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Project Governance Practices: Influence on the Appropriation and Sustainability of the Values of Infrastructure Projects

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Abstract

Project governance practices play a central role in the performance and success of initiatives, yet their contribution to the appropriation and sustainability of values remains underexplored, particularly in the infrastructure sector. This research, focused on *La Grande Alliance* (LGA) in the Baie-James region, investigates the effectiveness of governance practices through a mixed-methods approach combining semi-structured interviews, evaluation reports, and stakeholder surveys.

The findings highlight the critical role of participative management at every stage of the process. During the definition of values, regular consultation, delegation of responsibilities, transparency, and decentralized leadership foster their appropriation. During the awareness and integration phases, collaborative leadership strengthens stakeholder engagement. Finally, in the monitoring and evaluation phase, ethical and collaborative decision-making ensures not only the appropriation of values but also their sustainability, encompassing aspects such as durability, socio-economic impact, and ecosystem protection.

In conclusion, effective governance practices establish a participatory and coherent structure, enabling stakeholders to appropriate project outcomes while ensuring the long-term benefits of infrastructure initiatives in the region.

Keywords: Project governance, appropriation, sustainability, project values, infrastructure

1. Introduction

In a context where infrastructure projects and programs serve as strategic levers for economic, social, and environmental development, the governance of these initiatives emerges as a crucial determinant of their success and sustainability. Project governance is defined as the set of structures, processes, and mechanisms designed to guide, control, and evaluate undertaken actions, ensuring their alignment with the strategic objectives of organizations and optimizing their added value (Müller et al., 2021).

Existing research has widely demonstrated the importance of robust governance practices in creating value (Bekker, 2019). However, the appropriation of values by stakeholders and their sustainability remain underexplored dimensions, particularly in the context of infrastructure projects. These issues are critical to securing stakeholder buy-in, establishing a transparent and participatory framework, and integrating fundamental values such as sustainability, efficiency, and social responsibility throughout the project lifecycle (Too & Weaver, 2014). In contrast to the traditional view that assumes project values naturally emerge from their technical implementation, more holistic approaches to project management emphasize the importance of active

collaboration among stakeholders, including directly affected communities (Turner et al., 2020).

Nonetheless, the process of value appropriation and sustainability faces organizational, social, and institutional constraints. This underscores the need for optimized governance incorporating key levers such as leadership, risk management, open communication, and stakeholder participation (Kvalnes, 2021). Accordingly, this research aims to provide theoretical, methodological, and managerial insights into the mechanisms through which effective governance can positively influence the appropriation and sustainability of values in sustainable infrastructure projects.

Focusing on a case study of infrastructure initiatives in the Eeyou Istchee Baie-James region of Quebec, within the framework of *La Grande Alliance* (LGA), this research will draw on relevant theoretical frameworks to explore how optimized governance practices enhance the ethical and collaborative dimensions of projects. It will also analyze the impact of these practices on the sustainability of generated benefits, highlighting their importance in a constantly evolving environment.

Ultimately, this study seeks to answer fundamental questions: how do governance practices rooted in collaboration, participation, and ethics foster better value appropriation and increased sustainability in infrastructure projects? Moreover, why is understanding and optimizing governance practices a strategic imperative for ensuring that these projects are sustainably embedded within the socio-economic and environmental fabric, guaranteeing enduring benefits for all stakeholders? These questions are part of a broader perspective aimed at promoting project management approaches focused on long-term sustainability and value creation.

2. Theoretical and Conceptual Framework

2.1 Practices of Project and Program Governance

The governance of projects and programs constitutes a strategic framework essential for ensuring the success of organizational initiatives and their alignment with long-term objectives. The concepts of project and program governance, governance of projects and programs, and governmentality are interdependent in understanding and creating value within projects (Bekker, 2014).

Project and program governance focuses on the internal control of individual projects, emphasizing the flexible and tailored application of tools, techniques, and responsibilities (Bekker, 2015; Foi, 2021). In contrast, the governance of projects and programs transcends individual initiatives by addressing the selection, coordination, and control of project portfolios through strategic management mechanisms adapted to national and organizational contexts (T. Lappi & Aaltonen, 2017; Riis et al., 2019). Governmentality, meanwhile, addresses the intangible dimensions of management, focusing on the governance of attitudes, perceptions, values, and stakeholder cultures to maximize adherence and the sustainability of project outcomes (Badewi & Shehab, 2016).

Governance relies on a coherent structure that defines the roles, responsibilities, and interactions among stakeholders, ensuring ethical, transparent, and consistent decision-making processes. Researchers such as Lappi and Aaltonen (2017) and Riis et al. (2019) distinguish two facets of project governance: an external dimension, examining the relationship between the project and its organizational environment, and an internal dimension, focusing on the specific management of projects. These facets enable an analysis of the interdependencies between strategic initiatives and their operational implementation.

This research adopts a holistic definition of project and program governance, viewing it as an integrated and ethical management system designed to guide, coordinate, and control projects strategically (Renz, 2016). Effective governance practices not only ensure optimal resource allocation but also foster enhanced collaboration among stakeholders, which is crucial for maximizing the creation and sustainability of organizational value (Beringer, Jonas, & Kock, 2013; Mignenan, 2023a, 2023b).

A well-established governance structure clarifies interdependencies between roles and responsibilities before project initiation, thereby reducing cognitive conflicts and enhancing team cohesion (Ahola et al., 2013). Consequently, project and program governance emerges as a critical strategic lever for improving management practices, increasing organizational value, and ensuring the sustainability of results (Mignenan, 2023).

Project governance is built on key components, including steering structures, integrated methodologies (Agile, PRINCE2, PMBOK), standards and policies, risk management, monitoring and reporting, as well as communication and stakeholder engagement. Together, these elements ensure structured and collaborative management, enhancing the capacity of projects to effectively meet stakeholder expectations.

2.2 Appropriation of Project and Program Values

The appropriation of values is a central concern in ensuring the durability, strategic coherence, and positive impact of projects and programs. It refers to the process by which stakeholders—including project team members, leaders, partners, and beneficiaries—adopt, integrate, and embody the fundamental values conveyed by a project or program. These values often encompass principles such as sustainability, innovation, ethics, collaboration, and social responsibility.

This process of value appropriation is multidimensional and rests on three primary axes: cognitive adoption, which reflects stakeholders' understanding and commitment to the defined values; behavioral adoption, which translates values into daily practices and strategic decisions; and cultural adoption, which transforms values into intrinsic elements of the organizational culture, influencing long-term attitudes and behaviors.

The appropriation of values is fundamental for strategic alignment, ensuring that all initiatives are consistent with the organization's overarching vision. It strengthens stakeholder engagement, motivation, and resilience in the face of challenges. Moreover, it guarantees the sustainability of projects by preserving fundamental principles beyond their operational phase and improves the management of stakeholder relationships, thereby reducing conflicts and increasing collective satisfaction.

Several factors stemming from governance practices influence this process, including exemplary leadership, transparent communication, continuous training, recognition of behaviors aligned with values, and a favorable organizational culture. These elements enable the seamless integration of values into daily actions, enhancing their relevance and longevity.

The process of value appropriation unfolds through several key stages: the definition of values, stakeholder awareness, their integration into organizational processes, monitoring and evaluation, and continuous improvement. These stages transform abstract principles into tangible and sustainable realities, ensuring a lasting impact on projects, stakeholders, and beneficiary communities.

Figure 1, developed for synthesis purposes, illustrates the process of value appropriation in projects.

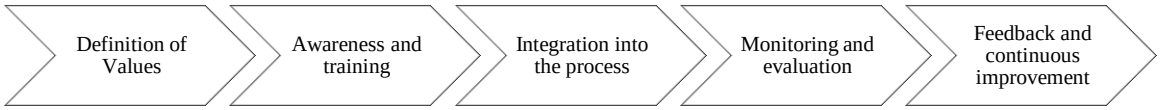


Figure 1. process of appropriation of the values of projects and programs

Spring. Compilation of literature, authors 2024

Project governance practices are applied at every stage of the process, from defining values to ensuring their sustainability. In the context of complex projects, the literature highlights several approaches to fostering value appropriation. These methods include co-creation workshops that actively engage stakeholders in defining and constructing values, thereby strengthening their commitment. The use of storytelling and narratives concretely demonstrates how values translate into tangible actions and positive outcomes. Furthermore, integrating values into human resource policies, such as performance evaluations and recognition programs, aligns organizational behaviors with strategic objectives. Lastly, participatory leadership that values team contributions promotes collective adoption of values.

The values generated by projects and programs manifest as financial, socio-economic, or strategic benefits, thereby justifying investments. These values, whether quantifiable or qualitative, bridge the gap between current capacities and future organizational ambitions (Badewi & Shehab, 2016; Bekker, 2014). However, their appropriation relies on a dynamic process through which stakeholders fully integrate these benefits, transforming them into actionable opportunities.

Value appropriation is a cornerstone of effective governance. It ensures that fundamental principles do not remain theoretical but are adopted, internalized, and translated into concrete actions by all stakeholders. This dynamic enhances strategic alignment, team engagement, and project sustainability. Achieving this requires clear communication, inspiring leadership, and an organizational culture focused on responsibility and sustainability. Thus, value appropriation extends beyond initial adoption to continuous integration within organizational processes, ensuring their relevance and impact.

Concurrently, the sustainability of values in infrastructure projects and programs constitutes a critical dimension of governance. It aims to ensure the continuity of defined principles beyond the implementation phase by

embedding them into organizational culture and operational practices (Willumsen et al., 2019). This sustainability extends not only to the initial stages of planning and construction but also to the operation, maintenance, and future evolution of infrastructures. It ensures that values such as sustainability, innovation, and social responsibility continue to guide strategic decisions.

Sustainability strategies are built on durable governance structures, exemplary leadership, and consistent operational practices. For instance, the development of specific standards and protocols, combined with feedback mechanisms and continuous improvement, reinforces the integration of values into daily activities. Additionally, stakeholder engagement, supported by transparent communication and active participation, helps maintain a shared sense of responsibility and ownership. Finally, the use of advanced technologies such as big data and artificial intelligence enables organizations to anticipate future needs and adjust practices accordingly.

The sustainability of values not only ensures the durability of projects but also enhances their resilience in the face of technological, environmental, and social changes. By maintaining coherence between strategic objectives and operations, projects become long-term drivers of socio-economic and environmental development. Consequently, investing in sustainability strategies is imperative for organizations aiming to maximize project performance while addressing the demands of an ever-changing environment. This discussion paves the way for a deeper theoretical analysis and the proposition of a conceptual model, which are explored in the subsequent sections of this work.

3. Theoretical Framework and Conceptual Model

3.1 Description of Stakeholder Theory and Institutional Theory

Stakeholder theory in project governance (Bonnafous-Boucher et al., 2016; Bridoux & Stoelhorst, 2022; Miles, 2017) emphasizes the necessity of addressing the interests, expectations, and concerns of all entities involved in or affected by a project. These stakeholders include, but are not limited to, sponsors, project team members, clients, suppliers, regulators, and surrounding communities. According to this theory, project success is not confined to the attainment of internal objectives but also depends on the ability to engage, satisfy, and address the expectations of stakeholders throughout the project lifecycle. In project governance, this entails adopting integrated management mechanisms that incorporate these needs into decision-making processes, risk management, and strategic adjustments. Such a collaborative approach minimizes potential conflicts, strengthens project legitimacy and acceptance, and ensures sustainable value creation for all actors involved.

Simultaneously, institutional theory (Keohane & Martin, 2014; Peters, 2022) investigates how norms, rules, values, and institutional pressures shape the behaviors and decisions of actors involved in project management. From this perspective, projects are not solely driven by technical considerations or internal goals but are also influenced by external pressures, such as regulations, societal expectations, and professional standards. Project governance, through this lens, underscores the importance of legitimizing management practices by adopting processes that conform to institutional standards, whether through certifications, regulatory compliance, or recognized industry models. This institutional legitimacy not only bolsters the sustainability of projects but also ensures their access to critical resources and alignment with environmental expectations.

The inherent complexity of project and program governance (Badewi, 2016; Bekker, 2014) suggests that no single theoretical perspective can fully capture the mechanisms at play. The choice of governance structures, therefore, hinges on the institutional context, stakeholder expectations, and the nature and scope of the project. A deeper understanding of governance emerges at the intersection of multiple theories, notably stakeholder theory and institutional theory, which respectively highlight the importance of incorporating legitimate actors' expectations and conforming to institutional environments.

In this research, these two theories are particularly relevant for analyzing governance practices in the context of infrastructure projects and programs undertaken in the Baie-James region. These projects, characterized by their scale and strategic importance, require governance that is both inclusive and aligned with institutional frameworks. Accordingly, our conceptual model is based on the hypothesis that the appropriation and sustainability of project values are directly contingent on the effectiveness of governance practices. These practices, through their three fundamental components—participation, collaboration, and ethical decision-making—are expected to enhance value appropriation and bolster its sustainability. Stakeholder and institutional theories provide the explanatory foundation for this conceptual link, which is illustrated in the framework outlined in Figure 2

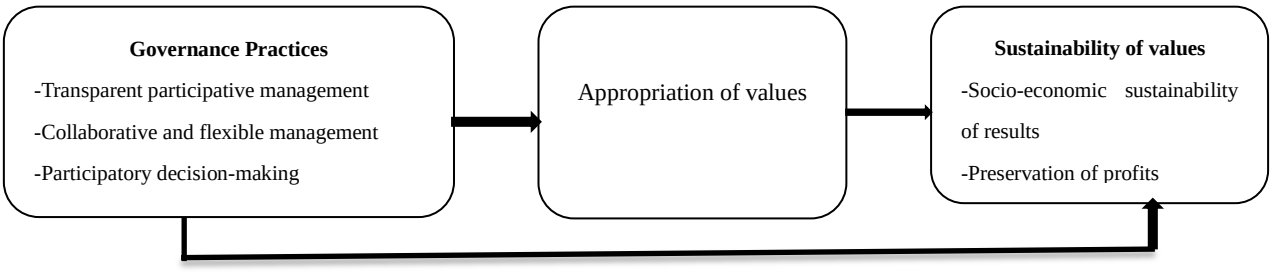


Figure 2. Project Value Governance Model, Authors January 2024

Spring. Compilation of Literature, Authors 2024

3.2 Development of Hypotheses

Hypothesis 1 (H1). Participative management (H1a) and collaborative management (Ha2) promote the appropriation of project values by stakeholders.

Hypothesis 2 (H2). Ethical and participatory decision-making contributes positively to the appropriation of values (H2a) and increases the sustainability of project values (H2b).

Hypothesis 3 (H3). Appropriation of project values increases the sustainability of results (H3a) and promotes the preservation of benefits (H3b).

For the purposes of synthesis, Figure 3 is developed.

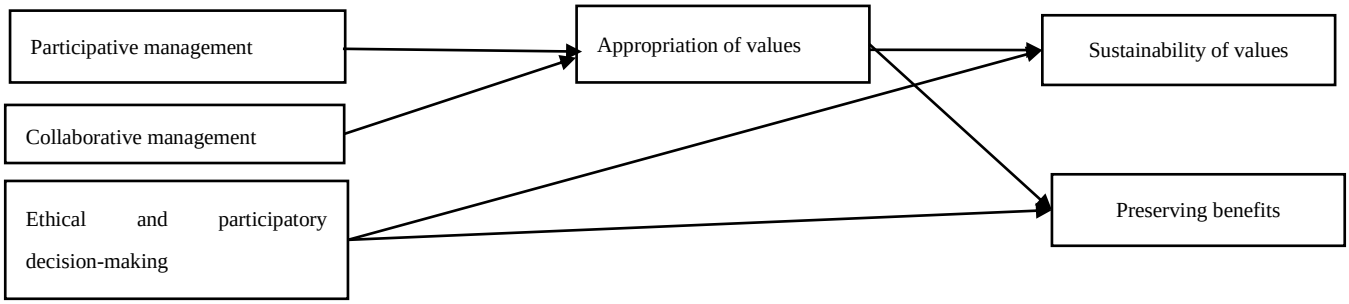


Figure 3. Framework of hypotheses.

Spring. Compilation of literature, authors 2024

4. Methodological Approach

To gather the data necessary for this research, we employed a mixed methodological approach, justified by the complexity and multidimensional nature of the constructs under study: governance practices, value appropriation, and value sustainability. By simultaneously mobilizing exploratory qualitative and explanatory quantitative perspectives (Creswell, 2013), this mixed approach facilitates both an in-depth understanding and empirical validation of the phenomena investigated. The first step consisted of a rigorous documentary review to structure the conceptual framework and identify the relevant instruments for data collection.

4.1 Sample Size, Data Collection, and Descriptive Analysis of the Sample

4.1.1 Sample Size

The determination of the sample size was guided by the methodological recommendations of Igalens and Roussel (1998), who advocate for a sample size proportional to the number of items used to measure the constructs, ranging from five to ten units per item. In this study, 18 items were defined to evaluate the three primary constructs. Applying this rule, the ideal sample size ranged from 90 to 180 units. A sample of 180 participants was selected, representing direct beneficiaries of the values generated by the infrastructure projects and programs. This sample was designed to reflect the diversity of stakeholders involved.

4.1.2 Data Collection Instruments

The data collection instruments included a semi-structured interview guide and a structured questionnaire, designed following the funnel method to ensure a logical and engaging progression for respondents. These tools

were pre-tested with a pilot sample of five leaders involved in La Grande Alliance (LGA) infrastructure projects. This pilot group included project managers, academic experts in leadership and social entrepreneurship, human resource management consultants, and representatives from associations recognized for their success in social entrepreneurship. The pre-test facilitated adjustments to ensure the clarity and relevance of the questions.

To measure the three components of governance practices deployed in LGA's infrastructure projects, we adhered to the methodological recommendations of Russell and Stone (2002) and Sendjaya, Sarros, and Santora (2008). A five-point frequency scale, ranging from "never" to "very regularly," was used to assess the frequency of communication tools and governance mechanisms. Value appropriation was evaluated using an adapted version of Becker's scale, focusing on three dimensions: integration, application, and strategic and organizational use of values. Finally, value sustainability was measured using three key indicators: durability, viability, and the persistence of values over time.

The comprehensive list of items used in this study is detailed in Table 1, providing a clear and concise overview of the dimensions explored and the indicators employed. This rigorous methodological approach ensures the reliability and validity of the collected data, while enabling robust interpretation of the results obtained.

Table 1. Indices of Reliability and Convergent Validity of the Measures

	Constructs and indicators	**Factor contributions**	**Alpa de Cronbach**	**Reliability index**
Governance Practices				
(PraGouv.1) Participative management		,83	,79	,78
(PraGouv.2) Collaborative management		,80		
(PraGouv.3) Ethical decision-making		,76		
Appropriation of Values (ApVa)				
(ApVa.1) Cognitive Adoption		.73	.88	.798
(ApVa.2) Cultural Adoption		.86		
(ApVa.3) Social and Organizational Adoption		,83		
Sustainability of values (PerVa)				
(PerVa.1) Integration into governance		.73	.76	.79
(PerVa.2) Integration into the organizational culture		.86		
(PerVa.3) Process Integration and Operational Practices		,83 ,84		
Sustainability of values				
(DurVal.1) Adoption of values by the organization		,86	**74**	**72**
(DurVal.2) Modeling values through leadership		,83		
(DurVal.3) Continuous dissemination of values		- -		
Perseverance of values				
(PersVal.1) Active Stakeholder Engagement		,88	,86	,87
(PersVal.2) Integration of values in the Organization		,90		
(PersVal.3) Ongoing Monitoring and Evaluation		,83		
(Tran.4) Transparent and Regular Communication		,87		

5. Research Results

5.1 Overview of La Grande Alliance (LGA) and Sustainable Infrastructure Projects

La Grande Alliance (LGA) represents a strategic and collaborative initiative between the Cree Nation and the Government of Québec, designed to promote balanced, sustainable development that respects the unique cultural

and environmental characteristics of Northern Québec. Built upon an inclusive and structured governance framework, LGA facilitates a participatory and integrative approach to addressing the socio-economic and environmental aspirations of Cree communities while meeting the expectations of governmental stakeholders.

1. The Grande Alliance: Components and Objectives

LGA is structured around four major pillars: transportation infrastructure, communication programs, electricity initiatives, and environmental protection projects. These components embody a holistic vision of sustainable development that integrates economic, social, and environmental goals. LGA's primary objectives include fostering environmentally conscious economic growth, preserving Cree cultural traditions, and improving essential infrastructure to enhance the quality of life for local populations. The initiative focuses on strategic areas such as education, healthcare, hydroelectric power, and natural resource management, thereby ensuring a comprehensive approach to regional development.

2. Structured and Inclusive Governance

LGA's governance is organized into three interconnected levels: the Steering Council, Operational Committees, and the Internal Coordination Office. The Steering Council plays a pivotal role in setting strategic directions and overseeing project implementation. Operational Committees specialize in targeted areas, including environmental management, economic development, cultural preservation, and financial oversight. The Internal Coordination Office facilitates communication, administrative management, and project monitoring.

Decision-making processes are participatory and consensus-driven, ensuring robust consultation and engagement with local communities. Mechanisms for mediation and arbitration address potential disputes, while digital platforms and transparent reporting ensure seamless communication and accessible information for all stakeholders.

3. Impact of LGA on the Values of Infrastructure Projects

Projects initiated under LGA demonstrate a strong capacity to integrate and sustain core values such as sustainability, social responsibility, and environmental stewardship. By involving the Cree Nation from the early planning stages, LGA ensures cultural and local ownership of the projects, aligning their objectives with the aspirations of the communities. Moreover, LGA's collaborative governance structure facilitates the long-term sustainability of these values, ensuring they are upheld throughout the lifecycle of the projects.

4. Challenges and Solutions

Despite its successes, LGA faces significant challenges, including cultural divergences between traditional Cree practices and Western management approaches, as well as the dual necessity of adhering to strict environmental standards while addressing pressing economic needs. These challenges are mitigated through ongoing dialogue, the integration of traditional knowledge into decision-making processes, and the development of flexible governance frameworks capable of adapting to changing contexts.

In conclusion, La Grande Alliance exemplifies an innovative and sustainable collaboration model, demonstrating that inclusive and structured governance practices not only facilitate the appropriation of infrastructure project values by local communities but also ensure their long-term sustainability. By integrating cultural, social, and environmental dimensions into every phase of the projects, LGA stands as a landmark example of harmonious development in complex, multicultural contexts.

By way of summaries, the table 2 below summarises the level of commitment of the different communities.

Table 2. commitment of the different communities.

	General Meetings and Public Meetings	Focus Groups	Interviews with Land Users	Number of Traplines
Regional entities	33	11	4	N/A
Whapmagoostui	7	6	17	13
Chisasibi	12	4	37	23
Wemindji	3	1	22	8
Eastmain	3	3	15	4
Waskaganish	5	2	26	8
Nemaska	1	1	28	12
Waswanipi	1	0	3	3
Ouj é-Bougoumou	3	0	8	4
Mistissini	3	2	66	19
Association Eeyou Washaw Sibi	2	1	9	4
Total	73 general meetings (50 to 150 participants each)	31 focus groups (typically 8 to 15 participants each)	235 interviews (2 to 3 participants each)	98 traplines included

Spring. Cree Development Corporation, Communication Report (2024), p.12

5.2 Qualitative Outcomes

On a qualitative level, we highlighted the full reports initially generated. Table 3 presents a portrait of these reports.

Table 3. Full Proceedings

Variables tested	***Full Proceedings***
Participative management	- *Regular consultation with employees: We solicited the opinions and ideas of team members before making important decisions.* - *Delegation of responsibilities: we give employees more autonomy and power in the management of their tasks and projects.* - *Open communication: We promote a culture of transparency and dialogue, where information flows freely and everyone can express themselves.* - *Community Engagement: We encourage all associates, regardless of their skill level, to speak up and contribute to strategic and operational decisions*. - *Team cohesion: We have created an environment where cooperation and synergy between team members are prioritized.* - *Decentralized leadership: We have reduced the centralization of power and allowed each team member to play an active and autonomous role in project management or problem solving.* - *Transparency: We have fostered clear and transparent communication to ensure that information flows freely within the organization.* - *Trust and autonomy: We have given the different members of the community the freedom to act and take initiatives, while establishing a climate of mutual trust.*
Collaborative management	- *Co-construction of decisions: Decisions are made in consultation with team members, with each participant having the opportunity to contribute ideas and contribute to the strategic direction of the project.* - *Transparency and information sharing: A smooth flow of information ensures that all stakeholders have the necessary elements to actively participate in management.* - *Shared responsibility: Each member of the team or organization takes on a share of the responsibility, strengthening the collective commitment to common goals.* - *Flexibility and adaptation: Collaborative management allows for increased responsiveness, thanks to the collective ability to quickly adjust actions according to feedback or changes in context.*
Ethical decision-making	- *Consequence assessment: Analyze the impact of each decision on all stakeholders (employees, customers, society, environment) to minimize negative effects.* - *Respect for moral values: Integrate values such as honesty, fairness, transparency, and respect for human rights into the decision-making process.* - *Compliance with ethical standards: Adherence to the ethical principles specific to the profession or organization, while considering social expectations.* - *Consideration of moral dilemmas: Identify and manage situations where there are conflicts of values or decisions that are difficult to make ethically.*

Sustainability and persistence of projects	*Participative management has promoted the **motivation** and **commitment** of community members to the appropriation of values by integrating these values into organizational processes.* *Collaborative management has contributed to the appropriation of the jobs created and the preservation of road, communication, protection, and electricity infrastructures.* *Ethical decision-making builds **the trust** and **reputation** of community members, while ensuring the viability and perseverance of infrastructure project values.*

Source: Excerpt from interview results, author, 2024

On the correlational front, we analyzed the statistical parameters of mean and standard deviation (S.D.), which provide insights into stakeholder perceptions regarding the governance practices of the studied infrastructure projects and programs. The results, summarized in Table 3, reveal that stakeholders view participatory management, collaborative steering, and ethical decision-making as essential drivers for the construction, appropriation, and sustainability of values in sustainable infrastructure projects. These dimensions are deemed pivotal, spanning from the definition phase to the feedback and continuous improvement stages.

Specifically, respondents highlighted those practices implemented by LGA, such as regular consultations, delegation of responsibility, open communication, and shared accountability, achieved a high mean score of 4.9 out of 5 (S.D. = 1.83). The appropriation and sustainability of values appear to be initiated as early as the definition phase, supported by co-decision-making, transparency, and flexibility, which scored a mean of 4.5 out of 5 (S.D. = 1.75). Additionally, practices focusing on consequence evaluation, adherence to ethical standards, and addressing moral dilemmas were rated slightly lower, with a mean of 3.8 out of 5 (S.D. = 1.65).

Despite these predominantly positive findings, interviews revealed some divergences, particularly among younger community members, who expressed a heightened interest in better understanding and engaging with LGA's initiatives. However, these respondents acknowledged the significant efforts made by LGA in strategic areas such as training, communication, environmental protection, and electrical infrastructure, identifying them as priorities to further strengthen in the regional development process.

Table 4 also highlights significant correlations between the variables studied. Participatory management exhibits the strongest correlation with value appropriation ($r = 0.89$, $p < 0.01$), followed by collaborative steering ($r = 0.81$, $p < 0.01$), and ethical decision-making ($r = 0.74$, $p < 0.01$). These findings are corroborated by qualitative analyses derived from semi-structured interviews, which align with the research hypotheses, affirming the critical role of these practices in enhancing the appropriation and sustainability of values in sustainable infrastructure projects.

Table 4. Means, standard deviations and correlations between variables

Variables	**Medium (S.T)**	Participative management	Collaborative management	Ethical decision-making
Participative management	4,9 (1,83)	1		
Collaborative management	4,5 (1,75)	0,89**	1	
Ethical decision-making	3,8 (1,65)	0,81**	0,74**	1

**p < ,01

Source: IMB SPSS 24 analysis., (authors, 2024)

In conclusion, it is essential to recognize that every actor involved in a sustainable infrastructure project, through effective and continuous investment in the improvement of management practices throughout the various stages of value appropriation and sustainability processes, can decisively contribute to the adoption and durability of these values. From the definition of values to their evaluation and continuous integration, rigorous and adaptive practices are imperative to ensure the success of initiatives and their lasting impact.

To test the four hypotheses of our study, we employed a stepwise regression method, preceded by a qualitative analysis based on comprehensive reports. This methodology enables the assessment of each explanatory variable's unique contribution to the increase in the model's coefficient of determination R^2(Alain, 2004). Data analysis was conducted using SPSS 24.0, and the results, synthesized in Table 4, support our research hypotheses.

Reliability and validity of measures

To ensure the reliability and validity of the measures, we utilized SPSS 24 and AMOS software. An exploratory factor analysis was conducted to eliminate items with communalities below 0.5 or factorial contributions spread

across multiple axes, with values of at least 0.3 on a secondary axis. The final factorial structure exhibited a satisfactory Kaiser-Meyer-Olkin (KMO) index of 0.76 and a highly significant Bartlett's sphericity test ($p < 0.001$). This structure explained 74.71% of the total variance, demonstrating substantial robustness of the measurement scales used.

The factorial contributions of all items exceeded the expected threshold of 0.71, while Cronbach's alpha coefficients and reliability indices obtained during confirmatory factor analysis ranged between 0.72 and 0.91. These results, detailed in Table 2, confirm the internal consistency of the scales and their suitability for evaluating the studied concepts.

Convergent validity was also established, with an Average Variance Extracted (AVE) above the recommended threshold of 0.50 for most scales (Bagozzi & Yi, 1988). Although the value persistence scale presented a slightly lower AVE (AVE = 0.49), its Maximum Shared Variance (MSV) and Average Shared Variance (ASV) indicators were lower than the AVE, thereby ensuring its discriminant validity (Fornell & Larcker, 1981). These findings underscore the psychometric robustness of the model, enabling reliable interpretation of structural relationships.

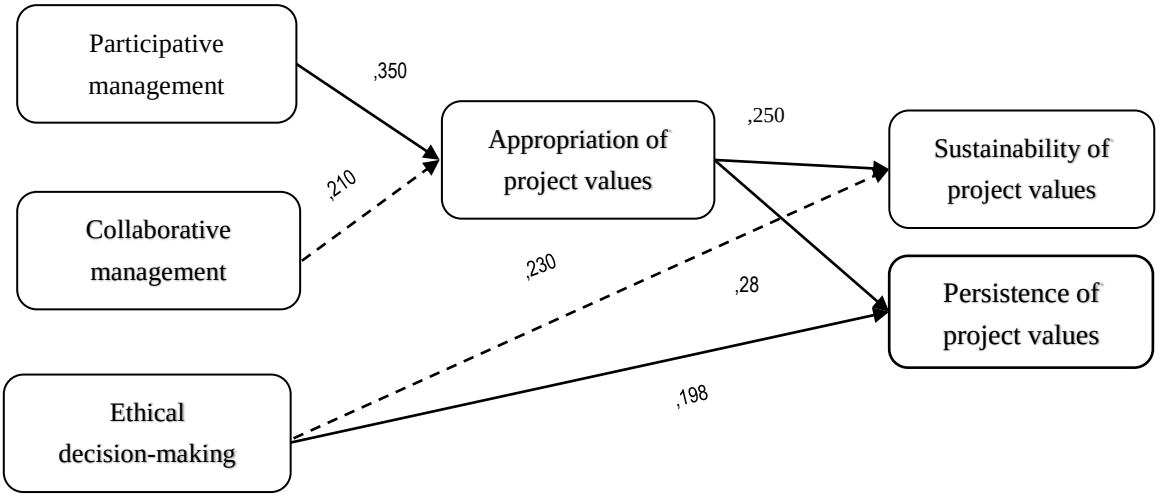
Implications of the Results

The results in Table 4 reveal strong and significant correlations between governance practices and value appropriation. Participatory management exhibited an exceptionally high correlation ($r = 0.89$, $p < 0.01$), followed by collaborative steering ($r = 0.81$, $p < 0.01$) and ethical decision-making ($r = 0.74$, $p < 0.01$). These relationships align with qualitative data from semi-structured interviews, further validating the relevance of the research hypotheses.

These findings highlight the crucial role of governance practices in the construction, appropriation, and sustainability of values in sustainable infrastructure projects. They also underscore the necessity of strategic investment in rigorous management practices to maximize the positive outcomes of initiatives for communities and stakeholders. This evidence affirms the pivotal importance of governance as a cornerstone for achieving sustainable development goals and fostering long-term socio-economic and environmental benefits.

Table 5. Convergence validity *and discriminant validity*

	AVE	MSV	ASV	1	2	3	4	5	6
1. Participative management	,69	,08	,035	,83					
2. Collaborative management	,59	,26	,109	,12					
3. Ethical decision-making	,55	,23	,108	-,164	,74				
4. Appropriation of project values	,54	,23	,134	,05	,48	,74			
5. Sustainability of project values	,65	,19	,118	,19	,38	,43	,700	,79	
6. Persistence of project values	,49	,11	,081	,27	,17	,34	,33	,80	,87



Conversely, hypotheses H3a and H3b, which establish a relationship between value appropriation and the two dimensions of governance practices, are both validated (H3a: $\beta=0.250^{**}$; $p<0.01$ and H3b: $\beta=0.188^{*}$; $p<0.05$).

These findings confirm that the appropriation of project values acts as a critical mediator between governance practices and the sustainability of values. Mediation tests, including the Sobel test, substantiate this relationship for both the durability of values (critical ratio: 2.295*; p=0.022) and their persistence (critical ratio: 2.022*; p=0.043). These analyses highlight that the governance practices implemented by LGA significantly enhance the level of value appropriation among stakeholders, which, in turn, fosters the long-term sustainability of these values.

These findings bear significant theoretical and practical implications. From a theoretical perspective, they underscore the relevance of the conceptual frameworks mobilized in this study, particularly stakeholder theory and institutional theory. These theories posit that the legitimacy and effectiveness of projects largely depend on organizations' ability to actively engage stakeholders and integrate practices that align with institutional norms. Our results reveal that value appropriation is a central mechanism through which these objectives can be realized.

On a practical level, these conclusions suggest that governance practices oriented towards participation, transparency, and ethics play a pivotal role in the sustainability of infrastructure projects. They underscore the necessity for LGA to continue its efforts in stakeholder engagement and the establishment of collaborative processes, ensuring that the values initially defined in projects are not only adopted but also durably integrated into organizational practices and local communities.

These findings also open avenues for strategic project management. They highlight the importance of proactive and adaptable governance capable of aligning with stakeholder expectations while meeting institutional requirements. By optimizing governance practices, LGA could not only enhance the sustainability of its projects but also maximize their long-term socio-economic and environmental impact.

Based on these conclusions, the following discussion will illuminate the theoretical, methodological, and managerial implications of the results obtained. It will also explore the limitations and future research directions to deepen the understanding of these complex dynamics.

6. Discussion

This article provides an in-depth examination of the effectiveness of governance practices in projects and programs, focusing specifically on their role in the appropriation and sustainability of values in infrastructure projects, particularly within the framework of La Grande Alliance (LGA). Using a conceptual model, the study analyzes the influence of participatory management, ethical decision-making, and collaborative steering on these processes. Structural equation modeling, supported by qualitative and quantitative data, reveals that governance practices exert an indirect influence on the sustainability of values through their appropriation. More directly, participatory management, collaborative steering, and ethical decision-making significantly impact the appropriation of values, thereby contributing to their sustainability.

These findings align with stakeholder theory, which posits that inclusive governance fosters greater legitimacy and acceptance of projects while creating sustainable value for all involved stakeholders. Additionally, institutional theory supports these conclusions, emphasizing that governance practices are shaped by external pressures such as regulations and social expectations. In the context of LGA, governance aligns seamlessly with these institutional principles, incorporating processes that legitimize actions, such as certifications and regulatory compliance.

Implications for Research

First, this study stands out by addressing large-scale projects like those of LGA, which are often overlooked in literature focused primarily on small-scale projects or programs. The findings highlight the critical importance of participatory management, collaborative steering, and ethical decision-making in the creation, appropriation, and sustainability of infrastructure project values. These contributions pave the way for future research exploring these dimensions in other regional and cultural contexts.

Second, the study underscores the centrality of value appropriation in the effectiveness of governance practices. Unlike prior research, which has often relied on qualitative or exploratory approaches, the quantitative methodology employed here enables a more robust analysis. The works of Bridoux and Stoelhorst (2022) and Keohane and Martin (2014) find empirical validation in the context of LGA's large-scale, complex projects, demonstrating that governance can enhance value appropriation while adhering to institutional standards.

Third, this research contributes to the theoretical distinction between value appropriation, durability, and persistence. This differentiation enriches existing theories by demonstrating that while appropriation is a necessary condition for value durability, it is not sufficient on its own. These findings also reinforce

recommendations for future models that integrate these distinctions and explore the complex interactions between governance practices and project outcomes.

Implications for Policymakers and LGA Stakeholders

For policymakers and LGA stakeholders, this study underscores the importance of robust governance to ensure effective value appropriation and sustainability. The findings provide actionable insights for designing governance training programs tailored to the specific needs of local communities and stakeholders. In particular, integrating inclusive practices, such as collaborative steering, could enhance project legitimacy while fostering greater appropriation of results by local actors.

Moreover, the study suggests practical pathways for improving project governance in complex and multicultural environments like the Baie-James region. For instance, adopting transformational leadership combined with participatory and collaborative mechanisms could not only address community expectations but also create environments conducive to social innovation and sustainable development. This approach could further encourage the design of new capacity-building projects, thereby amplifying the impact of LGA initiatives.

In summary, the findings demonstrate that optimized governance practices promote stronger value appropriation while ensuring their sustainability. These practices provide public decision-makers and LGA leaders with a solid foundation for developing strategies that maximize long-term benefits for all stakeholders, while aligning project objectives with ethical and institutional standards.

7. Limitations and Future Research Directions

The specificities of the projects undertaken by La Grande Alliance (LGA), particularly their scale and governance structure, represent both methodological limitations and opportunities for future research. Focusing exclusively on transport projects characterized by complex challenges and significant resource mobilization restricts the generalizability of the findings to other LGA initiatives. This limitation raises critical questions for future research: to what extent can governance practices enable LGA and its beneficiaries to generate and appropriate sustainable values? Is the orientation toward collaborative steering and ethical decision-making universally effective across all stakeholders, including local communities?

The relationship between ethical decision-making and value sustainability also warrants deeper exploration, particularly regarding its differentiated impact on local communities and the managing entities of the projects. Future studies could investigate the capacities of local communities to appropriate these values and address potential disparities in capacity-building compared to government actors or project leaders. Moreover, the attitudes of community leaders, their leadership styles—whether authentic or transformational—and their roles in value appropriation and sustainability represent promising avenues for inquiry.

Another research trajectory could involve a systematic comparison between LGA projects and those of the Plan Nord, focusing on how governance structures and practices influence outcomes and social dynamics differently. Such comparisons could reveal whether current governance structures are universally applicable or require specific adjustments for each type of initiative. These investigations could also inform the refinement of practices and the development of tailored recommendations to maximize project impact.

A further limitation lies in the focus on governance practices at the expense of an in-depth exploration of management practices and the resilience of values. Incorporating these dimensions in future studies could unveil novel strategic mechanisms, particularly regarding the influence of managers on value persistence. Additionally, the role of young people in the Baie-James region in the appropriation and sustainability of project values—such as those related to environmental protection, communication infrastructure, or energy initiatives—represents a promising line of research. These youth could serve as critical agents of social transformation by integrating, constructing, and adapting project values to enhance their resilience within local contexts.

Lastly, it would be ambitious and highly relevant to extend this research to other regions, such as Saguenay and Lac-Saint-Jean, to conduct empirical comparisons. Such comparative studies could foster a scientific consensus on the influence of governance practices on the appropriation and sustainability of values in sustainable infrastructure projects, while also broadening the theoretical and practical implications of the findings across diverse contexts.

8. Conclusion

Our findings demonstrate that governance practices in the management of infrastructure projects and programs are not merely mechanisms for ensuring execution but serve as strategic levers for success, value appropriation by stakeholders, and long-term sustainability. A well-structured and optimized governance framework enables

the effective alignment of project objectives with organizational priorities, enhancing the coherence and impact of the actions undertaken.

This study underscores that robust governance structures, such as inclusive steering committees and transparent decision-making processes, not only foster shared responsibility but also build trust and commitment among stakeholders. The transparency achieved through these mechanisms acts as a catalyst for effective communication, a critical component in the appropriation of project values. Furthermore, creating a participatory framework that emphasizes collaboration, delegation, and decentralized leadership strengthens the engagement of beneficiary communities and other stakeholders.

Significantly, our research highlights the role of participatory management, ethical decision-making, and collaborative leadership in reinforcing fundamental project values such as sustainability, innovation, and social responsibility. These practices cultivate an organizational culture that supports not only the achievement of immediate objectives but also the durable and resilient transformation of projects over time. They underline the importance of continuous training, tailored evaluation and recognition mechanisms, and the integration of advanced technologies to optimize project management and communication.

The findings drawn from La Grande Alliance (LGA), particularly in the Eeyou Istchee Baie-James region of Quebec, illustrate these dynamics concretely. The sustainable infrastructures resulting from this initiative highlight the critical role of effective governance in transforming complex projects into resilient initiatives aligned with the socio-economic and environmental aspirations of stakeholders. These observations confirm that projects and programs underpinned by solid governance are better positioned to generate continuous added value while ensuring sustained adherence to defined principles.

However, implementing and maintaining effective governance practices requires ongoing commitment, adaptability to change, and substantial investment in developing leadership and project management capabilities. Flexible methodologies, coupled with a culture of continuous improvement and a proactive approach to stakeholder management, are essential for preserving the relevance and efficacy of governance structures.

Optimizing governance practices thus emerges as a strategic imperative to ensure that infrastructure projects not only meet their initial objectives but also integrate sustainably into the socio-economic and environmental landscape. Strong governance is the cornerstone of sustainable project success, driving harmonious growth, enhanced competitiveness, and the establishment of a future where fundamental values of sustainability and social responsibility are not merely preserved but amplified.

To maximize this impact, organizations must commit to innovative and adaptive strategies, thereby enhancing their ability to navigate the complex challenges of contemporary environments and ensuring that infrastructure projects become enduring pillars of progress and value creation.

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Authors' contributions

Dr. Victor Mignenan and Dr. Moussa Mahamat were responsible for the design and methodological oversight of the study. They also coordinated data collection, working closely with Éric Bayok. Dr. Victor Mignenan drafted the initial manuscript, while Dr. Serge Monglengar Nadingar conducted a critical review. All authors have read and approved the final version of the manuscript. Additionally, Dr. Victor Mignenan and Dr. Serge Monglengar Nadingar made significant and pivotal contributions to the execution of this study.

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The authors declare that they have no competing financial interests or personal relationships that could have influenced the work presented in this article.

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Obtained.

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No additional data are available.

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