capable of balancing efficiency, adaptability, and sustainable performance in complex corporate ecosystems.

1.1. Theoretical Repositioning through Contingency and Dynamic Capabilities: Literature Gap

Recent literature emphasizes the comparison between Lean Six Sigma (LSS) and Agile methodologies in project management, with both approaches increasingly applied across industries to improve performance outcomes [15, 22]. Whereas LSS has traditionally focused on data-driven analysis, defect reduction, and process stability, Agile emerged from software development and prioritizes adaptability, incremental delivery, and close customer collaboration [11, 28].

Studies confirm that LSS provides a robust framework for quality improvement and operational efficiency, yet it has been criticized for rigidity and substantial resource demands [29]. Conversely, Agile enables rapid responsiveness and team empowerment, but risks fragmented outputs and scope creep when applied in complex organizational settings [9, 30, 31]. Comparative research further highlights that LSS is particularly suitable for environments characterized by high process repeatability and compliance requirements, whereas Agile performs more effectively in dynamic contexts where requirements are uncertain or evolving [14, 17, 18]. Consequently, hybrid frameworks have been proposed as integrative solutions capable of combining the statistical rigor and structured problem-solving of LSS with the flexibility and iterative planning logic of Agile [5, 32]. Such combined orientations are argued to support continuous improvement in both stable and volatile environments, thereby allowing organizations to balance efficiency with adaptability.

Despite this growing body of research, several deeper theoretical and empirical limitations remain insufficiently addressed, and these limitations matter precisely because contemporary project environments are increasingly “dual”—simultaneously demanding reliability, compliance, and efficiency on the one hand, and rapid learning, responsiveness, and innovation on the other. Recent hybrid project management research confirms that organizations are indeed moving toward hybridization, but also indicates that evidence on *how* hybrids are configured and *when* they produce superior outcomes remains fragmented and under-specified [33].

Much of the LSS-Agile scholarship implicitly assumes that “method selection” is primarily a technical decision while treating organizational context as background noise. From a contingency theory perspective, however, effectiveness is contingent upon alignment between internal structural arrangements and environmental conditions [34, 35]. The central gap is therefore not merely that studies compare LSS and Agile, but that they rarely theorize *fit* in a testable way: environmental dynamism, regulatory intensity, task analyzability, interdependence, and information-processing requirements are seldom modeled as moderators of methodological effectiveness. This results in what can be termed a theoretical under-identification problem - the field describes differences in outcomes without specifying the contingency mechanisms through which those outcomes are produced.

Recent contingency-informed research on hybrid project management explicitly demonstrates that hybrid effects are conditional rather than universal and must be examined through the lens of fit between project characteristics and governance configuration (e.g., the interplay of agile and traditional controls) [36]. Moreover, contemporary reviews of the Agile literature highlight that “agile-as-a-tool” (contingency logic) and “agile-as-a-culture” (configuration logic) represent distinct explanatory perspectives, and that their intersection remains underexplored - particularly for innovation and organization-wide transformation contexts [37]. This is highly relevant for multinational service corporations, where projects span IT, HR, logistics, and shared services under layered governance and cross-cultural coordination demands [15, 22]. In such environments, methodological success is unlikely to be explained by the method alone; rather, it depends on the organization’s ability to *configure* formalization, autonomy, escalation rules, and coordination mechanisms across a portfolio of heterogeneous projects.

While prior work increasingly recognizes complementarities between LSS and Agile, empirical validation of hybrid configurations remains limited and conceptually uneven. Hybridization is often presented normatively as a strategic imperative [5, 32], yet rigorous evidence on whether integration enhances performance *net of* added coordination costs is scarce.

The emerging hybrid PM literature suggests that organizations frequently “customize” hybrids pragmatically by selectively combining agile and plan-driven practices, but that customization decisions depend on contingencies such as team type, coordination needs, and project goal structure [14]. Similarly, detailed case-oriented evidence shows that agile-hybrid delivery approaches may be valuable in complex design problems, but only when governance mechanisms are adapted to manage increased interdependence and uncertainty [16]. On the LSS side, evidence from [12, 31, 38] demonstrates that hybrid LSS project management approaches can be developed and deployed in practice, but the contribution lies not only in combining tools; it lies in building a coherent end-to-end control logic that integrates improvement cycles with project governance [39].

The gap, therefore, is that the literature does not yet provide a sufficiently granular typology of hybrid forms (e.g., “LSS-governed Agile,” “Agile-paced DMAIC,” “dual operating system hybrids”) nor robust evidence on boundary conditions under which each hybrid form reduces failure modes such as bureaucratic drag (often associated with LSS [29]) versus scope creep and fragmentation (often associated with Agile [9, 30, 31]). Without disaggregating hybridization into observable configurations and linking those configurations to contingencies, hybrid prescriptions remain vulnerable to being interpreted as fashionable synthesis rather than theory-driven governance design.

Next, comparative LSS-Agile research remains only weakly integrated with the dynamic capabilities perspective. From the standpoint of dynamic capabilities theory, sustainable advantage stems from the ability to sense environmental change, seize opportunities through resource orchestration, and transform internal routines accordingly [4, 26, 40]. Yet LSS and Agile are still predominantly treated as operational methods rather than as microfoundations of capability development.

Recent empirical work has begun to explicitly connect agile project management with sensing–seizing–reconfiguring routines, showing how agile practices can manifest dynamic capabilities in multinational settings [41]. Likewise, research on agile project management and leadership roles links agile transformations to dynamic capability development via microfoundations such as leadership behaviors, structures, and competence building. Complementary evidence suggests that agile leadership is itself associated with dynamic capability-related value creation mechanisms [42]. However, this emerging capability-linked stream has not yet been systematically merged with the LSS literature, which typically emphasizes exploitation-oriented stability and improvement cycles [29]. The missing link is a capability-based comparative argument that specifies *which* routines in LSS and Agile contribute to *which* capability classes (e.g., sensing vs. transforming), and how these routines interact in hybrids: for example, whether LSS strengthens transformation through routinized learning-by-measurement and control system institutionalization, while Agile strengthens sensing and seizing through rapid feedback, iterative reprioritization, and stakeholder co-creation. In large global service firms, this question is not merely theoretical: projects frequently require simultaneous exploitation (standardization, compliance, error minimization) and exploration (innovation, experimentation, adaptation), and dynamic capabilities research would predict that performance depends on the organization’s ability to orchestrate both sets of routines coherently.

Although project success has evolved beyond the traditional iron triangle toward multidimensional constructs incorporating stakeholder satisfaction, strategic alignment, and organizational learning, comparative LSS–Agile research rarely operationalizes success through weighted, practitioner-informed criteria. Existing studies [19, 30, 31] frequently rely on isolated indicators such as cost reduction, time-to-market, or defect rates in LSS contexts, and responsiveness or team engagement in Agile contexts. Yet even recent conceptual work [29] argues that “Agile Project Management” now spans multiple sectors and requires more precise definitional and measurement clarity. The measurement gap thus becomes a validity gap: when different success constructs are implicitly used for each methodology, comparative claims risk becoming tautological (LSS “wins” on efficiency because efficiency is measured; Agile “wins” on responsiveness because responsiveness is measured). This is particularly problematic given that project success is increasingly recognized as socially constructed and dependent on stakeholder expectations and governance structures [1]. Finally, leadership and culture are repeatedly identified as critical for either approach: Agile projects often fail without strong leadership commitment and defined organizational values [32], and both methodologies require training, support, and selective tool use to remain sustainable [23, 43]. Yet comparative empirical research still under-specifies *how* leadership and culture operate as governance mechanisms that moderate method–outcome relationships within the same institutional setting, even though recent case-based work on agile transformation reiterates leadership as a central causal lever [44].

Taken together, the literature reveals a multi-layered gap. Although consensus suggests that context-driven adaptation and hybrid integration represent promising pathways forward, the field lacks:

- Contingency-informed modeling of methodological fit [34, 35] with explicit moderators and identifiable governance configurations,
- Dynamic capability-based conceptualization of LSS and Agile as microfoundations of sensing–seizing–transforming routines [4, 26, 40],
- Controlled intra-organizational comparative designs within multinational service corporations [15, 22] that reduce contextual confounds, and
- Multidimensional, practitioner-weighted operationalization of project success capable of enabling valid cross-methodology comparison.

Addressing these deficiencies requires reconceptualizing LSS and Agile not merely as competing toolkits but as alternative and potentially complementary project governance configurations whose effectiveness depends on alignment with environmental complexity, organizational maturity, and capability development pathways. This repositioning is consistent with current evidence that hybrid PM is prevalent yet insufficiently understood and that capability-enabled agility and IT-enabled dynamic capabilities are increasingly central to organizational change in contemporary environments [33]. By situating comparative methodology analysis within contingency theory and dynamic capabilities logic, project management research can advance beyond descriptive contrasts toward a theoretically integrated explanation of how firms configure structured rigor and adaptive flexibility to sustain long-term competitiveness in complex global ecosystems.

2. Material and Methods

This study adopted a comparative case study design within the project management environment of Company S, a multinational technology and service enterprise operating across nearly 200 countries. The methodology is structured to provide both conceptual and empirical insights, combining workshop-based expert evaluation with analysis of two real-life projects implemented within the organization.

Research design: The research design follows a case study approach similar to applied studies of improvement methodologies in complex organizations [45]. This choice is justified by the need to capture contextual factors; organisational culture, leadership commitment, and cross-departmental collaboration. These factors strongly influence project success but cannot be isolated in experimental designs. The study applies qualitative and quantitative techniques, triangulating workshop data, project documentation, and performance outcomes.

Data collection: Nine of the ten project management experts from Company S who were invited to the brainstorming session on June 10, 2025, showed up. Lean Six Sigma and Agile experience was represented in the group by two service line managers, one Master Black Belt, three Black Belts, two Green Belts, and two Scrum Masters. On average, the participants' professional experience exceeded 12 years. There were other one-on-one consultations after the one-hour session. Internal project charters, progress reports, meeting minutes, and quantitative performance data (error rates, lead times, and cost savings) were reviewed for the two selected projects.

The core analytical framework combines:

- **Multi-Dimension Criteria Analysis (MDCA):** applied to define and weight project success criteria. Criteria were derived through brainstorming, then ranked by participants via an online survey (n=8 responses). Averaged scores were used to calculate relative importance.

The Multi-Dimensional Criteria Analysis (MDCA) followed a hierarchical weighted aggregation procedure consisting of two levels:

1. Affinity-group weights and
2. Individual criterion weights within each group.

Let:

W_i = first-level weight of affinity group i (where $\sum W_i=1$)

w_{ij} = second-level weight of criterion j within group i (where $\sum w_{ij}=1$ for each group)

S_{ij} = fulfillment score of criterion j in project evaluation

The weighted contribution of each criterion was calculated as:

$$C_{ij} = W_i \times w_{ij} \times S_{ij} \quad (1)$$

The total project score was obtained by summing all weighted contributions:

$$\text{Total Score} = \sum_{i=1}^8 \sum_{j=1}^{n_i} W_i \times w_{ij} \times S_{ij} \quad (2)$$

where, n_i represents the number of criteria within affinity group i .

Criterion fulfillment scores (S_{ij}) were assessed on a standardized evaluation scale during the case analysis phase. Because the first-level and second-level weights were normalized (i.e., each level sums to 1), the aggregation process ensures proportional influence of each criterion relative to its perceived importance.

For illustration, if a criterion within the "Communication" group had a first-level weight of 0.15, a second-level weight of 0.13, and received a fulfillment score of 5 (on a 1–5 scale), its weighted contribution would equal:

$$0.15 \times 0.13 \times 5 = 0.0975$$

The final MDCA project scores (66.65 for Agile and 61.88 for LSS) represent the aggregated sum of all weighted criterion contributions across the eight affinity groups.

- **Fishbone diagram (Ishikawa):** used to visualize the identified success factors and their causal relationships. This dual approach allows both structured prioritization and qualitative exploration of underlying causes, providing a holistic picture of project performance.
- Two projects from Company S were selected based on contrasting methodology use;

- LSS project (HR department): focused on reducing errors in employee benefits setup. The process was stable and repetitive, with an initial error rate of 31.34%. The project followed the DMAIC cycle, leading to a reduction of errors to under 1% and full automation of manual workload.
- Agile project (Order Management): aimed at redesigning the end-to-end order taking process to reduce costs by 25%. The scope was broad, customer requirements were initially undefined, and six thematic work streams were identified. The project applied Agile practices including iterative sprints, Kanban boards, and partial solution releases.

Although the two analyzed projects originate from different functional domains (Human Resources and Order Management), their selection was guided by strict comparability criteria. Both projects were of similar organizational scope, involved cross-functional stakeholder engagement, operated under the same corporate governance standards, and had comparable resource allocation and duration. Each project had strategic relevance within the multinational service company and required coordination across multiple departments and decision-making layers.

The study design intentionally controls for organizational context by embedding both cases within the same corporate ecosystem. This ensures comparability in terms of organizational culture, leadership environment, digital infrastructure, performance measurement systems, and governance maturity. By holding these contextual variables constant, the analysis isolates methodological effects more effectively than cross-organizational comparisons. Therefore, despite functional differences, the projects are comparable with regard to complexity, strategic importance, and governance requirements, which are the primary dimensions relevant to this research.

Because each analyzed project was originally conducted under a specific methodology (Agile or LSS), there is a potential risk that evaluation could implicitly favor the inherent strengths of the respective approach. To mitigate confirmation bias, several procedural safeguards were implemented.

- The weighting of project success criteria was performed prior to project scoring and independently of the methodological comparison. This temporal separation ensured that perceived importance of criteria was not influenced by performance outcomes of a specific project.
- Project evaluation followed a structured MDCA framework based on predefined criteria and standardized scoring scales, limiting discretionary interpretation. Experts evaluated criterion fulfilment rather than methodological compliance, thereby shifting the focus from “method adherence” to measurable performance outcomes.
- The voting and scoring processes were conducted anonymously, reducing peer influence and social conformity effects.
- The expert panel consisted of senior project professionals with cross-functional experience rather than individuals exclusively aligned with one methodological school. This reduced the likelihood of strong methodological allegiance bias.

While these measures cannot fully eliminate subjective influence, they significantly reduce the risk of systematic confirmation bias in the comparative assessment.

Procedure: In order to establish a robust framework for evaluating project performance, a group of subject-matter experts engaged in a structured brainstorming exercise guided by the central question: “What makes a project successful?” The output of this session was subsequently organized into a Fishbone diagram, in which the emergent success criteria were clustered into eight principal affinity groups; Project specifics, Teamwork, Communication, Quantitative and qualitative factors, People management, Leading mechanisms, Control mechanisms and Tools and methods. Each of these affinity groups encompassed a range of criteria generated during the workshop. In total, the experts identified 78 candidate criteria for project success. As expected in collaborative ideation processes, a number of these ideas were either duplicated or expressed in slightly different formulations. To ensure conceptual clarity and eliminate redundancy, these overlapping items were consolidated during the subsequent refinement phase.

The resulting Fishbone diagram (Figure 1) therefore comprises the eight affinity groups with a final validated set of 68 distinct success criteria. This structured categorization provides a comprehensive and methodologically rigorous representation of expert consensus on the determinants of project success.

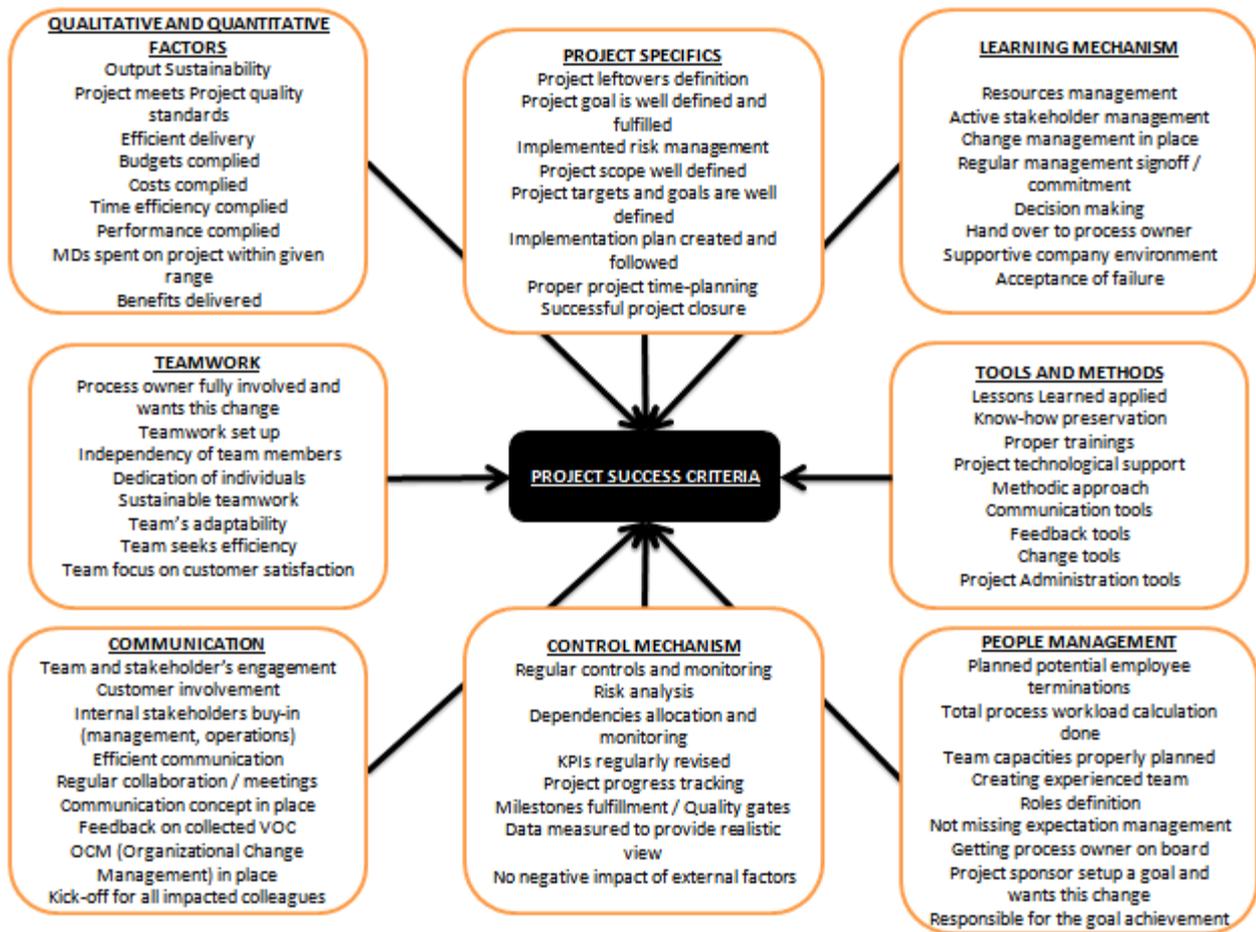


Figure 1. Fishbone diagram: Project Success Criteria

For greater conceptual clarity, each of the eight affinity groups of project success criteria is briefly elaborated below;

- **Project specifics:** This category encompasses all criteria directly associated with the inherent characteristics of a project. It spans the entire project life cycle, from the definition of objectives, targets, scope, and planning, through risk management, to project closure. The emphasis is on the explicit specification of these elements and their consistent adherence throughout the execution of the project.
- **Teamwork:** This group captures success factors related to intra-team collaboration, incorporating not only project team members but also extended roles such as process owners and project sponsors. The criteria emphasize efficiency, adaptability, sustainability, and customer orientation. They pertain both to collective team performance and to the contributions and behaviours of individual team members.
- **Communication:** This set of criteria highlights the necessity of effective and systematic communication. It extends beyond internal team interactions to include exchanges with customers and external stakeholders. Specific focus is placed on engagement, the quality of feedback processing, and the role of communication in facilitating change management.
- **Quantitative and qualitative factors:** This category refers to the more tangible dimensions of project execution, incorporating both measurable (quantitative) and descriptive (qualitative) aspects. The criteria address compliance with established quality standards, as well as the ability to operate within the defined financial and resource constraints of the project.
- **People management:** This affinity group involves the management of human resources throughout the project life cycle. It covers tasks such as workload estimation, role definition, and the assignment of responsibilities, while also considering softer dimensions including expectation management, stakeholder buy-in, and the degree of involvement of key roles.
- **Leading mechanisms:** This group addresses the higher-order mechanisms by which projects are steered and supported. It encompasses resource allocation, change management, stakeholder management, and decision-making processes, with particular attention to the tangible commitment of leadership to the project. The group also includes contextual factors such as organizational environment and the capacity to acknowledge and accommodate failure when necessary.

- Control mechanisms: The criteria within this group pertain to mechanisms that enhance transparency and accountability in project execution. These include progress tracking, the establishment and monitoring of key performance indicators (KPIs), systematic data collection and measurement, environmental scanning, and the application of diverse analytical methods.
- Tools and methods: This category consists of criteria linked to the selection and application of tools and methodological approaches. It encompasses communication tools, change and administrative support tools, as well as the use of appropriate project management methodologies, practices, and organizational know-how.

For each identified project success criterion, a corresponding hypothesis was formulated to enable structured testing and comparative evaluation within the contexts of Lean Six Sigma (LSS) and Agile project management. Table 1 presents the complete set of validated criteria organized into eight affinity groups derived from the expert workshop and subsequent Fishbone analysis. Each criterion is operationalized through a hypothesis that translates abstract success dimensions such as communication quality, stakeholder engagement, methodological appropriateness, governance rigor, and performance monitoring into observable and assessable statements.

The purpose of Table 1 is to establish a transparent conceptual and analytical foundation for the study. By formalizing practitioner-derived success determinants into testable hypotheses, the framework ensures that the evaluation of both case projects is anchored in predefined and methodologically consistent expectations rather than retrospective interpretation. This approach enhances analytical rigor and comparability between LSS and Agile implementations.

Importantly, the structure integrates both “hard” performance dimensions (e.g., budget adherence, milestone fulfillment, KPI tracking, risk mitigation) and “soft” organizational and behavioral determinants (e.g., team adaptability, leadership support, stakeholder alignment, communication effectiveness). Such multidimensional integration reflects the contemporary understanding of project success as a socio-technical construct shaped by governance mechanisms, cultural factors, and strategic alignment. By combining structured control-oriented criteria with relational and adaptive dimensions, the framework captures the dual logic of exploitation and exploration, which is essential for a balanced comparison of LSS and Agile approaches within a complex multinational service environment.

Table 1. Fishbone diagram incl. Hypothesis definition to all success criteria

Affinity	Criteria	Hypotheses
Qualitative and quantitative factors	Output Sustainability	Project outputs should be sustainable over time with processes remaining efficient and well-functioning. Process owner should possess tools to be able to maintain the process sustainable and has a right level of control over the process after the project closure.
	Project meets Project quality standards	The deliverables meet established quality standards and stakeholder expectations proved within regular testing and control mechanisms.
	Efficient delivery	Agile: Shorter delivery cadences (sprints) enhance the efficiency of incremental delivery. LSS: Outcome of each phase delivered; final solution delivered in the implementation phase.
	Budgets complied	The project was completed within a given budget.
	Costs complied	The project costs were not significantly raised during the project life.
	Time efficiency complied	Project time plan was fulfilled without significant prolongations.
	Performance complied	Capacities spent on project tasks were well planned and distributed within the team for the highest efficiency. The project meets specific performance indicators, such as efficiency, productivity, and usability of project resources.
	MDs spent on project within given range	Time spent on the project by all roles didn't significantly exceed the plan.
	Benefits delivered	The benefits of project delivery are as expected and in accordance with the defined goal.
	Project specifics	Project leftovers definition
Project goal is well defined and fulfilled		Project goal is well defined based on SMART criteria in the beginning of the project with no major changes during the project life cycle and align with organizational overall strategic vision. Special care should be given to definition of measurable values and dates, which should be complied. As well, as Return on Investment (ROI) is estimated and tracked during the project. Project goals were fulfilled as expected and defined.
Implemented risk management		Risks are managed to eliminate / mitigate possible issues and do not have a negative effect on project life cycle. In case of need, a risk management expert should be involved in the project.
Project scope well defined		Project scope is well defined in the beginning of project and not significantly modified within the project life cycle; if necessary to specify scope based on process, department, roles, etc. in more complex projects. Definition out of scope shouldn't be omitted.
Project targets and goals are well defined		Project goals and targets are well defined in the beginning of the project and aligned with sponsor and the project team.
Implementation plan created and followed		A clear plan was created before the solution implementation with the deadlines and responsible persons, regularly revised and updated.
Proper project time-planning		Project time plan was clear and followed within the project life cycle by all responsible.
Successful project closure		Project was properly closed after the fulfillment of project goals and completion of all tasks. The capacities were released to other tasks. Project closing should be done actively, utilizing all deliverables and compare them with the deliverables, mark the difference as kind of leftovers. Must be handed over to someone (process owner). Same for the business cases.

Leading mechanisms	Resources management	Necessary resources (human, financial, material) must be ensured, available and appropriately allocated throughout the project life cycle.
	Active stakeholder management	Project lead or small core team to run stakeholder analysis. In the beginning of the project was done a proper stakeholder analysis and procedures were set up based on the results.
	Change management in place	Changes were successfully implemented in the area and accepted by the employees, stakeholders and affected parts.
	Regular management signoff / commitment	Management gives enough priority to the topics related to the project and are committed to support project evolution.
	Decision making	Decisions were done in time, without prolongations and by the right people.
	Hand over to process owner	Handover the process and its changes to the process owner, including control reports that help with monitoring and continuous improvement.
	Supportive company environment	Company environment is stable and supports the project progress and implementation of project solutions in real life processes. Is Agile or Lean Six Sigma approach accepted / supported / welcomed in the company?
Communication	Acceptance of failure	Accept to fail and that a big project is like a marathon – no sprint. Any postponements were openly communicated incl. an understandable why.
	Team and stakeholder's engagement	People involved in the project, having impact on its progress are committed to fulfill its goals.
	Customer involvement	Customer needs and requirements are regularly collected and incorporated into the project plan.
	Internal stakeholders buy-in (management, operations)	Buy-in was created by listening to each stakeholder – knowing how to approach every stakeholder best – dos/don'ts. Stakeholders are not only informed, but the most skeptical ones are actively involved into the project team – having active roles and deliverables.
	Efficient communication	Team members communicate efficiently without wasting capacities and proper follow up.
	Regular collaboration / meetings	Information about project progress is regularly shared, discussed, and planned to held a right level of transparency. Regular communication should occur not only at project milestones but also in between them. Specially, Sponsor and owner engagement is essential, along with attention to the level of detail and communication frequency.
	Communication concept in place	Communication concept is well set up: What – why – how – when – to whom – to make people curious by finding a balance between share and need to know.
	Feedback on collected VOC	Colleagues participating in providing the voice of the customer will receive feedback on what happened with their process improvement suggestions.
	OCM (Organizational Change Management) in place	It's not a can, it's a must. Often only big programs consider change management – however success comes by getting everyone into the same boat, rowing into the same direction. To accompany people through a change it needs a structured and iterative approach with vision, strategy and change road map, communication concept/plan, change agents and key user network.
	Kick-off for all impacted colleagues	Kick-off meeting with the Sponsor and Process Owner present, clearly explaining the project's goal and purpose, with participation from all employees involved.
Teamwork	Process owner fully involved and wants this change	The process owner is interested in how the project is progressing and personally takes part in some of the activities. They want other team members to be involved too and to provide relevant data and information.
	Teamwork set up	Team members have set up clear cooperation rules and follow them.
	Interdependency of team members	Team members are motivated to share their opinions and ideas, as well as they have a share on decision making tasks.
	Dedication of individuals	Everyone is aware and dedicated to their role and tasks.
	Sustainable teamwork	The team should maintain a consistent pace of work over long term, avoiding burnout and ensuring ongoing productivity.
	Team's adaptability	The team is flexible and prepared to adjust plans and strategies in response to changing circumstances, feedback, or new information.
	Team seeks efficiency	Collaboration in the team increases the efficiency in the project, team members regularly discuss lessons learnt and find space for improvements.
Tools and methods	Team focus on customer satisfaction	Agile: Work in sprints brings small increments more regularly, so the customer can get more tangible results within shorter time than with Lean Six Sigma. On the other hand, Lean Six Sigma project should end without bringing a real complete solution to existing problem.
	Lessons Learned applied	Lessons learned within the project team were applied for more efficient and smoother project run.
	Know-how preservation	Proper documentation and sharing of knowledge gained throughout the project for future reference.
	Proper trainings	Team members, end users and employees were trained either during the project, before testing or before the project closure in important topics.
	Project technological support	Proper platforms were used for the project completion within communication, planning, analysis, and implementation (MS Office tools, lucid charts, online platforms, internal systems, etc.).
	Methodical approach	Methodology used in project was suitable for the topic and project was done formally correctly.
	Communication tools	One place for sharing news and documents and other requirements for all team members.
	Feedback tools	Appropriate tools and procedures were applied to gather and act on feedback effectively (questionnaires, interviews, etc.).
	Change tools	Effective change management tools and procedures were used to guide the organization through the transition (OBEYA method, internal communication platforms, hosting regular meetings, collect the feedback from users and employees, etc.).
	Project Administration tools	Project administration was efficient, with tasks, documents, and decisions well organized (tools like Kanban, mind maps, etc. were used).

Control mechanisms	Regular controls and monitoring	The project progress was regularly monitored, and control mechanisms were set up.
	Risk analysis	Exercise risk analysis at difference points in time and define mitigation activities. Done at least 2× per project.
	Dependencies allocation and monitoring	External dependencies were identified and managed proactively (Dependencies – other projects, regarding tooling).
	KPIs regularly revised	Smart KPI or smart target are regularly checked, even after the project closure. Compare the values from before and at the end of the project. Reports from measure phase are used for process control. Set process KPIs, measure the values before starting the process improvement, and again after the improvements are implemented.
	Project progress tracking	Project progress is tracked regularly against set of milestones and goals using performance metrics.
	Milestones fulfillment / Quality gates	Project milestones were reached on time (Fully? Partially?) and within given conditions, such as budget and capacities. All milestones are presented and confirmed by the project sponsor, next steps are planned.
	Data measured to provide realistic view	The data is measured and collected (automatically, manually) to provide realistic view of the process and the problem.
	No negative impact of external factors	External factors did not negatively impact project execution or outcomes and if, they were mitigated within risk management.
People management	Planned potential employee terminations	Planned employee terminations should ideally be carried out before the start of the project or after its closure.
	Total process workload calculation done	Calculate the team's capacity utilization and propose a capacity plan and team capacity management.
	Team capacities properly planned	Team members have assigned enough capacities in regards the project.
	Creating experienced team	Team members possess required skills and experience for the project topic.
	Roles definition	Roles need to be clearly determined right at the start.
	Not missing expectation management	Deeply analyze the expectations of every role/stake. Derive actions – e.g. like special ways of communication or work packages.
	Getting process owner on board	Find the true process owner who supports the change.
	Project sponsor setup a goal and wants this change	The project sponsor sets clear goals and keeps in touch with the team, helping clear up any confusion or stepping in when someone's not too keen to get involved.
Responsible for the goal achievement	The entire team should feel responsible for delivering the goal and the outcome, and actively contribute to the process.	

Weighting of criteria: Following the establishment of the final list of success criteria, an anonymous online voting procedure was conducted among the workshop participants. Each expert was asked to evaluate the relative importance of the criteria at two hierarchical levels using a structured questionnaire; First-level weighting (affinity groups), participants distributed a total of 100 points across the eight affinity groups, thereby reflecting their judgment regarding the relative importance of each group in determining project success. Second-level weighting (criteria within affinity groups), within each affinity group, participants distributed 100 points among the individual criteria, indicating their assessment of the relative importance of each criterion in relation to the others in the same group. Fewer points indicated lower perceived importance, whereas higher point allocations denoted greater strategic relevance. Eight experts completed the voting process, and the final weights at both levels were calculated as arithmetic means of all individual responses, thereby mitigating individual bias and generating aggregated consensus-based values.

Importantly, this weighting procedure transforms the framework from a descriptive catalogue of criteria into a structured multi-criteria decision model. The hierarchical weighting ensures that highly ranked dimensions exert proportionally greater influence on the final project score. Consequently, the comparative outcomes do not merely reflect whether specific criteria were fulfilled, but how strongly their fulfillment contributed to overall methodological effectiveness based on practitioner-perceived importance. This design strengthens interpretative robustness and allows subsequent performance differences between LSS and Agile to be understood as weighted profile variations rather than simple binary assessments of compliance.

The comprehensive weighting results are presented in Table 2, which operationalizes the conceptual structure introduced in Table 1 by translating qualitatively defined success dimensions into quantitatively prioritized factors. Together, Tables 1 and 2 establish a coherent analytical progression from defining what constitutes project success to determining the relative importance of each dimension thereby creating the methodological foundation for the aggregated comparative analysis presented in Figure 3. This stepwise structuring enhances analytical transparency and ensures that the evaluation of Lean Six Sigma (LSS) and Agile performance is grounded in explicitly defined and hierarchically weighted criteria rather than retrospective or subjective judgment.

Table 2. Complete voting results for the criteria 1st and 2nd level weights

Affinity	Criteria	Voting		
		Weights	Points collected	Average weight ii %
Qualitative and quantitative factors	Output Sustainability	0.14	110	14%
	Project meets Project quality standards	0.09	73	9%
	Efficient delivery	0.13	102	13%
	Budgets complied	0.13	102	13%
	Costs complied	0.12	97	12%
	Time efficiency complied	0.11	87	11%
	Performance complied	0.11	86	11%
	MDs spent on project within given range	0.06	46	6%
	Benefits delivered	0.12	97	12%
Total		0.14	115	14%
Project specifics	Project leftovers definition	0.05	40	5%
	Project goal is well defined and fulfilled	0.25	199	25%
	Implemented risk management	0.11	89	11%
	Project scope well defined	0.12	92	12%
	Project targets and goals are well defined	0.20	156	20%
	Implementation plan created and followed	0.11	91	11%
	Proper project time-planning	0.10	82	10%
	Successful project closure	0.06	51	6%
Total		0.13	101	13%
Leading mechanisms	Resources management	0.14	109	14%
	Active stakeholder management	0.13	103	13%
	Change management in place	0.13	104	13%
	Regular management signoff / commitment	0.12	94	12%
	Decision making	0.13	101	13%
	Hand over to process owner	0.12	94	12%
	Supportive company environment	0.14	110	14%
	Acceptance of failure	0.11	85	11%
Total		0.11	84	11%
Communication	Team and stakeholder's engagement	0.13	107	13%
	Customer involvement	0.09	75	9%
	Internal stakeholders buy-in (management, operations)	0.11	86	11%
	Efficient communication	0.13	100	13%
	Regular collaboration / meetings	0.11	84	11%
	Communication concept in place	0.10	83	10%
	Feedback on collected VOC	0.13	106	13%
	OCM (Organizational Change Management) in place	0.10	81	10%
	Kick-off for all impacted colleagues	0.10	78	10%
Total		0.15	118	15%
Teamwork	Process owner fully involved and wants this change	0.13	103	13%
	Teamwork set up	0.13	105	13%
	Independency of team members	0.10	77	10%
	Dedication of individuals	0.13	107	13%
	Sustainable teamwork	0.11	89	11%
	Team's adaptability	0.11	89	11%
	Team seeks efficiency	0.12	97	12%
	Team focus on customer satisfaction	0.17	133	17%
Total		0.15	116	15%

	Lessons Learned applied	0.09	69	9%
	Know-how preservation	0.11	91	11%
	Proper trainings	0.13	103	13%
	Project technological support	0.12	98	12%
Tools and methods	Methodic approach	0.17	133	17%
	Communication tools	0.13	104	13%
	Feedback tools	0.10	83	10%
	Change tools	0.09	75	9%
	Project Administration tools	0.06	44	6%
	Total	0.1	82	10%
	Regular controls and monitoring	0.15	120	15%
	Risk analysis	0.12	96	12%
	Dependencies allocation and monitoring	0.12	99	12%
	KPIs regularly revised	0.13	104	13%
Control mechanisms	Project progress tracking	0.11	86	11%
	Milestones fulfillment / Quality gates	0.13	105	13%
	Data measured to provide realistic view	0.15	121	15%
	No negative impact of external factors	0.09	69	9%
	Total	0.12	94	12
	Planned potential employee terminations	0.08	63	8%
	Total process workload calculation done	0.11	88	11%
	Team capacities properly planned	0.12	97	12%
	Creating experienced team	0.15	117	15%
People management	Roles definition	0.11	87	11%
	Not missing expectation management	0.08	67	8%
	Getting process owner on board	0.07	58	7%
	Project sponsor setup a goal and wants this change	0.14	114	14%
	Responsible for the goal achievement	0.14	109	14%
	Total	0.11	90	11%

The analysis of first-level weights (Figure 2) reveals that the differences across affinity groups are not particularly pronounced. Nevertheless, the evaluation provided by the participating project management experts indicates that project success is perceived to depend primarily on the performance of the project team itself and the establishment of effective communication structures. A further group of highly weighted factors is associated with project-specific characteristics, including the definition of objectives and targets, adherence to project plans, and the consistent operation within the predefined boundaries of project scope. Although to a somewhat lesser degree, control mechanisms - such as monitoring processes and transparency measures - are also recognized as important elements of project success. By contrast, leading mechanisms and people management received lower relative importance. This may be attributable to the high level of independence, professional experience, and communication proficiency of the experts who constituted the workshop group. The lowest relative weight was assigned to tools and methodologies. This outcome reflects the perception that such elements are often pre-determined by organizational context or assigned to the project manager as given constraints. Consequently, they are regarded as exerting a less visible influence on project outcomes when compared with the more dynamic factors of teamwork, communication, and project specificity.

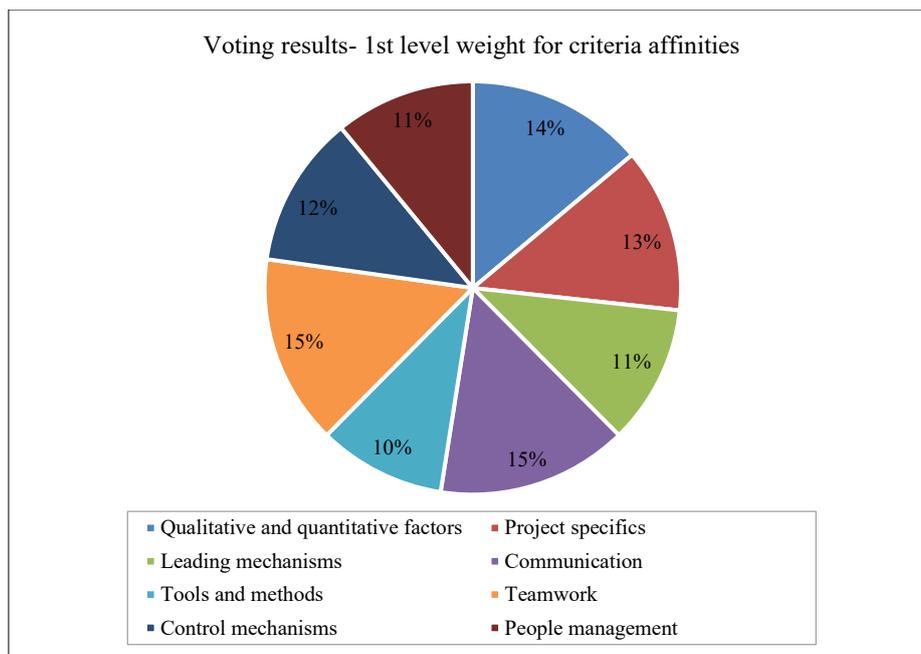


Figure 2. MDCA criteria summary incl. 1st and 2nd level weights

The assessment of second-level weights demonstrates that the highest-rated criterion is the definition and achievement of project goals. This finding underscores the centrality of goal clarity and fulfillment to the overall perception of project success. Other criteria that ranked among the top priorities include; a team orientation toward customer satisfaction, the adoption of an appropriate methodological approach, systematic data measurement to ensure a realistic understanding of the project topic, regular monitoring across the project life cycle, and collaboration with an experienced team. At the opposite end of the spectrum, several criteria received the lowest evaluations. These included; the definition of project leftovers, likely reflecting the perspective that unfinished elements cannot be equated with success, the calculation of man-days (MDs) expended on a project, which is often difficult to estimate at the outset and rarely proves accurate, planning for potential employee terminations, considered highly unpredictable and variable in impact depending on the specific role within the project, and the use of project administration tools and related instruments, generally regarded as trivial factors for project success due to their standardized and expected availability.

In the subsequent section, these weighted criteria will be applied to the two case study projects - namely, the Agile project in the Order Taking Department and the Lean Six Sigma project in the Human Resources Department - and evaluated based on the project managers’ experiential insights from both contexts.

Project evaluation: Both projects were assessed against the weighted criteria. For the LSS project, DMAIC phase outcomes (error reduction, workload automation, process stability) were measured. For the Agile project, outcomes were assessed in terms of incremental delivery, team collaboration, and cost-saving potential.

Comparative analysis: Results were compared to identify synergies, limitations, and areas where LSS and Agile complement or contradict each other.

Use of Artificial Intelligence Tools: In the preparation of this manuscript, an artificial intelligence (AI) - based language model was employed exclusively for linguistic correction and stylistic refinement. All substantive information, empirical data, and conceptual contributions presented in this study are entirely original and derived from the author’s own research and analysis. The AI tool was not used for generating or altering the data, results, or theoretical interpretations. Its role was limited to supporting clarity, consistency, and readability of the text in accordance with academic standards.

3. Results and Discussion

The findings are presented in alignment with RQ1 and RQ2 and structured into three analytically connected layers:

- Weighting of project success criteria,
- MDCA-based comparative evaluation of Agile and Lean Six Sigma (LSS), and
- Integrative interpretation of methodological complementarities within a governance perspective.

The extended graphical and tabular presentation enhances interpretive clarity and strengthens analytical robustness.

3.1. Weighting of Project Success Criteria

The first stage of the analysis stems from the expert workshop and the subsequent anonymous voting procedure conducted among eight experienced project management professionals. As described in the methodology section, 68 success criteria were consolidated into eight affinity groups through Fishbone analysis. The weighting procedure was performed at two hierarchical levels using a fixed 100-point allocation system, and final weights were calculated as arithmetic means of all individual votes.

Table 3 presents the aggregated first-level weights assigned to the eight affinity groups.

Table 3. First-Level Weights of Affinity Groups

Affinity Group	Average Weight (%)
Communication	15
Teamwork	15
Project specifics	13
Qualitative & quantitative factors	14
Control mechanisms	12
Leading mechanisms	11
People management	11
Tools and methods	10

As seen in Table 3, teamwork and communication are perceived as the most decisive determinants of project success. Although the numerical differences across groups are not extreme, a distinct hierarchy emerges. Relational dimensions dominate over procedural and tool-based elements. Project specifics and performance measurement factors follow closely, reflecting the experts' belief that clarity of objectives and measurable outcomes must complement collaborative strength.

Control mechanisms occupy a moderate position, indicating that monitoring and KPI-based governance remain important but are not perceived as primary drivers of success. Leading mechanisms and people management received comparatively lower weights, which may reflect the high professional maturity and autonomy of the expert respondents. The lowest scores were attributed to tools and methods, suggesting that methodologies themselves are regarded as enablers rather than determinants of project success.

These results directly address RQ2 by empirically identifying which dimensions of project governance practitioners consider most critical within a multinational service context. To provide more granular insight, Table 4 presents the highest- and lowest-weighted individual criteria. Table 4 clarifies that practitioners prioritize strategic clarity, customer orientation, systematic evaluation, and experienced teamwork. Administrative elements and estimation-based tools are perceived as secondary. The highest-ranked criterion - project goal definition and fulfilment - underscores the foundational importance of outcome alignment. Customer satisfaction and methodological appropriateness follow closely, reinforcing the dual requirement of strategic focus and contextual method selection.

Table 4. Top and Bottom Individual Success Criteria

Highest Weighted Criteria	Weight (%)
Definition and fulfilment of project goals	25
Customer satisfaction focus	17
Appropriate methodological selection	17
Regular monitoring and control	15
Data measurement for realistic evaluation	15
Experienced and collaborative team	15
Lowest Weighted Criteria	Weight (%)
Project leftovers definition	5
Administrative tools	6
Man-day calculation	6
Planned employee terminations	8

Table 4 confirms that project success is conceptualized as a balanced integration of strategic direction, operational control, and human collaboration, rather than as a purely procedural or methodological construct. At first glance, the finding that “tools and methods” received the lowest relative weight may appear conceptually paradoxical, given that this study explicitly compares two methodologies. However, this result does not diminish the relevance of methodological choice; rather, it reframes its role.

The weighting outcome suggests that practitioners perceive formal tools, templates, and procedural artifacts as enabling mechanisms rather than as primary determinants of project success. In other words, methodology does not directly generate outcomes; instead, it shapes how critical success factors, such as communication quality, teamwork dynamics, goal clarity, and control structures, are structured and enacted.

Agile and Lean Six Sigma differ not merely in their toolkits but in their underlying governance logics. Agile institutionalizes adaptability, iterative feedback, and stakeholder integration, thereby influencing relational and collaborative dimensions. LSS institutionalizes measurement discipline, structured problem-solving, and process stabilization, thereby influencing control and structural dimensions.

Consequently, methodology matters less as a set of isolated tools and more as a systemic configuration that conditions how higher-weighted human and structural factors operate within the project environment. This distinction resolves the apparent paradox and supports the interpretation that governance architecture - not procedural formalism - is the true locus of methodological impact.

3.2. Comparative MDCA Evaluation of Agile and Lean Six Sigma

The second stage applied the weighted criteria to two case study projects conducted within Company S: an Agile initiative in the Order Management department and a Lean Six Sigma project in Human Resources. Each project was evaluated against all criteria, and weighted scores were aggregated. Table 5 presents the total MDCA scores.

Table 5. Overall MDCA Scores

Methodology	Total Score
Agile	66.65
Lean Six Sigma	61.88

Figure 3 visualizes the comparative totals.

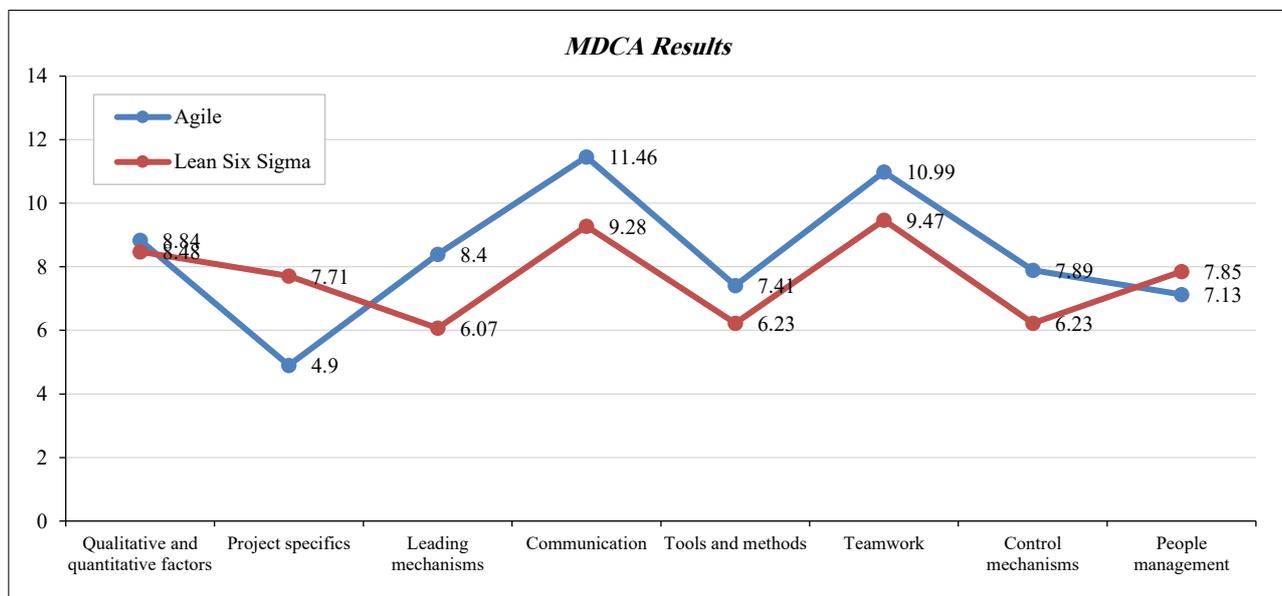


Figure 3. MDCA analysis on Agile vs. Lean Six Sigma project

The Agile project achieved a moderately higher overall score (+4.77 points). However, the difference does not indicate categorical superiority; rather, it reflects distinct performance profiles across success dimensions. We can identify complementary patterns. Agile demonstrates superior performance in teamwork and communication, reflecting high adaptability, dynamic stakeholder engagement, and rapid feedback loops. Customer orientation is strongly embedded within the Agile team culture, reinforcing alignment between project execution and stakeholder expectations.

In contrast, Lean Six Sigma exhibits stronger performance in project specifics and control mechanisms. Its structured DMAIC approach ensured rigorous planning, clear goal definition, and measurable error reduction. The LSS project achieved significant quality improvements and process stabilization, demonstrating high compliance with predefined objectives. Where Agile showed weaknesses - particularly in workload planning, role clarity, and goal stability - LSS maintained structural coherence. Conversely, where LSS exhibited bureaucratic rigidity and reduced stakeholder dynamism, Agile demonstrated flexibility and responsiveness.

It is important to clarify that the identified weaknesses of the Agile project should not be interpreted as inherent limitations of Agile frameworks. Established Agile methodologies such as Scrum explicitly define structured roles (e.g., Product Owner, Scrum Master), sprint planning routines, and backlog prioritization mechanisms.

The observed challenges in this case are better understood as implementation-specific characteristics rather than structural deficiencies of the methodology itself. In the analyzed project, adaptability and iterative responsiveness were emphasized more strongly than formalized workload forecasting and role stabilization. This prioritization reflects contextual managerial choices rather than conceptual shortcomings of Agile as a governance framework. Consequently, the comparative findings distinguish between methodological logic and execution quality. While Agile inherently provides mechanisms for structured coordination, the degree to which these mechanisms are rigorously applied significantly influences project performance outcomes.

3.3. Statistical Robustness (Appropriate Metrics for a Two-Case Design)

The overall performance difference between the Agile and Lean Six Sigma (LSS) projects can be expressed through normalized gap measures. The Agile project achieved a total MDCA score of 66.65 points, while the LSS project scored 61.88 points. The absolute difference therefore equals 4.77 points. When expressed as a relative improvement over LSS performance, this corresponds to 7.71% ($4.77 / 61.88$). To avoid asymmetry in interpretation, a symmetric normalized difference can be calculated relative to the mean of both scores. Using this approach, the normalized gap equals 0.0742 (i.e., 4.77 divided by the average of 66.65 and 61.88), which corresponds to approximately 7.42%. This indicates a moderate but not decisive overall performance divergence, reinforcing the interpretation that neither methodology demonstrates categorical dominance.

Robustness can be assessed at the affinity-group level by examining the multidimensional performance profiles presented in Figure 3. After normalizing all eight affinity-group scores to a 0–1 scale (relative to the global maximum observed value), several complementary profile metrics can be calculated. The Euclidean distance between the Agile and LSS profiles equals 0.441, which can be interpreted as a moderate multidimensional divergence across the eight dimensions. In contrast, the cosine similarity between the two profiles equals 0.982, indicating that while the projects differ in the distribution of strengths, their overall performance structures remain broadly aligned. In other words, both methodologies achieve consistently solid scores across categories, but they peak in different areas.

Additional dispersion indicators further clarify the nature of the divergence. The mean absolute difference across the eight affinity groups equals 1.64 raw points per dimension, reflecting moderate absolute variation. When expressed as Mean Absolute Percentage Error (MAPE), the average relative difference between Agile and LSS scores across dimensions amounts to 22.23%. This suggests that, on average, the methodologies differ by roughly one-fifth of their dimensional performance values, reinforcing the conclusion that their divergence lies in profile emphasis rather than overall capability level.

Taken together, these normalized and profile-based robustness measures substantiate the comparative findings without relying on inappropriate inferential statistics. They demonstrate that the Agile project exhibits a moderately higher aggregate score, while the more analytically relevant distinction lies in the differentiated distribution of strengths across relational, structural, and control-oriented dimensions.

3.4. Gap Analysis

Table 6 summarizes the affinity-level performance difference between methodologies.

Table 6. Affinity-Level Performance Gap (Agile–LSS)

Affinity Group	Relative Advantage
Teamwork	Agile
Communication	Agile
Project specifics	LSS
Control mechanisms	LSS
Leading mechanisms	Neutral
People management	Slight LSS
Tools and methods	Neutral
Qual./Quant. factors	Slight Agile

The symmetrical distribution of strengths confirms complementarity rather than dominance. Agile expands in adaptive and relational dimensions, whereas LSS extends in governance and structural stability dimensions.

3.5. Integrated Discussion

The purpose of this study was to comparatively analyze the applicability of Lean Six Sigma (LSS) and Agile methodologies within a multinational service company and to identify the most influential project success criteria. The findings provide several theoretically and practically significant insights, particularly when interpreted through the lenses of project governance, contingency theory, organizational ambidexterity, and dynamic capabilities.

One of the most salient findings concerns the weighting of success criteria. The dominance of teamwork and communication over tools and formal methodologies confirms that project success is not primarily method-driven but socially embedded. This aligns with long-standing critiques of overly mechanistic project evaluation models focused solely on the “iron triangle” (time - cost - scope) [2, 3]. Contemporary project management research emphasizes that stakeholder satisfaction, learning, and relational alignment are equally decisive dimensions of success [46].

The empirical prioritization of goal definition and customer satisfaction further reinforces the argument that success is fundamentally strategic rather than procedural. Clear outcome articulation and stakeholder value alignment function as boundary conditions within which methodologies operate. In this sense, LSS and Agile should not be interpreted as deterministic success drivers, but rather as governance mechanisms that condition how critical success factors are enacted. This finding supports the view that methodologies act as enablers rather than determinants of performance [47].

The comparative MDCA results demonstrate that Agile and LSS exhibit differentiated strength profiles rather than absolute superiority. Agile outperforms LSS in teamwork and communication, while LSS demonstrates advantages in project specifics and control mechanisms. This symmetrical divergence suggests complementarity rather than competition.

From an ambidexterity perspective [48, 49], the two methodologies represent distinct but complementary organizational logics. Agile aligns with exploration-oriented governance, characterized by adaptability, iterative learning, stakeholder engagement, and decentralized coordination. Its strengths in communication and collaboration reflect a capacity to rapidly adjust to emerging requirements, consistent with exploratory learning processes. Conversely, LSS aligns with exploitation-oriented governance. Its emphasis on structured planning, error reduction, and compliance reflects a logic of efficiency, standardization, and incremental improvement. The DMAIC cycle institutionalizes disciplined problem-solving and variance reduction, supporting process reliability and measurable quality gains.

The moderate normalized performance gap (approximately 7–8%) and high cosine similarity between profiles (0.982) indicate that both approaches achieve broadly comparable overall effectiveness, but distribute competence differently across dimensions. This finding is consistent with ambidexterity theory, which suggests that sustainable performance depends not on choosing between exploration and exploitation, but on orchestrating both [48].

Interpreting the findings through the dynamic capabilities framework [26, 40, 50] provides additional theoretical depth. Dynamic capabilities are typically conceptualized as comprising sensing, seizing, and transforming capacities.

Agile routines, such as iterative feedback cycles, continuous stakeholder communication, and adaptive reprioritization, can be interpreted as strengthening sensing and seizing capabilities. The high scores in teamwork and communication suggest that Agile enhances the organization’s ability to detect environmental signals and rapidly mobilize responses. In contrast, LSS routines, structured goal definition, systematic measurement, and control mechanisms, reinforce transforming capabilities. By institutionalizing learning through measurement and process stabilization, LSS enables the organization to embed improvements into stable operational routines.

The divergence observed at the affinity-group level thus reflects differentiated microfoundations of dynamic capability development. Agile enhances responsiveness and flexibility, whereas LSS enhances reliability and institutionalized learning. Neither logic alone guarantees sustained competitiveness; rather, capability orchestration becomes critical [26].

The results strongly support contingency-based reasoning [51, 52]. Methodological effectiveness appears contingent upon project context rather than intrinsic methodological superiority. Agile proves advantageous in environments characterized by uncertainty, evolving requirements, and high stakeholder interaction. LSS performs better in contexts requiring stability, compliance, and measurable error reduction. The gap analysis confirms that performance differences cluster around contextual fit variables: adaptability versus control. This context dependence reinforces the argument that project governance should be configured according to environmental volatility, task complexity, and regulatory intensity. The moderate profile divergence (Euclidean distance = 0.441) indicates differentiated governance responses rather than performance asymmetry. Thus, the findings empirically substantiate configurational perspectives in project management research, which argue that structural alignment between project characteristics and governance mechanisms determines outcomes [3].

The combined empirical and theoretical analysis supports the proposition that hybrid configurations may provide superior governance in complex organizational environments. Hybridization should not be interpreted as a superficial combination of tools but as a deliberate orchestration of microfoundations across sensing–seizing–transforming cycles. A theoretically grounded hybrid would preserve Agile’s relational intensity and adaptability while embedding LSS’s discipline in goal definition, monitoring, and error control. Such integration aligns with ambidextrous design principles, where structural differentiation and integrative leadership mechanisms enable simultaneous exploration and exploitation [48].

Importantly, the weighting results show that practitioners already assign highest importance to relational coordination and strategic clarity. A hybrid model that aligns with these prioritized dimensions would therefore reflect both theoretical coherence and practitioner legitimacy.

This study contributes to project management scholarship in several ways.

- It empirically validates the multidimensionality of project success within a multinational service context, extending prior success models [3, 46].
- It demonstrates that methodological comparison benefits from weighted, multi-criteria evaluation rather than binary superiority claims.
- By integrating ambidexterity and dynamic capability reasoning into project-level governance analysis, it bridges strategic management theory with operational project management practice.

The findings challenge method-centric debates and instead position LSS and Agile as complementary governance logics whose effectiveness depends on contextual alignment and capability orchestration. This perspective advances the discourse beyond methodological polarization toward a configurational and capability-based understanding of project success.

3.6. Theoretical and Practical Implications

The findings of this study contribute to project management scholarship by reframing the Agile - Lean Six Sigma debate from a method-centric comparison toward a governance and capability-based perspective. Rather than treating methodologies as competing paradigms, the results empirically demonstrate that their effectiveness is contingent upon alignment with prioritized success criteria and contextual project characteristics:

- The weighted multi-criteria evaluation reinforces the multidimensional nature of project success. Consistent with the extended success models proposed by Shenhar & Dvir [3] and Turner & Zolin [46], the study confirms that relational and strategic dimensions, particularly teamwork, communication, and goal clarity, outweigh purely procedural or tool-based determinants. This challenges reductionist interpretations that equate methodological rigor with project success and instead supports the view that governance quality mediates the impact of methodological choice.
- By demonstrating that Agile and LSS distribute strengths differently across affinity groups, the study contributes to ambidexterity research within project contexts. Agile aligns more closely with exploration-oriented governance logic, while LSS aligns with exploitation-oriented process discipline. The moderate normalized performance gap combined with high profile similarity suggests that sustainable project performance depends less on choosing one paradigm and more on orchestrating both. This insight extends ambidexterity theory into the project management domain by empirically illustrating how exploration - exploitation tensions manifest at the methodological level.
- The dynamic capabilities perspective described in [4, 26, 40] offers a useful explanatory lens for interpreting methodological complementarities. Agile routines strengthen sensing and seizing capabilities through rapid feedback and stakeholder integration, while LSS routines enhance transforming capabilities via institutionalized measurement and process stabilization. By empirically mapping performance differences onto these microfoundational processes, the study bridges strategic management theory and operational project governance, thereby advancing interdisciplinary integration.

For practitioners operating in multinational service organizations, the results suggest that methodological choice should not be treated as a binary strategic decision. Instead, managers should evaluate project context, environmental volatility, regulatory requirements, and stakeholder complexity before selecting or configuring governance mechanisms.

Projects characterized by high uncertainty, rapid requirement evolution, and intensive stakeholder interaction are likely to benefit from Agile-oriented governance structures. The empirical findings indicate that Agile’s strengths in communication and teamwork significantly enhance adaptability and stakeholder alignment. However, managers must proactively mitigate known weaknesses, such as scope instability, workload ambiguity, and role diffusion, by introducing clearer accountability mechanisms and structured review checkpoints. Conversely, projects focused on process optimization, compliance, and measurable quality improvement are well suited to LSS governance. The structured DMAIC cycle, emphasis on data-driven decision-making, and rigorous goal definition provide strong

foundations for stability and accountability. Nevertheless, managers should remain attentive to risks of bureaucratic inertia and limited stakeholder dynamism. Introducing periodic adaptive review sessions or cross-functional engagement mechanisms can partially offset these limitations.

The study strongly supports the adoption of hybrid governance configurations, particularly in complex service environments where projects simultaneously require innovation and operational reliability. Effective hybridization should not consist of superficial tool blending but of deliberate orchestration. Managers should integrate Agile routines that promote sensing and stakeholder responsiveness with LSS routines that institutionalize measurement and compliance. Such orchestration enables organizations to balance flexibility with structural discipline.

At the portfolio level, the findings imply that organizations may benefit from differentiated methodological deployment rather than uniform standardization. Certain project categories (e.g., digital transformation initiatives) may be governed predominantly through Agile principles, while others (e.g., process standardization programs) may rely on LSS frameworks. Senior leadership plays a critical role in ensuring integration across these streams to avoid fragmentation and maintain strategic coherence.

Finally, the empirical weighting results highlight the primacy of relational coordination and strategic clarity. Managers should therefore prioritize investments in communication infrastructure, team capability development, and explicit goal alignment over excessive focus on methodological certification or tool proliferation. Methodologies should serve governance objectives - not substitute for them.

4. Conclusion

This study set out to comparatively examine the applicability of Lean Six Sigma (LSS) and Agile methodologies within the project management environment of a multinational service company. By integrating expert-based weighting of 68 project success criteria with a structured Multi-Dimensional Criteria Analysis (MDCA) of two embedded case studies, the research provided a context-controlled and analytically robust comparison of methodological performance.

The findings demonstrate that project success is not primarily determined by the nominal methodology employed, but rather by the alignment between prioritized success criteria and project context. Teamwork and communication emerged as the most influential affinity groups, while tools and formal methodologies were consistently rated as secondary enablers rather than primary drivers of success. Although tools and methods received the lowest direct weighting, this does not imply that methodology is irrelevant. Rather, methodologies function as governance architectures that structure the enactment of more influential factors such as teamwork, communication, and control. Thus, their impact is indirect but systemic. At the individual level, clear goal definition, customer satisfaction, methodological appropriateness, systematic data measurement, regular monitoring, and experienced collaboration were identified as the most decisive criteria.

The comparative analysis revealed differentiated but complementary methodological profiles. Agile demonstrated superior performance in relational and adaptive dimensions, particularly in communication, stakeholder engagement, and teamwork. Lean Six Sigma, in contrast, excelled in structured planning, goal clarity, and control mechanisms, reflecting its strength in compliance-oriented and stability-driven environments. The moderate normalized performance gap and high profile similarity between the two approaches indicate that neither methodology is universally superior. Instead, effectiveness depends on contextual alignment and governance configuration. The results support the proposition that hybrid models, deliberately integrating Agile flexibility with LSS discipline, offer a promising pathway for organizations operating in complex corporate ecosystems. By moving beyond binary methodological debates and adopting a capability-oriented and context-sensitive perspective, this study advances the understanding of project governance and contributes empirically grounded insights to contemporary project management theory and practice.

4.1. Limitations and Future Research

While the study provides structured comparative insights into the applicability of Lean Six Sigma (LSS) and Agile methodologies within a multinational service context, several limitations must be acknowledged.

The research design is based on two embedded case studies within a single multinational organization. Although this intra-organizational design enhances contextual control and reduces variability associated with cross-company comparisons, it also limits generalizability. Organizational culture, governance maturity, leadership style, and corporate process standards may have influenced both the weighting of success criteria and the performance profiles of the two projects. Future research should therefore replicate the MDCA-based comparative framework across multiple organizations and industries to assess external validity and contextual transferability.

Another limitation concerns the composition and size of the expert panel involved in the weighting process. The workshop included nine senior project professionals, and eight completed the structured 100-point allocation survey. While this sample size is acceptable for exploratory and expert-driven research designs, it inevitably limits statistical robustness and external generalizability.

Furthermore, all experts operated within the same multinational service organization. Although this homogeneity enhances internal consistency and contextual alignment, it may also introduce organizational bias. Shared corporate culture, governance maturity, and managerial norms could have influenced the prioritization of relational dimensions such as teamwork and communication over procedural or tool-based criteria. While the structured weighting procedure and averaging mechanism reduce individual bias, they do not eliminate the possibility of collective cognitive alignment shaped by organizational experience. Future research should therefore replicate the weighting process across multiple organizations, industries, or cultural contexts. Expanding the expert pool, applying Delphi techniques, or conducting cross-regional comparisons would further strengthen weighting robustness and enhance external validity.

Despite implemented safeguards, residual confirmation bias cannot be entirely excluded. Experts operating within a corporate environment where both methodologies are institutionalized may still exhibit implicit preferences shaped by prior experience. Future research could strengthen objectivity by incorporating external evaluators, cross-organizational panels, or blinded scoring procedures in which evaluators are unaware of the methodological label of the project under review.

The weighting of success criteria was derived from expert judgment ($n = 8$). While the structured 100-point allocation method and averaging procedure increase reliability, the results remain perception-based rather than behaviorally observed. The relative importance assigned to teamwork, communication, and project specifics reflects practitioner experience but may vary in organizations with different governance cultures or hierarchical structures. Future studies could expand the respondent base, incorporate cross-cultural comparisons, or apply Delphi methods to further refine weighting stability. Longitudinal studies may also examine whether perceived importance shifts over time as organizations undergo digital transformation or structural change.

Although normalized divergence metrics (e.g., Euclidean distance and cosine similarity) strengthen analytical robustness in a two-case design, the absence of large-sample inferential testing inherently limits statistical generalization. The study prioritizes analytical depth and configurational insight over statistical representativeness. Future research could extend the MDCA framework to larger datasets, enabling multivariate modeling, structural equation modeling, or configurational approaches such as fuzzy-set qualitative comparative analysis (fsQCA) to explore non-linear relationships between methodological configurations and project success.

The study focuses on project-level performance rather than portfolio-level or organizational-level outcomes. While the dynamic capabilities and ambidexterity interpretations provide a theoretical bridge to strategic management, empirical validation at higher organizational levels remains necessary. Future research could examine how methodological hybridity contributes to firm-level innovation performance, organizational learning capacity, or long-term competitive advantage.

Hybridization is conceptualized in this study as a potential governance configuration emerging from complementary methodological strengths. However, the empirical cases examined here represent single-method applications rather than fully integrated hybrid implementations. Future research should investigate explicitly designed hybrid models, analyzing how structured integration of Agile and LSS routines influences sensing, seizing, and transforming capabilities over time.

Finally, technological evolution and digitalization may alter the relative effectiveness of governance mechanisms. As artificial intelligence, advanced analytics, and collaborative digital platforms become embedded in project environments, the balance between structured control and adaptive responsiveness may shift. Future studies should therefore examine how digital tool ecosystems mediate the relationship between methodology, governance structure, and project performance.

Building on these limitations, several promising research trajectories emerge:

- **Configurational modelling:** Future studies could adopt configurational or contingency-based modeling to formally test alignment between project characteristics (uncertainty, complexity, regulatory intensity) and governance configuration (Agile, LSS, hybrid).
- **Longitudinal capability development:** Research could track projects over time to observe how methodological routines contribute to the evolution of dynamic capabilities at organizational level.
- **Hybrid governance taxonomy:** There is a need to systematically classify hybrid project management configurations beyond generic “Agile–LSS combinations,” identifying structural, temporal, and procedural integration patterns.
- **Cross-cultural replication:** Given the multinational service context of this study, cross-regional comparisons may reveal how national culture and institutional environments influence methodological effectiveness.
- **Quantitative scaling:** Expanding the MDCA framework to larger samples would enable robust hypothesis testing and allow integration with broader project performance datasets.

In summary, while the present study offers a context-controlled and analytically robust comparison of Agile and LSS within a global service organization, further research is required to extend theoretical generalization, refine hybrid governance models, and deepen understanding of capability orchestration in complex project environments.

5. Declarations

5.1. Author Contributions

Conceptualization, D.A.P.; methodology, I.A.S.; investigation, K.B.; resources, J.L.; writing—original draft preparation, D.A.P.; writing—review and editing, D.A.P., I.A.S., K.B., and J.L. All authors have read and agreed to the published version of the manuscript.

5.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

5.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

5.4. Acknowledgments

The authors gratefully acknowledge DTI University, Slovakia for supporting this work.

5.5. Institutional Review Board Statement

Not applicable.

5.6. Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

5.7. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

6. References

- [1] PMI. (2021). Pulse of the Profession 2021: Beyond Agility. Project Management Institute, Pennsylvania, United States. Available online: <https://www.pmi.org/learning/thought-leadership/pulse/pulse-of-the-profession-2021-beyond-agility> (accessed on Jan 2026).
- [2] Baccarini, D. (1999). The Logical Framework Method for Defining Project Success. *Project Management Journal*, 30(4), 25–32. doi:10.1177/875697289903000405.
- [3] Shenhar, A. J., & Dvir, D. (2007). Project Management Research—The Challenge and Opportunity. *Project Management Journal*, 38(2), 93–99. doi:10.1177/875697280703800210.
- [4] Teece, D. J. (2007). Explicating dynamic capabilities: The nature and micro-foundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. doi:10.1002/smj.640.
- [5] Laureani, A. (2021). Agile and Lean Six Sigma integration: a Leadership framework. *Proceedings of the Eighth International Conference on Lean Six Sigma: Leading the Future of Lean and Six Sigma Research Methodologies*, 6. doi:10.5703/1288284317325.
- [6] Antony, J., Snee, R., & Hoerl, R. (2017). Lean Six Sigma: yesterday, today and tomorrow. *International Journal of Quality and Reliability Management*, 34(7), 1073–1093. doi:10.1108/IJQRM-03-2016-0035.
- [7] Krijnen, A. (2007). The Toyota way: 14 management principles from the world's greatest manufacturer. *Action Learning: Research and Practice*, 4(1), 105–114. doi:10.1080/14767330701234002.
- [8] Milewska, B., & Milewski, D. (2025). Lean, Agile, and Six Sigma: Efficiency and the Challenges of Today's World: Is It Time for a Change? *Sustainability (Switzerland)*, 17(8), 3617. doi:10.3390/su17083617.
- [9] Denning, S. (2018). *The age of agile: How smart companies are transforming the way work gets done*. AMACOM, New York, United States.
- [10] Ciric Lalic, D., Lalic, B., Delić, M., Gracanin, D., & Stefanovic, D. (2022). How project management approach impact project success? From traditional to agile. *International Journal of Managing Projects in Business*, 15(3), 494–521. doi:10.1108/IJMPB-04-2021-0108.
- [11] Rigby, D. K., Sutherland, J., & Noble, A. (2018). Agile at scale. *Harvard Business Review*, 96(3), 88–96.
- [12] Alqudah, M. K., Razali, R., Alqudah, M. K., Al Dalaien, M. N., Alabool, H. M., & Alkhazaleh, H. A. (2024). A grounded theory of selecting lean and agile practices for software development. *Journal of Software: Evolution and Process*, 36(4), e2539. doi:10.1002/smr.2539.

- [13] Berntzen, M., Stray, V., Moe, N. B., & Hoda, R. (2023). Responding to change over time: A longitudinal case study on changes in coordination mechanisms in large-scale agile. *Empirical Software Engineering*, 28(5), 114. doi:10.1007/s10664-023-10349-0.
- [14] Verwijs, C., & Russo, D. (2024). Do Agile scaling approaches make a difference? an empirical comparison of team effectiveness across popular scaling approaches. *Empirical Software Engineering*, 29(4), 75. doi:10.1007/s10664-024-10481-5.
- [15] Salleh, N. M., & Nohuddin, P. N. E. (2019). Comparative study between lean six sigma and lean-agile for quality software requirement. *International Journal of Advanced Computer Science and Applications*, 10(12), 212–218. doi:10.14569/ijacsa.2019.0101230.
- [16] Özener, O. Ö., & Büyüktopcu, E. (2025). Agile-hybrid delivery approaches for complex design and engineering projects: an integrated case study. *Smart and Sustainable Built Environment*, 1-34. doi:10.1108/SASBE-04-2024-0125.
- [17] Improta, G., Guizzi, G., Ricciardi, C., Giordano, V., Ponsiglione, A. M., Converso, G., & Triassi, M. (2020). Agile six sigma in healthcare: Case study at santobono pediatric hospital. *International Journal of Environmental Research and Public Health*, 17(3), 1052. doi:10.3390/ijerph17031052.
- [18] Senna do Amaral, C., Varanda Cotaet, O., Santos Bochetti, F. A., & Tobal Berssaneti, F. (2025). Combining Lean Six Sigma and agile approach to optimize order management: action research in a Brazilian company. *International Journal of Lean Six Sigma*, 16(2), 346–377. doi:10.1108/IJLSS-10-2023-0182.
- [19] Stankalla, R., Koval, O., & Chromjakova, F. (2018). A review of critical success factors for the successful implementation of Lean Six Sigma and Six Sigma in manufacturing small and medium sized enterprises. *Quality Engineering*, 30(3), 453–468. doi:10.1080/08982112.2018.1448933.
- [20] Chughtai, M. S., Syed, F., Naseer, S., & Chinchilla, N. (2024). Role of adaptive leadership in learning organizations to boost organizational innovations with change self-efficacy. *Current Psychology*, 43(33), 27262–27281. doi:10.1007/s12144-023-04669-z.
- [21] Jinga, A. A., Oumer Hussien, J., Gezahagn Negash, H., & Bezabih Estifanos, A. (2024). Leadership behavior and organizational change management in selected public universities of Ethiopia: Exploring the impact of leadership influences and change processes. *Heliyon*, 10(19), 37149. doi:10.1016/j.heliyon.2024.e37149.
- [22] Cesarotti, V., Gubinelli, S., & Introna, V. (2019). The evolution of Project Management (PM): How Agile, Lean and Six Sigma are changing PM. *Journal of Modern Project Management*, 7(3), 162–189. doi:10.19255/JMPM02107.
- [23] Sumant, M., Mistry, J., & Agarwal, P. (2025). Evaluation of critical success factors for successful implementation of Lean Six Sigma in Small and Medium Enterprises (SMEs) in India. *Australian Journal of Mechanical Engineering*, 23(3), 421–446. doi:10.1080/14484846.2024.2332014.
- [24] Lande, M., Shrivastava, R. L., & Seth, D. (2016). Critical success factors for Lean Six Sigma in SMEs (small and medium enterprises). *TQM Journal*, 28(4), 613–635. doi:10.1108/TQM-12-2014-0107.
- [25] Kaya, Y. (2023). Agile Leadership from the Perspective of Dynamic Capabilities and Creating Value. *Sustainability (Switzerland)*, 15(21), 15253. doi:10.3390/su152115253.
- [26] Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of Management Perspectives*, 28(4), 328–352. doi:10.5465/amp.2013.0116.
- [27] PMI. (2025). A guide to the project management body of knowledge (PMBOK® guide) – Eighth edition and the standard for project management. Project Management Institute, Pennsylvania, United States.
- [28] Quick, L. (2023). Six Sigma vs Agile: Major differences and what to choose from? KnowledgeHut, Bengaluru, India. Available online: <https://www.knowledgehut.com/blog/agile/six-sigma-vs-agile> (accessed on January 2026).
- [29] Dong, H., Dacre, N., Baxter, D., & Ceylan, S. (2024). What is Agile Project Management? Developing a New Definition Following a Systematic Literature Review. *Project Management Journal*, 55(6), 668–688. doi:10.1177/87569728241254095.
- [30] Perkin, N. (2023). *Agile transformation: structures, processes and mindsets for the digital age*. Kogan Page Publishers, London, United Kingdom.
- [31] Masood, Z., Hoda, R., & Blincoe, K. (2022). Real World Scrum A Grounded Theory of Variations in Practice. *IEEE Transactions on Software Engineering*, 48(5), 1579–1591. doi:10.1109/TSE.2020.3025317.
- [32] Antony, J. (2011). Six Sigma vs Lean. *International Journal of Productivity and Performance Management*, 60(2), 185–190. doi:10.1108/17410401111101494.
- [33] Székely, B., Késmárki-Gally, S. E., & Lakner, Z. (2025). Hybrid project management: Scoping review. *Project Leadership and Society*, 6, 100182. doi:10.1016/j.plas.2025.100182.
- [34] Reiff, J., & Schlegel, D. (2022). Hybrid project management – a systematic literature review. *International Journal of Information Systems and Project Management*, 10(2), 45–63. doi:10.12821/ijispm100203.

- [35] Sebrek, S. S., Semenova, V., & Kosztyán, Z. T. (2024). Advancing the software development process through the development of technology-enabled dynamic capabilities in a project-based firm: insights from action design research. *Business Process Management Journal*, 30(8), 313–342. doi:10.1108/BPMJ-02-2024-0070.
- [36] Khan, U. A., & Qaiser, M. (2025). Hybrid project management and its effects on project performance. *International Journal of Organization Theory and Behavior*. doi:10.1108/IJOTB-09-2024-0166.
- [37] Magistretti, S., & Trabucchi, D. (2025). Agile-as-a-tool and agile-as-a-culture: a comprehensive review of agile approaches adopting contingency and configuration theories. *Review of Managerial Science*, 19(1), 223–253. doi:10.1007/s11846-024-00745-1.
- [38] Mirzaei, M., Mabin, V. J., & Zwikael, O. (2025). Customising Hybrid project management methodologies. *Production Planning and Control*, 36(9), 1188–1205. doi:10.1080/09537287.2024.2349231.
- [39] Krishnan, S., Mathiyazhagan, K., & Sreedharan, V. R. (2021). Developing a hybrid approach for lean six-sigma project management: A case application in the reamer manufacturing industry. *IEEE Transactions on Engineering Management*, 69(6), 2897–2914. doi:10.1109/TEM.2020.3013695.
- [40] Eisenhardt, K. M., & Martin, J. A. (2008). Dynamic capabilities: What are they? *The SMS Blackwell Handbook of Organizational Capabilities: Emergence, Development, and Change*, 341–363. doi:10.1002/9781405164054.ch21.
- [41] Ferreira, L. S., & Nobre, F. S. (2022). Agile project management under the perspective of dynamic capabilities. *Gestao e Producao*, 29, 3122. doi:10.1590/1806-9649-2022V29E3122.
- [42] Langholf, V., & Wilkens, U. (2021). Agile Project Management, New Leadership Roles and Dynamic Capabilities-Insight from a Case Study Analysis. *Journal of Competences, Strategy & Management*, 11, 1–18.
- [43] Mann, D. (2017). *Creating a Lean Culture: Tools to Sustain Lean Conversions*, third edition. *Creating a Lean Culture: Tools to Sustain Lean Conversions, Third Edition*, 1–356. doi:10.1201/b17563.
- [44] Suvvari, S. K. (2024). The Role of Leadership in Agile Transformation: A Case Study. *Journal of Advanced Management Studies*, 1(2), 31–41. doi:10.36676/jams.v1.i2.12.
- [45] Yin, R. K. (2018). *Case study research and applications: Design and methods*. SAGE Publications, California, United States.
- [46] Turner, R., & Zolin, R. (2012). Forecasting success on large projects: Developing reliable scales to predict multiple perspectives by multiple stakeholders over multiple time frames. *Project Management Journal*, 43(5), 87–99. doi:10.1002/pmj.21289.
- [47] Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott – the elucidation of project success. *International Journal of Managing Projects in Business*, 5(4), 757–775. doi:10.1108/17538371211269040.
- [48] O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324–338. doi:10.5465/amp.2013.0025.
- [49] Harandi, A., & Bagheri, Y. (2025). A systematic review of the ambidexterity strategy in the development of the digital economy. *Journal of Value Creating in Business Management*, 5(1), 471–494.
- [50] Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36(6), 831–850. doi:10.1002/smj.2247.
- [51] Donaldson, L. (2014). *The Contingency Theory of Organizations*. The Contingency Theory of Organizations. SAGE Publications, California, United States. doi:10.4135/9781452229249.
- [52] Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and Integration in Complex Organizations. *Administrative Science Quarterly*, 12(1), 1. doi:10.2307/2391211.