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Understanding and Managing Risk in Complex Construction Projects

A Study through the Lens of Institutional Logics

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Abstract

This thesis explores how project professionals understand and manage risk in large and complex construction projects, with a focus on how these practices are shaped by institutional logics. While traditional risk management approaches emphasize structured, calculable processes aimed at minimizing cost, time, and scope deviations, this study adopts a more situated perspective, highlighting how risk is interpreted and negotiated in practice. Drawing on twenty semi-structured interviews with professionals across public and private construction projects in Sweden, the study identifies three dominant institutional logics, market, state, and professional, each offering a distinct framing of risk. The findings show that these logics coexist and often compete, creating institutional complexity that shapes both how risks are understood and how they are managed. Risk emerges not only as a technical or financial concern but also as a context-dependent and interpretive concept, influenced by organizational roles, project conditions, and normative expectations. The study contributes to a deeper understanding of how formal risk frameworks are adapted in practice, and how institutional environments structure the possibilities and limitations of risk work in complex project settings.

Key Words: *Risk Management · Institutional Logics · Construction Projects · Uncertainty · Institutional Complexity · Ambiguity · Project Practices · Professional Judgment*

Introduction

Large-scale construction projects are known for their strategic complexity, high costs, and technical ambition (Winch & Leiringer, 2016). In Sweden, projects such as Västlänken in Gothenburg and Nya Karolinska Sjukhuset (NKS) in Stockholm have attracted considerable public attention due to delays, cost escalations, and controversies surrounding governance and decision-making. Large-scale projects also inherently carry risk, both in terms of technical uncertainties and in how responsibilities, expectations, and outcomes are distributed and interpreted. These projects exemplify how risk in complex construction environments is not only financial or technical, but also deeply institutional and political (Trafikverket, 2025; Johannesson & Qvist, 2019). Such projects fall under the category of large and complex construction projects, typically defined by high capital intensity, long timeframes, and significant organizational interdependencies (Winch & Leiringer, 2016). They involve multiple stakeholders, competing objectives, and evolving regulatory and societal expectations. As such, they require management approaches that account for both structured planning and contextual complexity (Kivilä et al., 2017). Historically, risk management in construction projects has evolved from technical assessments of time and cost uncertainty toward more integrated models involving governance, stakeholder communication, and sustainability (Smith et al., 2006). Yet, despite these advancements, projects continue to face major challenges. The case of NKS, for example, has been widely critiqued for its use of public-private partnerships, particularly regarding unclear allocation of responsibilities and how risks were distributed between actors, and its lack of transparency in decision-making processes (Johannesson & Qvist, 2019). These examples illustrate that risk is not only about measurable probabilities but also involves how different actors define, interpret, and respond to uncertainty. Early on, Knight (1921) distinguished between risk as quantifiable and uncertainty as indeterminate. In practice, however, this boundary is often blurred, and project outcomes are shaped as much by social negotiation, institutional norms, and political agendas as by formal planning models (Toma & Chiti, 2012). The different factors create expectations for how projects should be managed, giving rise to multiple, coexisting logics about what is considered appropriate, efficient, or legitimate. These institutional logics shape how risk is understood, handled, and justified in practice (Thornton et al., 2012). As risk is not only a technical or financial concern but also an institutional construct shaped by competing logics, this complexity raises questions about how risk is understood and managed by professionals working within large-scale projects, how they make sense of risk, balance competing demands, and navigate institutional tensions in day-to-day practice.

While a substantial part of research has examined risk management in large-scale construction projects, the focus has predominantly been on structured, quantitative approaches aimed at minimizing cost, time, and scope deviations (Atkinson, 1999). These approaches often rely on predictive modeling and standardized procedures, which, although valuable, tend to treat risk as a discrete, measurable variable. Despite growing attention to stakeholder engagement and governance, these aspects are frequently addressed in parallel rather than in integration with formal risk management strategies. As a result, there remains a limited understanding of how

"hard" and "soft" dimensions, quantitative assessments and qualitative interpretations, are interwoven in the everyday management of uncertainty (Caccamese & Bragantini, 2013). This study contributes by examining how such dimensions are embedded in professional practices, and how their prioritization is shaped by institutional logics. Moreover, existing frameworks often overlook the subjective and situated nature of risk as it is understood and managed by different project actors. This creates a gap in knowledge regarding how professionals navigate the tensions between formalized procedures and the relational, communicative, and institutional dimensions of project complexity. Given the multifaceted and ambiguous nature of risk, spanning technical, organizational, and institutional domains, this study aims to explore how project professionals understand and manage risk in complex construction environments. By examining how uncertainty is framed and how risk practices are shaped by institutional logics, this research aims to advance understanding of risk not only as a calculable phenomenon, but as a lived and negotiated aspect of project work. To do so, we draw on the institutional logics perspective as our analytical lens. In order to achieve this purpose, the following research question have been formulated:

> How do project professionals understand and manage risk in large and complex construction projects?

Literature Review

The history of project management traces its evolution from basic planning methods to more sophisticated approaches integrating governance, communication, stakeholder management and adaptive strategies (Shenhar & Dvir, 1996). Early models were largely technocratic, emphasizing efficiency and control, yet these approaches often neglected the complexities and social dimensions of projects (Lampel, 2001). Söderlund (2004) critiques this lack of theoretical depth in project management literature, advocating for multifaceted frameworks that reflect the field's growing complexity. A key development in project management has been the formalization of the Project Life Cycle (PLC) in the beginning of the 1980s, which provides a structured framework for managing projects through distinct phases, typically initiation, planning, execution, and closure (Pinto & Prescott, 1988). However, Smith et al. (2014) emphasize that variations of the PLC have emerged to accommodate different project types, for example, construction projects could sometimes follow an extended eight-phase model depending on the project setting. This framework has helped organizations improve decision-making, resource allocation, and risk management throughout a project's duration. However, research suggests that while PLC offers structure, it must also allow for flexibility to address uncertainties that arise during project execution (Patanakul, et al., 2010). As organizations increasingly rely on projects to drive strategic initiatives, project management has evolved to accommodate broader organizational goals. Rather than being isolated activities, projects are now embedded within larger organizational structures, requiring coordination across multiple functions and stakeholders (Winch & Leiringer, 2016).

Project Management and the Iron Triangle

Project management is traditionally defined as the structured process of planning, monitoring, and controlling tasks within the constraints of cost, time, and scope (PMI, 2000). This framework, widely known as the iron triangle, has since the middle of the 20th century been considered the fundamental and inseparably linked to measurements of project management success (Atkinson, 1999). However, scholars have increasingly challenged this perspective, arguing that project success should not be determined solely by these three constraints but should also incorporate broader organizational, social, and stakeholder-driven considerations (Caccamese & Bragantini, 2013; Smith et al., 2014; Shenhar & Dvir, 1996; Dyer, 2017). Atkinson (1999) critiques the long-standing reliance on the iron triangle, arguing that time and cost estimations are often made at the project's initiation when uncertainty is highest, making them unreliable benchmarks for success. Furthermore, quality, as a key component of the triangle, is not a fixed attribute but rather an emergent characteristic influenced by stakeholder expectations. This perspective suggests that success metrics should extend beyond process efficiency to include factors such as stakeholder satisfaction, long-term organizational benefits, and the adaptability of project outcomes. This aligns with Dyer's (2017) view that the iron triangle remains dominant due to its appeal to financial stakeholders prioritizing return and risk minimization. However, this narrow focus often results in the neglect of softer success dimensions, leading to implementation failures and dissatisfaction among stakeholders (Dyer, 2017). Caccamese and Bragantini (2013) further expand this critique by introducing the soft pyramid concept, which integrates human and organizational factors, such as motivation, communication, and cultural alignment, into project management frameworks. Smith et al. (2014) similarly emphasize that projects are shaped by external influences and governance structures, requiring adaptive management approaches that accommodate emerging challenges. Shenhar and Dvir (1996) add that project types vary significantly and thus demand tailored management styles, a nuance that the iron triangle framework overlooks. Although frameworks have evolved to address broader definitions of success, the unpredictability of real-world projects, especially in the construction industry, reveals the limitations of rigid measures of success. Construction projects are especially vulnerable to risks related to weather, workforce productivity, and material variability. Mills (2001) notes that risk is often managed informally, such as through simplistic cost buffers, which is insufficient in high-risk environments. This highlights the need for a structured approach to risk management that not only mitigates threats but also fosters expectation alignment and proactive problem-solving (Mills, 2001).

Governance in PBOs Risk Success

Governance structures play a vital role in coordinating project activities and managing risks across organizational levels (Power, 2007). Effective governance ensures structured oversight, enabling alignment with project goals and societal expectations (Winch & Leiringer, 2016; Mills, 2001). Traditionally, governance in project-based contexts has been strongly associated with control, standardization, and compliance, reflecting a concern with what Pemsel and Söderlund (2024) refer to as the efficiency problem. However, they argue that this emphasis risks overshadowing another crucial aspect, the creativity problem, which relates to how governance practices can enable responsiveness, improvisation, and learning in uncertain

environments. In their analysis of project-based organizations (PBOs), Pemsel and Söderlund (2024) stress that governance must go beyond rule-following and support conditions under which professionals can engage in new problem-solving. Particularly in knowledge-intensive or innovation-driven projects, governance systems that are overly rigid may suppress local initiative and delay adaptation. Instead, effective governance should provide both guidance and generative space, structures that enable actors to deviate constructively when necessary and respond meaningfully to emergent challenges (Pemsel and Söderlund, 2024). This perspective is particularly relevant in complex projects where creative solutions are not only encouraged but often essential to overcome unexpected obstacles. As Wang et al. (2025) emphasize, governance plays a critical distributive and relational role. It must ensure that risks and rewards are fairly allocated and that collaboration remains viable under institutional and operational complexity. In contexts such as public-private partnerships, where the division of responsibility and legitimacy is often contested, relational governance mechanisms, such as trust-building, reputation systems, and long-term orientation, become crucial complements to formal contracts and control frameworks. Stakeholder involvement is central to this, as project success often hinges on aligning expectations between clients, suppliers, regulators, and communities (Smith et al., 2014). Xia et al. (2018) argue that risk and stakeholder management are often addressed in isolation, reducing effectiveness. Integrated approaches based on proactive communication and transparent engagement can improve coordination and minimize conflict. To strengthen governance capacity and risk resilience, project teams must embed stakeholder coordination into broader governance and risk frameworks (Zwikael et al., 2023). This allows for more adaptive project environments, enhances legitimacy, and supports successful delivery in complex construction contexts (Xia et al., 2018).

Risk Management

Risk management has become a foundational component of project management, especially in domains characterized by complexity and uncertainty (Mills, 2001). At its core, risk management refers to the systematic identification, assessment, and treatment of uncertainties that could influence project outcomes (PMI, 2021). Within this field, a foundational distinction is drawn between risk and uncertainty. Risk refers to situations where outcomes can be assigned known probabilities, while uncertainty describes conditions in which such probabilities are unknown or indeterminate (Hillson, 2002). This distinction has critical implications for project-based work. Risk is generally approached as a quantifiable construct, allowing for the use of structured analysis tools and predictive models. In contrast, uncertainty is difficult to quantify and often requires judgment-based, flexible strategies (Smith et al., 2014). The literature also recognizes that risk is not inherently negative; it encompasses both potential threats and opportunities. A risk, in this broader sense, is simply an uncertainty that matters due to its possible impact on objectives (Hillson, 2004). Understanding the relationship between threats and opportunities is crucial in modern risk management. Chapman and Ward (2003) emphasize the need for integrated frameworks that account for both, arguing that decision-making must balance risk mitigation with value generation. Focusing exclusively on minimizing negative outcomes may inhibit innovation, while pursuing opportunities without risk awareness can lead to overexposure (Smith et al., 2014).

Accordingly, managing both requires a nuanced understanding of project dynamics and stakeholder expectations.

The process of risk management is often described as a cycle involving several interdependent phases. ISO 31000 (2009) outlines a widely accepted structure, starting with the establishment of context. This involves defining the internal and external conditions that influence a project's exposure to risk, such as market volatility, legal frameworks, or operational capacity. A clear context supports more relevant and responsive risk strategies (Mills, 2001). Following this, risk identification involves detecting potential events or conditions that may affect project goals. Techniques include brainstorming, expert consultation, data analysis, and stakeholder engagement (PMI, 2000). Once identified, risks are analyzed to evaluate their likelihood and potential impact. This assessment may be qualitative, using categorical risk matrices, or quantitative, employing tools like sensitivity analyses (Smith et al., 2014). Risk response refers to the formulation of strategies for managing identified risks. These strategies typically fall into four categories: avoidance, mitigation, transfer, or acceptance (PMI, 2000). ISO 31000 (2009) stresses that selection should consider both technical feasibility and alignment with broader project objectives. Positive risks, or opportunities, may also be deliberately exploited if they offer strategic advantage (Hillson, 2004). Finally, risk monitoring and review ensure the process remains adaptive throughout the project lifecycle. As projects evolve, new risks may emerge while others diminish or transform. Regular updates to risk registers, feedback loops, and ongoing communication are essential to maintaining relevance and stakeholder alignment (PMI, 2000; Smith et al., 2014).

While these structured frameworks offer a clear roadmap for managing uncertainty, the literature also highlights critical benefits and limitations. On the benefit side, risk management has been shown to enhance project planning and decision-making by improving the visibility of uncertainties and facilitating proactive mitigation strategies (Power, 2004). Tools such as risk probability assessments and periodic risk reviews contribute to greater control, more efficient resource allocation, and improved project predictability (Raz & Michael, 2001). Risk management is also essential in regulatory environments, where formal compliance with risk protocols serves not only legal obligations but also financial and reputational protection (ISO 31000, 2009). Beyond compliance, structured risk management contributes to organizational adaptability. By formalizing risk thinking, organizations can better anticipate disruptions, align risk-taking with strategic goals, and create mechanisms for capturing learning from past projects (Raz & Michael, 2001; Kivilä et al., 2017). This adaptability is particularly crucial in dynamic industries like construction, where project complexity and uncertainty are unavoidable features of the operational landscape (Winch & Leiringer, 2016). At the same time, several critiques have emerged in the literature. Cleden (2009) and Power (2009) argue that many risk management practices have become overly bureaucratic, emphasizing documentation and control over substantive mitigation. This tendency was highlighted during the 2008 financial crisis, where institutions with extensive risk protocols still failed to foresee or react to systemic risks (Power, 2009). One core issue is the overreliance on quantifiable risks, which may obscure emergent threats that fall outside existing classifications or tools (Cleden, 2009). Cleden (2009) further distinguishes between

risk, which is measurable and often based on historical data, and uncertainty, which involves unknowns that may only emerge over time. Traditional frameworks often struggle with these emergent uncertainties, leading to blind spots in project execution. Additionally, organizational culture plays a critical role. Raz and Michael (2001) show that leadership engagement and cross-functional involvement are key to ensuring that risk tools are used and internalized. In many cases, formal tools exist, but are underutilized due to lack of incentives, limited understanding, or resistance to change. Another unintended consequence of formal risk management is the potential for risk aversion. Power (2009) warns that excessive focus on control may reduce organizations' willingness to engage in innovation or experimentation. When risks are treated solely as liabilities to be minimized, rather than uncertainties to be understood and engaged with, strategic agility can be lost. This critique aligns with more recent calls to integrate risk and uncertainty management into broader resilience-building practices, such as scenario planning and adaptive governance structures (Cleden, 2009; Kivilä et al., 2017).

Risk Management in Large and Complex Construction Projects

“No construction project is risk free” (Latham, 1994, p.14), and large-scale projects are particularly vulnerable due to complex regulatory frameworks, interdependencies and context-specific challenges. Effective risk management involves systematically identifying, assessing, and managing uncertainties to improve performance outcomes (Mills, 2001). Risk is often defined as an uncertain event that can positively or negatively impact project objectives (Xia et al., 2018). Thus, risk management aims to increase opportunity while minimizing threats. This requires a structured process that includes identification, classification, analysis, assessment, response planning, and control (Xia et al., 2018). A central element is risk allocation, which should be addressed early in the procurement process to clarify responsibilities and contingencies (Mills, 2001). In large infrastructure projects, risks and benefits are typically distributed between public and private actors, where private firms take on financing, construction, and maintenance responsibilities in exchange for long-term compensation (Wang et al., 2025). Furthermore, Winch and Leiringer (2016) highlight the importance of strong ownership, defined by strategic oversight and stakeholder engagement, in managing complex projects. Kivilä et al. (2017) further emphasize integrating economic, environmental, and social dimensions into governance to enhance long-term project performance. A systematic approach to risk management supports key functions such as prioritizing major risks, informing mitigation strategies, and enhancing decision-making (Mills, 2001). Risk matrices and probability-impact models are often used to rank and visualize risks, distinguishing this practice from financial risk management methods (Xia et al., 2018). However, the success of these frameworks depends on stakeholder buy-in and continuous engagement with the process (Mills, 2001). While the literature emphasizes structured approaches to risk management, it also reveals how practices are shaped by contextual and institutional factors. To capture these variations, we turn to the institutional logics perspective, which offers a lens for understanding how broader norms and expectations influence how risk is interpreted and managed.

Theoretical Framework

Rooted in the foundational work of Friedland and Alford (1991), institutional logics are defined as historically contingent, socially constructed systems of values, beliefs, and practices that provide actors with vocabularies of motive and criteria for legitimacy. The institutional logics perspective offers a cultural and structural framework for analyzing how meaning systems shape organizational action across fields and over time. Developed as a critique and extension of earlier institutional theories, this approach emphasizes the importance of symbolic systems, social norms, and material practices in shaping how institutions guide behavior, cognition, and interaction (Thornton & Ocasio, 1999). These logics not only prescribe what is appropriate or acceptable, but also define what constitutes success, authority, and identity in specific institutional contexts (Friedland & Alford, 1991; Thornton et al., 2012). Central to the institutional logics perspective is the concept of the interinstitutional system: a typology of ideal-type institutional logics such as the market, the state, the profession, the corporation, the family, religion, and the community. Each of these institutional logics represents a distinct domain of cultural and material life, characterized by its own organizing principles, symbolic systems, and patterns of legitimate action (Thornton et al., 2012). This conceptualization enables scholars to analyze how organizations operate not merely within technical environments, but within culturally embedded fields shaped by multiple, sometimes competing, normative frameworks (Reay & Hinings, 2009). By focusing on the interaction between institutions, organizations, and individuals, the institutional logics perspective offers a multi-level analytical lens. It conceptualizes institutions not as closed or static, but as dynamic, multi-layered, and often contradictory systems that actors must interpret, apply, and navigate (Lawrence & Suddaby, 2006; Thornton & Ocasio, 2008). This approach opens space for understanding variation in organizational practices, the emergence of hybrid forms, and the role of agency in institutional reproduction and change (Besharov & Smith, 2014). Rather than assuming isomorphism or field-level convergence, the institutional logics perspective encourages an examination of how institutional logics coexist, shift in salience, and interact over time (Smets & Jarzabkowski, 2013). In doing so, it provides a theoretical basis for exploring not only how institutions constrain action, but also how they offer cultural resources that actors draw while organizing (Besharov & Smith, 2014).

The Market-, State-, and Profession Logic

While all logics in the interinstitutional system can theoretically shape organizational behavior, certain logics tend to dominate depending on the context (Thornton et al., 2012). In many professional and technical domains, three logics, *market*, *state*, and *profession*, are especially present (Thornton et al., 2012; Pache & Santos, 2013; Goodrick & Reay, 2011). These logics not only inform organizational structures and practices but also frame how legitimacy is constructed and contested (Friedland & Alford, 1991). *Market logic* is centered on principles of efficiency, competition, and profit maximization. It prioritizes calculative reasoning, outcome orientation, and the use of performance metrics to guide decision-making. Organizations embedded in market logic strive for growth, customer satisfaction, and financial returns, and they derive legitimacy from their ability to perform successfully in

competitive environments (Thornton et al., 2012). Within this logic, the primary actors are framed as rational agents seeking to optimize resources in pursuit of individual or organizational gain (Jackall, 1988). As Goodrick and Reay (2011) point out, the market logic is strongly aligned with hierarchical control mechanisms and shareholder value models, where authority resides with capital owners and legitimacy stems from market-based performance. Market logic also tends to downplay procedural concerns in favor of results, which can create friction when it collides with other logics emphasizing fairness, duty, or process (Besharov & Smith, 2014). Nevertheless, its dominance in many organizational fields stems from the pervasive role of market institutions in today's capitalist societies (Thornton et al., 2012). *State logic* is grounded in bureaucratic authority, legal compliance, and public accountability. It views organizations as instruments of collective welfare, charged with delivering outcomes in accordance with formal rules and procedures (Friedland & Alford, 1991). Legitimacy under this logic derives from alignment with public interest, adherence to regulation, and the ability to demonstrate procedural correctness (Reay & Hinings, 2009). Authority structures are typically hierarchical and rule-based, mirroring the bureaucratic ideals of control, standardization, and predictability (Thornton et al., 2012). The state logic is particularly salient in publicly funded sectors or in contexts where organizations are subject to regulatory oversight or rely on political support (Greenwood et al., 2011). Nicolini et al. (2016) emphasize that state logic operates through highly formalized control systems, where legitimacy depends on transparency and formal accountability. In multi-layered environments, such as large organizations or public-private partnerships, this logic often interacts with others, requiring negotiations or compromises between formal compliance and alternative normative systems (Pache & Santos, 2013). *Professional logic* is rooted in expertise, autonomy, and peer-regulated standards of conduct. It emphasizes technical competence, normative integrity, and identity-based legitimacy, that is, the recognition by professional communities of one's right to act and decide based on specialized knowledge (Thornton et al., 2012). The authority within professional logic derives from associations, licensing bodies, and disciplinary norms, rather than market outcomes or legal mandates (Pache & Santos, 2013). Professionals are expected to act according to codified ethics and standards that transcend immediate organizational goals, privileging integrity, responsibility, and long-term quality (Reay & Jones, 2015; Thornton & Ocasio, 1999). This logic assumes that technical and ethical judgment cannot be fully reduced to economic calculation or bureaucratic rules. As Lounsbury and Boxenbaum (2013) argues, professional logics introduce a distinctive vocabulary of motive, one that is oriented toward service, craft, and duty, often in tension with other logics that emphasize efficiency or regulation. Goodrick and Reay (2011) describe professional logic as inherently embedded in relational networks and peer-based governance, often resisting hierarchical or market-based control. At the same time, they note that the influence of professional logic can be diluted or reframed in environments where managerial or commercial requirements dominate. These ideal-type logics are conceptually grounded in the interinstitutional system described by Thornton et al., (2012), who outline how each logic encompasses distinct sources of legitimacy, authority structures, and identity systems. The descriptions align with how these logics function across organizational fields (Thornton et al., 2012; Friedland & Alford, 1991).

Institutional Complexity and Strategic Navigation

According to Greenwood et al. (2011), institutional complexity arises when organizations are exposed to multiple, and potentially conflicting, institutional logics within the same organizational field. Wu et al. (2023) build on this by identifying three configurations of such complexity: contexts dominated by a single institutional logic, situations shaped by two competing logics, and environments where multiple logics coexist without a clear hierarchy. These configurations influence how actors experience institutional pressures and determine the degree of flexibility required for navigating them (Wu et al., 2023). Actors facing institutional complexity do not respond uniformly but rather adopt different strategies to manage competing demands (Pache & Santos, 2013). As Wu et al. (2023) explain, these strategies include logic prioritization, where one logic is emphasized over others where different logics are managed in different organizational units or time periods, and logic blending, where elements from multiple logics are combined into hybrid practices. Such strategic engagement illustrates how institutional logics function not only as constraints but also as cultural resources that actors actively interpret and mobilize (Smets & Jarzabkowski, 2013). According to Pache & Santos (2013), this perspective shifts the focus from passive institutional compliance toward dynamic processes of negotiation, adaptation, and selective coupling. Institutional complexity thus becomes a source of both challenge and opportunity, where maintaining legitimacy depends on the actor's ability to interpret and combine different institutional demands (Greenwood et al., 2011; Thornton et al., 2012). As Smets and Jarzabkowski (2013) argue, these practices are situated and relational, requiring actors to navigate complexity in context-specific and often creative ways. Institutional logics do not remain static over time or across organizational roles, but can shift in importance depending on context and phase of action (Thornton et al., 2012). Actors navigating this complexity often engage in selective coupling, strategically combining elements from multiple logics to manage institutional demands without fully conforming to any single logic (Pache & Santos, 2013). This enables organizations to maintain legitimacy across diverse audiences while adapting to the operational realities of the project context (Pache & Santos, 2013). How actors interpret and apply institutional logics is also shaped by their professional roles and day-to-day practices (Smets & Jarzabkowski, 2013).

Institutional logics as previously mentioned are not static, nor do they exert uniform influence across time and space. Rather, they are dynamic, contested, and historically contingent, shaped by broader societal developments, shifts in organizational fields, and local enactment (Reay & Hinings, 2009). This approach departs from previous notions of convergence at the field level and instead positions institutional settings as domains with multiple, overlapping normative orders (Greenwood et al., 2011). Goodrick and Reay (2011) introduced the concept of "constellations of institutional logics" to describe how multiple logics may coexist within the same field, each governing distinct domains of organizational life. Rather than moving toward fusion, these logics can retain their separate identities and inform different aspects of practice in parallel (Reay & Hinings, 2009). This idea is extended by Nicolini et al. (2016), who propose the metaphor of "institutional knotting" to explain how logics are selectively intertwined into temporary configurations. These institutional knots represent durable but

reversible solutions that enable local coordination while keeping logics formally separated. The metaphor captures the flexibility and fragility of such arrangements, which are continuously re-negotiated as field dynamics evolve (Nicolini et al., 2016). Importantly, logic coexistence is not merely a technical coordination problem, but a symbolic and emotional process. Lounsbury & Boxenbaum (2013) emphasizes that institutional logics is embedded in core values and moral language, which shape not only what actors do but how they feel about what they do. This symbolic dimension helps explain why logics may persist in tension; they are embedded in identity structures and moral commitments that resist reduction or synthesis (Toubiana & Zietsma, 2017). The persistence of coexisting logics is also facilitated by actors' ability to engage in strategic, situated action. As McPherson and Sauder (2013) note, individuals may engage in switching logics, alternating between logics depending on the audience or context. Others adopt more integrated strategies, such as coupling and decoupling practices to manage competing demands (Smets et al., 2015). These mechanisms are often supported by internal differentiation, such as role division, discursive framing, or parallel structures, that allow logics to coexist without necessarily converging (Reay & Hinings, 2009; Greenwood et al., 2011). From this perspective, logic interactions are not abstract conflicts but lived experiences shaped by ongoing interpretation, material arrangements, and power relations (Greenwood et al., 2011). This processual understanding aligns with Reay et al. (2017), who highlight how logics are maintained through repeated relational work and normative negotiation in everyday organizational settings. Taken together, these perspectives suggest that logic coexistence is not an unstable transitional state, but a common feature of contemporary institutional life (Thornton et al., 2012). Organizational stability, under such conditions, is achieved not through integration, but through context-sensitive practices that maintain distinct logics in tension (Nicolini et al., 2016). Such arrangements depend on continual effort and are vulnerable to disruption, but they also enable flexibility and responsiveness across shifting institutional landscapes (Besharov & Smith, 2014).

Institutional Logics as a lens to interpret Risk Management

This study draws on two complementary perspectives, risk management and institutional logics, to develop a more holistic understanding of how risk is perceived and handled in large-scale construction projects. While risk management offers a structured and technical framework for identifying, analyzing, and mitigating uncertainties (Mills, 2001; Xia et al., 2018), institutional logics provide a lens to understand how broader cultural and institutional structures influence actors' interpretations and actions (Thornton et al., 2012; Greenwood et al., 2011). From this perspective, risk management is not simply a neutral or objective process but is shaped by the logic that dominates in a given context or for a given actor (Wu et al., 2023; Pache & Santos, 2013). These logics could influence how risks are defined, which risks are considered most critical, and how responses are formulated (Smets & Jarzabkowski, 2013; Wu et al., 2023). By integrating these perspectives, this study aims to explore not only what risk management practices are used but also how and why these practices vary depending on institutional logics. This integrated framework enables an analysis that captures both the formal, procedural dimensions of risk management and the informal, interpretative processes through which risk is made meaningful in complex project environments.

Methodology

To investigate how risk management practices unfold in large-scale complex construction projects, we conducted an in-depth qualitative study across several major construction sites in Sweden. The projects selected for this study were valued between 1.5 and 10 billion SEK and encompassed both privately funded commercial developments and publicly financed infrastructure projects. To gain direct insights into the project environments, we visited active construction sites and spent time in temporary offices and project barracks, where we observed informal practices and organizational routines. These site visits, although primarily used to contextualize interview data rather than for systematic observation analysis, provided valuable background for interpreting participants' accounts. The primary data source consisted of 20 semi-structured interviews with industry professionals occupying roles such as project managers, site managers, risk managers, and project engineers (See Table 1.). Participants were selected to ensure a diversity of perspectives across strategic and operational levels within projects. Each interview lasted approximately one hour, allowing for detailed explorations of both formal risk management structures and the informal practices that emerge during project execution. By combining field visits with in-depth interviews, we aimed to capture not only formal descriptions of risk practices but also the lived experiences and relational dynamics that shape how risk is managed on the ground.

Alias	Role	Private/Public org.
Respondent A	Project Manager	Private
Respondent B	Project Engineer	Private
Respondent C	Site Manager	Private
Respondent D	Chief of Estimations	Private
Respondent E	Production Manager	Public
Respondent F	Project Manager	Public
Respondent G	Technical Manager	Private
Respondent H	Quality & Sustainability Manager	Private
Respondent I	Project Manager	Public
Respondent J	Project Engineer	Public
Respondent K	Project Engineer	Public
Respondent L	Project Engineer	Public
Respondent M	Project Engineer	Public
Respondent N	Project Manager	Private
Respondent O	Technical Advisor	Public
Respondent P	Project Engineer	Private
Respondent Q	Production Manager	Private
Respondent R	Project Manager	Private
Respondent S	Project Developer	Private
Respondent T	Project Manager	Private

Table 1: List of Respondents

Research Design

This study employs a qualitative research design to explore subjective interpretations and socially constructed practices surrounding risk management in large-scale construction projects. Qualitative methods were deemed appropriate given the research objective: to understand how practitioners understand and manage risk and uncertainty in complex project environments (Bell et al., 2019). We chose semi-structured interviews as the primary method for data collection. This format allowed us to maintain a consistent thematic focus across interviews while providing participants with the flexibility to elaborate on areas most salient to their experiences. An interview guide was developed covering broad themes such as project initiation, risk identification, uncertainty management, and stakeholder influence. However, the guide remained flexible to accommodate emergent topics raised by interviewees. Rather than seeking objective measurements of risk, the study focuses on how risk is understood and managed within the complex socio-technical systems characteristic of large construction projects.

Data Collection

Participant recruitment combined purposive and snowball sampling techniques. Initially, we identified key individuals with extensive experience in risk management within large-scale construction projects. Through subsequent recommendations, additional participants were recruited, enabling access to specialized professionals who might otherwise have been difficult to reach through traditional sampling methods. This approach allowed for the gradual expansion of a network of informants directly involved in complex project environments. Interviews were conducted both on-site and digitally via Microsoft Teams, depending on participants' availability and project site accessibility. On-site interviews often coincided with visits to active construction projects, which enabled us to engage informally with the working environments and routines. Although the primary focus of the study remained on the interview data, these field visits enhanced our contextual understanding of the physical, organizational, and relational conditions under which risk management practices were carried out. Each interview followed a semi-structured format, guided by a pre-developed interview guide centered around four thematic areas: introduction and background, project process, risk identification and processes, and actions and iterations. The questions were designed to generate detailed descriptions of participants' roles, perceptions of risk, organizational routines, and experiences with risk management strategies. For instance, participants were asked to reflect on their role in a project, their understanding of terms such as risk, risk management, and risk assessment, and how these concepts were applied in their daily work. They were also invited to walk through the key stages of a typical project and discuss how goals were established, stakeholders engaged, and project performance monitored. Specific questions addressed methods for identifying and evaluating risks, such as whether brainstorming, checklists, or prior experiences were used, and how risks were assessed in terms of potential impacts on time, cost, and quality. Participants also discussed practical actions taken to manage identified risks, including strategies such as risk transfer, limitation, avoidance, or insurance, and reflected on how risk follow-up was integrated into different project phases. Finally, the interviews explored participants' views on knowledge capture and

transfer within their organizations, highlighting potential obstacles and suggesting improvements for organizational learning regarding risk management practices. The interviews typically lasted between 45 and 75 minutes and were audio-recorded with participants' consent. Interviews were subsequently transcribed exact verbatim to ensure the accuracy and richness of the data for analysis. The combination of structured thematic focus and flexible dialogue allowed participants to articulate their experiences in their own terms, an approach particularly important considering the Gioia methodology we employed for analysis. By foregrounding the informants' voices and avoiding the imposition of predefined theoretical categories, we sought to preserve the authenticity and complexity of the phenomena under study (Gioia, et al., 2012).

Data Analysis

The interview data were analyzed using a thematic analysis approach informed by the Gioia methodology (Gioia, et al., 2012; Gioia, 2020). This method emphasizes the development of concepts that are grounded in the participants' own experiences and language, allowing for a transparent connection between raw data and emergent theory. The analysis followed a structured process: First, we conducted a first-order analysis, identifying informant-centric terms and codes. At this stage, the focus was on preserving the participants' own wording and interpretations, minimizing early theoretical abstraction. This initial coding resulted in a broad set of descriptive categories that reflected how practitioners experienced and understood risk management in large-scale construction projects. Next, in the second-order analysis, we engaged in a more conceptual level of interpretation. Here, the first-order categories were examined for similarities, differences, and overarching patterns. This step involved abstracting the informant terms into researcher-centric concepts and themes that could explain underlying processes and relational dynamics within the data. Subsequently, related second-order themes were grouped into aggregate dimensions, capturing broader conceptual areas emerging from the data (See Table 2.). These dimensions provided a higher-level synthesis of the key phenomena observed and formed the foundation for the theoretical framework of the study. To ensure transparency and rigor, a data structure was developed, visually illustrating the progression from first-order terms through second-order concepts to aggregate dimensions. This structure served as a critical tool for demonstrating the systematic development of findings and will be presented later in the report to support the credibility of the analysis. Discrepancies were discussed and resolved through consensus among the researches, strengthening the trustworthiness of the coding framework. By employing the Gioia methodology, we aimed not only to surface rich, informant-grounded insights but also to ensure that the resulting concepts and theoretical contributions were systematically developed and defensible within the context of qualitative research.

1st Order Concept	2nd Order Concept	Aggregated Dimensions
Regulatory Compliance Societal Expectations	State Logic	Institutional Logics
Deadlines Budgets Financial Performance	Market Logic	
Experience Judgement & Intuition Responsability	Professional Logic	
Knowledge Transfer Standardized Models Limitations of Experience	Experience	Large-Scale Projects
Uncertain Environments Technical Complexities Emergent Elements	Project Complexity	
Ownership over Risks Contractual Demands Organizational Structures	Coordination	
Iterative Monitoring of Risk Responses and Mitigations Risk Working Methodologies	Risk Process	Risk Management
Own Risk Perception Organization Risk Definitions Ambiguity of Risk	Risk Perception	
Risk Improvements Critical Risks Risk Categorization	Risk Prioritization	

Table 2: Visualizing the thematic analysis of interaction based on the Gioia method (2020).

Ethical Considerations and Limitations

Given the qualitative nature of this study, where primary data were collected through interviews with managers, engineers, and other project stakeholders, ethical considerations were central throughout the research process. Participants were fully informed about the purpose and scope of the study and participated voluntarily after providing informed consent. Anonymity was guaranteed to protect individuals and organizations from potential harm or reputational risks. As interviews touched on sensitive areas such as risk management failures, conflicts of interest, and project governance, neutral questioning and strict confidentiality were prioritized to minimize social desirability bias and ensure trustworthy data, in line with Silverman's (2022) recommendations. Additionally, handling potentially sensitive project information required secure data storage and restricted access to all research materials. Despite these precautions, the study carries several limitations that must be acknowledged to appropriately frame the scope and applicability of the findings. First, the reliance on semi-structured interviews introduces subjectivity, as insights depend on participants' willingness and ability to articulate their experiences. Although efforts were made to triangulate and cross-validate accounts, the data remain shaped by personal narratives. Second, the exclusive focus on Swedish construction projects may limit the generalizability of findings to other contexts with different regulatory, organizational, or cultural conditions. Variations in project governance and stakeholder landscapes elsewhere could influence how

risk management is practiced. Third, while site visits provided valuable contextual understanding, observations were used to enrich interview interpretations rather than systematically coded as independent data. Fourth, time constraints limited the number of interviews and precluded longitudinal observation across project phases, which could have captured evolving risk management dynamics more comprehensively. Finally, although the Gioia methodology ensured a systematic and transparent analytical process, inductive concept development inherently carries a risk of researcher interpretation influencing abstraction. Intercoder discussions and agreements were used to mitigate this risk. By recognizing these limitations, we aim to situate the study's contributions within an appropriate scope and provide a foundation for future research seeking to extend and refine these findings.

Empirical Findings

Across the interviews, uncertainty emerged not as an exception but as a defining condition of large-scale construction projects. While some risks could be anticipated, planned for, and managed through established routines, many uncertainties were described as fluid, emergent, and deeply embedded in the complexity of the project environment itself. Respondents consistently emphasized that large projects unfold in highly dynamic contexts where unexpected developments, ranging from weather disruptions and shifting ground conditions to pandemic-related delays, require continuous adjustment. Uncertainty here was framed as environmental and largely beyond the control of the project organization. These uncontrollable elements create tension with pre-defined schedules and budgets, forcing teams to improvise and adapt repeatedly during execution. Despite extensive planning efforts, teams often found themselves having to improvise and redesign plans in response to events beyond their control. Several respondents pointed out that even the most detailed schedules and risk analyses could become outdated due to unforeseen external changes.

> We had everything planned for spring, but then winter came back. We had to rethink our logistics. - Respondent D, Chief of Estimations

Such reflections illustrate a widely shared sentiment across the interviews: unpredictability is normal, not exceptional. Encountering disruptions was seen not as a failure of planning, but as an expected part of the project reality. Adaptability, rather than rigid adherence to initial plans, was framed as the core capability distinguishing resilient teams.

> Every project is unique, which is both the charm and the burden of working in the construction industry [...] - Respondent C, Site Manager

This approach reinforced the idea that managing uncertainty is not only about contingency planning, but also about developing organizational resilience and flexibility. Respondents highlighted the contrast between managing smaller, more predictable projects and navigating the complexity of large-scale ones. Whereas smaller projects often feature fewer actors, simpler logistics, and a narrower scope, large projects introduce a different order of magnitude, one where unpredictability becomes systemic. Almost all interviewees agreed that complexity multiplies the sources of uncertainty. Project managers must simultaneously

balance technical, operational, and financial while responding to evolving stakeholder demands and managing internal organizational dynamics. The sheer number of moving parts, and the interdependencies among them, meant that even minor issues could cascade into major disruptions if not handled proactively.

> Since it's a unique project. If you're building housing or something like that, apartments, they tend to look pretty much the same, so you can make quite precise estimates. Here, it's a lot harder because there are so many steps we've never done before [...] - Respondent B, Project Engineer

Despite the acknowledgment of uncertainty as unavoidable, experience emerged as a critical asset for navigating it. Across the interviews, many respondents described how prior involvement in similar projects provided a crucial frame of reference for interpreting emerging issues, recognizing early warning signs, and making faster, more confident decisions. However, respondents were equally clear about the limitations of their experiences. In projects that were technically new, organizationally complex, or set in unfamiliar environments, past knowledge could only offer general guidance, not ready-made solutions, which makes it difficult to fully transfer previous lessons. Several interviewees stressed that while experience helps build intuition, each project's unique conditions require careful situational assessment and the willingness to adapt previously successful practices.

> When we work at this scale, we have to rely on earlier experience. That helps. But then you just have to see what actually happens once construction begins. - Respondent A, Project Manager

> Just because you've done it before doesn't mean it will work this time. - Respondent E, Production Manager

These reflections pointed toward previous experience were not unusual. Many respondents emphasized that while experience is helpful, it rarely offers ready-made solutions. Instead, it provides a framework, a starting point for thinking, rather than exact instructions. Several respondents noted that every project involves its own mix of stakeholders, technical requirements, and political or geographic constraints. Because of this, applying the same approach in every case can be risky. Experience could provide guidance, but it had to be balanced with a clear awareness of what was new or different in each project. Another important theme that emerged was the role of coordination as both a response to and a source of uncertainty. As projects grow larger and more complex, the number of interdependencies between teams, timelines, and technical systems increases exponentially. Managing these interdependencies was identified as one of the most persistent internal challenges across all interviews. Respondents emphasized that, unlike smaller projects, where one person might keep track of most tasks, large-scale initiatives involve multiple layers of subcontractors, consultants, and client representatives, all working on different parts of the project at different times. Which becomes a critical determinant of project performance.

> Coordination is absolutely crucial in every project, but especially in these big ones. You need to make sure everyone understands what they're doing, every day. - Respondent D, Chief of Estimations

Interviewees warned how poor coordination could lead to misaligned schedules, rework, cost overruns, or even safety incidents. Yet, they also noted that even with advanced digital planning tools and carefully detailed schedules, gaps often remained. Especially during handovers between disciplines or in phases where new team members joined ongoing work, miscommunication or differing assumptions could quickly unravel even the best-laid plans. The interviews revealed that as project size increases, the nature of coordination shifts fundamentally, from being a background activity managed through personal knowledge and informal meetings, to becoming a core strategic function requiring continuous attention, embedded routines, and strong relational networks.

> I haven't worked this systematically before, actively [...] When I worked on smaller projects as a contractor, I would make a risk list at the start, and that was it. It wasn't something we followed up on. But back then, I had control over the whole job myself. In a project of this scale, that just doesn't work. It's a completely different magnitude. - Respondent E, Production Manager

Organizations sought to manage this complexity by implementing daily coordination meetings, integrated scheduling systems, and clearly defined work packages. However, respondents were clear that technical systems alone were not sufficient. Effective coordination depended just as much on fostering a communication culture characterized by clarity, trust, and responsiveness. It was this relational aspect of coordination, rather than formal procedures alone, that ultimately enabled teams to navigate the inevitable uncertainties of large-scale project delivery.

The Ambiguous definition of Risk

While the concept of risk occupies a central place in construction project management discourse, the interviews revealed that its meaning is far from straightforward. Across respondents, there was considerable variation in how risk was defined and interpreted. Rather than a unified or universally accepted concept, risk emerged as a fluid, context-dependent, and at times ambiguous concept. When asked directly how they would define risk, many respondents hesitated, offering a range of perspectives shaped by their professional roles, personal experiences, and organizational environments. For some, the ambiguity surrounding the term was acknowledged openly, suggesting an underlying awareness of its contested nature.

> We probably have a good definition of it within the company. But there are different interpretations anyway. - Respondent A, Project Manager

> Oh, that's not an easy one to answer. What does risk even mean? I'm not really sure. - Respondent C, Site Manager

These reflections were not uncommon. A striking theme that emerged early in the interviews was the lack of a unified or shared understanding of what risk actually entails. While a few respondents referred to formal standards like ISO 31000, these references were relatively rare. Instead, risk was more often framed through subjective, intuitive, or situational lenses, depending on the individual's role, responsibilities, and previous experiences. Several respondents emphasized that risk is inherently tied to uncertainty, the gap between what is known and what might happen. However, how this uncertainty was understood and acted upon varied considerably, leading to divergent approaches even within the same organization.

> For me, a risk is something unknown, something that might happen, but we can't be sure about. Everything else is just facts. [...] It's not that easy to say what risk actually means. Everyone throws around the word, but sometimes it feels like we're not even talking about the same thing. - Respondent G, Technical Manager

This lack of consensus was further reflected in how risk discussions played out during training sessions, workshops, and everyday project work. Even in formal learning contexts where risk management was a focal topic, the concept remained multifaceted and open to interpretation.

> There's a lot of talk about risks in that context too, and when I run training, I often say that risk is a multifaceted concept. - Respondent K, Project Engineer

The practical implications of this conceptual ambiguity were also frequently mentioned. Respondents noted that the absence of a shared understanding created alignment challenges within teams and across the organization. Without a common language or frame of reference, coordinating risk assessments, mitigation strategies, and decision-making processes became more difficult.

> I think that one's tricky, because I don't believe everyone shares the same definition of risk. Not everyone might see it the way [company name] does, how risk is defined and how the work should be carried out. So, there's probably a bit of an issue there, that there isn't a shared understanding. - Respondent B, Project Engineer

These insights suggest that risk is not merely a calculable or technical variable, but rather a contested and socially constructed concept, one that is shaped by context, role, and interaction. The interviews highlighted how discussions about risk often blurred distinctions between concepts such as uncertainty, hazard, consequence, and control. As a result, what precisely should be identified, monitored, and managed was not always clear, even to experienced practitioners. Despite these challenges, many respondents attempted to articulate their own working definitions of risk, often grounding their understanding in the practical realities of their specific roles. Risk was frequently associated with the possibility of failing to meet expectations, whether contractual, technical, or operational.

> I connect it very much to what I work with, that is quality. If we see that we won't be able to deliver what we've promised, or that what's in the documents or agreements won't hold up, then we have to speak up. And then we work on minimizing the risk. - Respondent H, Quality & Sustainability Manager

Others highlighted particular characteristics that, in their experience, signaled elevated risk, novelty, complexity, incomplete knowledge, and uncertainty around time and cost estimations.

> That a task is difficult to carry out. That it's new, involves new methods. That the conditions aren't fully known. That costs and time are hard to assess or uncertain. - Respondent O, Technical Advisor

Although the overall definition of risk remained ambiguous, some common intuitions about its practical characteristics: difficulty, novelty, unpredictability, could still be identified in the interviews. Nevertheless, the diversity of perspectives underscored an important reality, in the context of large-scale construction projects, risk is not a static or easily pinned down concept. It is an evolving, negotiated understanding that reflects the complexity of the environments in which practitioners operate.

Risk Management Practices

Across the interviews, respondents highlighted that risk management was not perceived as a standardized or one-size-fits-all process. Instead, it was described as a context-dependent practice that evolved based on organizational demands, project specifics, and professional norms. Although most worked within formalized systems, their experiences suggested that risk management often diverged from official procedures and was instead negotiated on the ground, shaped by what was deemed urgent and critical at different moments. A major theme that emerged among respondents, particularly from commercially driven projects, was the centrality of time and cost in framing risk management. Many interviewees emphasized that risks were primarily understood through their potential to disrupt schedules or inflate budgets. Time and money were seen as the fundamental variables around which risk assessments revolved, often overshadowing other issues such as environmental, social, or long-term operational risks. In these settings, staying on budget and meeting deadlines was not just a project goal. Risk management was viewed as an exercise in maintaining control over a tightly constrained delivery process, where deviations could have immediate and measurable financial consequences.

> If we budgeted for 10,000 hours and it turned out to be 11,000… well, that's 400,000 extra. - Respondent A, Project Manager

Respondents described risk monitoring systems that revolved around forecasting deviations from cost and time targets. Formal tools like time plans and budget tracking were widely

used, but the real driver was an ingrained sensitivity to anything that could threaten project predictability.

> Our project goals are mostly about time, cost, and scope… and those are quite clear. We have a forecast, a budget, and a deadline, and our job is to stick to them. - Respondent L, Project Engineer

However, several respondents reflected critically on this narrow focus. Risks that did not immediately affect the financial bottom line, such as risks related to the environment, stakeholder satisfaction, or long-term sustainability, were often given lower priority unless they had the potential to cause delays or overruns. This led to a reactive rather than preventive risk management culture in many projects.

> Environmental risks? Well, they matter mostly if they delay the schedule. Unfortunately. - Respondent I, Project Manager

While such a focus enabled efficiency in the short term, it also limited the ability of projects to address broader forms of uncertainty, potentially exposing organizations to reputational, environmental, or regulatory risks further down the line. In contrast to the commercially driven projects, respondents involved in public infrastructure projects emphasized a broader and more formalized approach to risk management. Here risk management was more closely aligned with legal, regulatory, and societal expectations. Managing risks was not just about avoiding cost or time overruns, but about meeting regulatory requirements, upholding environmental and safety standards, and safeguarding organizational reputation. Several respondents stressed that working with public clients or in highly visible projects required a broader understanding of risk, explicitly including external stakeholder expectations and societal impacts. Meeting the letter of environmental regulations, for example, was seen as a baseline requirement, but many respondents pointed out the importance of demonstrating a commitment beyond simple compliance.

> When working with [Company Name], you're forced to think more about environmental impact and safety. That's important to them, so we have to follow that lead. - Respondent K, Project Engineer

The broader framing of risk translated into systematic documentation, structured risk reviews, and formalized approval processes, particularly within the public sector, where respondents highlighted that compliance with standards was not only essential for project success but also critical for safeguarding organizational reputation.

> [...] trust and brand reputation are definitely categories we manage as risks. It's something that's always present in our discussions; we aim to minimize our impact on the surrounding environment and act with care. - Respondent L, Project Engineer

However, despite the apparent robustness of compliance systems, interviewees also pointed to frustrations. Some felt that rigid adherence to standards sometimes came at the expense of

practical judgment and adaptive problem-solving. In certain cases, the emphasis on being technically correct could obstruct more pragmatic, outcome-oriented approaches.

> We need people who know the regulations, but also when we can bend them. Sometimes it feels like it's 'better to be right than good,' and that's not helpful. - Respondent F, Project Manager

Thus, while compliance frameworks provided necessary legitimacy and risk containment, they also introduced tensions between formal accountability and practical flexibility. Beyond formal systems and organizational frameworks, many respondents emphasized the irreplaceable role of professional expertise and judgment in managing risks. Especially among senior project managers and engineers, risk management was described as a craft developed through years of hands-on experience, rather than as a purely managerial activity. Respondents noted that structured frameworks could only go so far, effective risk management often relied on an intuitive sense of what might go wrong, developed through repeated exposure to complex project realities.

> For me, it's about helping project managers shift from simply reacting to what happens, to anticipating what could happen. I often use the word predictability as a key concept. People talk about being proactive rather than reactive, but at the core, it's about creating better conditions by thinking ahead. - Respondent K, Project Engineer

This intuitive dimension was seen as critical to catching emerging risks early and proactively steering projects away from trouble, complementing more formal risk identification and mitigation practices. Moreover, the internal distribution of expertise within organizations was described as an important risk management resource. Knowing who had relevant experience, and fostering internal networks of expertise, was framed to improve organizational resilience.

> I believe more in creating clarity within the organization, knowing who has worked on similar projects, who has specific expertise, and who is recognized as a risk expert. It's about identifying the people we can turn to for support when managing risks. - Respondent G, Technical Manager

Several respondents also stressed the importance of professional integrity and normative commitments to quality and sustainability. Even when clients did not explicitly demand higher environmental or ethical standards, some organizations pursued internal initiatives to exceed regulatory baselines.

> We've set internal goals for reducing carbon emissions in concrete, even if the client doesn't ask for it. - Respondent H, Quality & Sustainability Manager

Yet, despite these commitments, some respondents also acknowledged the vulnerability of professional norms when confronted with tight project constraints. When time and cost pressures intensified, even strongly held ideals could be overridden.

> When an environmental risk threatens the project timeline, it suddenly becomes a major concern, not necessarily because of the environmental impact, but because it could cause delays. Unfortunately, time often takes priority. - Respondent I, Project Manager

Thus, while professional judgment broadened the scope of risk management beyond immediate deliverables, it remained exposed to the competing priorities and structural pressures that characterized large and complex projects. These competing priorities and pressures can be seen as expressions of different institutional logics, each shaping how risk is perceived, prioritized, and managed in practice. In the following discussion, we explore how these logics influence the ways uncertainty, risk, and project success are understood in large-scale construction projects.

Discussion

The empirical findings illustrate that uncertainty is not an occasional disturbance but a persistent and formative element of large-scale construction projects. Respondents described how even extensive planning could quickly become obsolete as projects encountered unforeseen environmental, logistical, or organizational disruptions. This resonates with Kivilä et al. (2017), who argue that complex projects operate under conditions of sustained complexity, where rigid plans must often give way to emergent coordination and responsive governance. In contrast to the traditional view of project management as a linear, controllable process (Pinto & Prescott, 1988), our findings confirm earlier critiques that emphasize the limitations of such assumptions in dynamic project environments (Söderlund, 2004). Uncertainty in our study manifested in several forms. External uncertainties, such as weather events, regulatory changes, or stakeholder interventions, were often cited as particularly challenging due to their unpredictability and impact across project systems. Internal sources of uncertainty, including coordination, shifting priorities, and organizational dynamics, were also prevalent. These findings align with Mills (2001), who noted that construction risks are not only technical or financial but often systemic, embedded in project interdependencies and knowledge gaps. In particular, our respondents repeatedly emphasized that traditional risk frameworks are not sufficient to capture the full extent of these uncertainties, which resonates with Powers' (2009) critique of formal risk frameworks that neglect emerging threats.

This ambiguity surrounding uncertainty was not interpreted uniformly across cases but was deeply shaped by the institutional logics present in each project context. The institutional logics perspective offers a valuable framework for analyzing how uncertainty is interpreted and managed in large-scale construction projects. As highlighted in our findings, *professional logic* shaped an understanding of uncertainty grounded in technical expertise, prior experience, and informed judgment. Respondents who drew on this logic emphasized the importance of context-specific assessments and iterative learning based on project conditions, particularly in unfamiliar or technically new environments. This resonates with Thornton et al. (2012), who define professional logic as rooted in normative standards and domain specific knowledge, which legitimizes discretion and adaptive problem-solving. In this view, uncertainty is not a failure of planning but an expected feature of complex environments that

must be actively engaged with through expertise and practice. In contrast, actors influenced by *market logic* framed uncertainty as a threat to predictability, performance, and efficiency. The dominant concern in these cases was maintaining control over cost and time, which led to the use of predefined risk frameworks, estimation buffers, and contract-based risk allocations. These practices reflect Hillson's (2002) description of risk management as probability-based control, where the goal is to quantify and minimize deviations. Within market logic, as described by Thornton et al. (2012), such calculative reasoning is central: organizational legitimacy stems from delivering measurable outcomes aligned with investor or client expectations. As a result, uncertainty is approached as a risk to be contained, often reduced to deviation from budget and schedule, rather than explored as a contextual phenomenon. Our findings suggest that this emphasis can constrain flexibility, as uncertainty becomes something to suppress rather than explore. In publicly financed projects, *state logic* introduced a different interpretation of uncertainty. Respondents described how procedural accountability, formal traceability, and regulatory transparency shaped responses to even minor disruptions. These behaviors are consistent with the expectations outlined by Greenwood et al. (2011), who argue that the state logic imposes formalized governance structures and emphasizes legitimacy through compliance.Thus, uncertainty under state logic is framed as a legitimacy issue, rather than a technical or financial one. These interpretations rarely appeared in isolation. Rather, multiple logics coexisted within the same projects, leading to *institutional complexity*, a condition in which actors must respond to conflicting normative expectations (Greenwood et al., 2011; Wu et al., 2023). In our case, this was evident when professional judgment clashed with formal reporting structures, or when market-driven time pressure undermined risk procedures based on compliance or safety. Wu et al. (2023) outline how such complexity can vary depending on the degree of dominance, coexistence, or competition between logics. Our findings suggest that project actors often responded through *selective logic coupling* (Pache & Santos, 2013), strategically emphasizing different logics depending on situational pressures and actor roles. This highlights how institutional logics not only influence how uncertainty is perceived, but also shape which sources of uncertainty are prioritized and which are ignored.

This *institutional complexity* was particularly evident in how uncertainty affected project coordination. Respondents noted that although digital tools and formalized routines were important, effective coordination often relied on relationships, clarity in communication, and trust, elements that align more closely with professional norms than with formal systems. This supports Winch and Leiringer's (2016) emphasis on owner capability and relational alignment, as well as Zwikael et al.'s (2023) argument that coordination under uncertainty depends on overcoming knowledge asymmetries and role ambiguity. Our data further suggest that these dynamics were not neutral, but shaped by institutional expectations: where market logic prevailed, coordination was performance-driven; where state logic dominated, it was compliance-oriented; and where professional logic was dominant, it was dialogical and adaptive. Taken together, these findings support the view that risk and uncertainty in large-scale construction projects cannot be fully understood without considering the institutional context in which they are embedded. Rather than being governed by a single rationality, risk practices are shaped by the interaction of multiple logics that coexist,

compete, and at times contradict one another. Institutional logics theory thus provides not only a descriptive lens, but also an explanatory one, clarifying why formal tools often fall short, and why practitioners continue to rely on situational judgment in environments of high uncertainty.

The Ambiguity of Risk

The findings reveal that the concept of risk is characterized by considerable ambiguity in the everyday work of professionals involved in large-scale construction projects. Across interviews, Respondents offered divergent definitions of what constitutes a risk, often grounded in their specific roles, project contexts, and personal experiences. Rather than reflecting a lack of expertise, this variation illustrates that risk is not a neutral or objective construct, but a contextually shaped and interpretive concept (Mills, 2001). Some respondents explicitly acknowledged that different team members or organizations used the term in different ways, while others struggled to define it at all. Although a few referred to formal standards such as ISO 31000, these references were relatively rare and did not seem to guide day-to-day risk work in practice. Several interviewees hesitated when asked to define risk, and others openly expressed concern about the vagueness of the term. The empirical material points to a shared experience of risk as an abstract and flexible concept, something practitioners often use in conversation, but not always with a common understanding. The perceived difficulty in defining risk was not limited to individual interpretation, but extended to organizational settings where divergent understandings complicated coordination. In some cases, professionals explained how risk was used in synonym with other concepts such as uncertainty, threats, or deviation from plan, which contributed to blurred boundaries and ambiguous expectations. This ambiguity, however, was not random. Our findings suggest that it was deeply shaped by the presence of multiple institutional logics, each offering a distinct vocabulary for interpreting risk. This practical ambiguity reflects Power's (2009) critique that formal risk systems can create an impression of control while failing to capture the lived complexity of risk in dynamic settings. Hillson's (2002) distinction between measurable risks and indeterminate uncertainties also helps explain the discomfort many respondents expressed when asked to articulate what risk means.

From an institutional perspective, these ambiguities can be understood as expressions of competing legitimacy criteria across different logics (Thornton et al., 2012). In commercially driven projects, where market logic dominated, risk was primarily associated with quantifiable outcomes, especially time and budget deviations. Respondents working under this logic emphasized tracking deviations, estimating consequences in monetary terms, and applying control measures. This framing aligns with Atkinson's (1999) critique of the Iron Triangle, where project success is reduced to adherence to predefined cost, time, and scope targets. Risk management in this view becomes an exercise in prioritizing efficiency and risk minimization (Dyer, 2017). In publicly funded projects, respondents described a different emphasis. Here, state logic manifested in the prioritization of compliance, documentation, and transparency (Greenwood et al., 2011). Risk was not only about potential project setbacks but also about reputational exposure, political scrutiny, and failure to fulfill regulatory obligations (Wang et al., 2025). Some respondents described how issues that would be seen as standard in

private projects became notable risks in public settings due to established expectations. This aligns with literature emphasizing how risk in public projects is tightly coupled with transparency and the demonstration of responsible governance (Nicolini et al., 2016). Professional logic introduced yet another framing of risk, rooted in expertise, craft, and a sense of responsibility for long-term quality (Thornton et al., 2012). Several respondents emphasized that risk was not always quantifiable, but rather something sensed or judged based on experience, especially in technically new or complex project environments. Risk, in this framing, was linked to unknowns, new construction methods, or ethical considerations around quality and sustainability. These insights are consistent with Smets and Jarzabkowski's (2013) view of relational contextualization, where risk is not defined in general but through role-based interpretation and situated judgment. They also reflect Chapman and Ward's (2003) call for risk management to engage with uncertainty as a project-wide condition requiring reflection, not only mitigation. Rather than converging toward a unified understanding, these logics coexisted within the same projects, resulting in institutional complexity (Wu et al., 2023). As the findings illustrate, actors had to navigate overlapping conceptions of risk that did not always align. Some organizations tried to manage this through training or frameworks, but these efforts rarely resolved the underlying divergence in interpretation. Instead, as suggested by Nicolini et al. (2016), project teams developed locally functioning compromises, what they call institutional knotting where different risk framings could coexist temporarily without being fully aligned. This helps explain why the term risk remains difficult to define in practice. In large and complex projects, professionals are embedded in environments shaped by multiple institutional logics, each offering its own criteria for what should count as a risk, how it should be evaluated, and why it matters. When these logics coexist, whether due to public-private collaboration, interdisciplinary teams, experiences, or overlapping interests, they contribute to the conceptual instability of risk. What appears ambiguous at the surface can therefore be understood as a reflection of deeper normative tensions between logics that define not only how risk is spoken about, but what it is. (Thornton et al., 2012; Friedland & Alford, 1991). What risks are made visible, which are prioritized, and which are downplayed depends not solely on formal frameworks but on the dominant logic at play. This further reinforces our argument that risk, far from being a fixed or technical concept, is a site of negotiation and meaning-making in institutional practice. Taken together, the findings suggest that ambiguity is not a byproduct of poor implementation, but a reflection of the multiple institutional logics that shape how risk is made meaningful in practice. This helps explain why formal systems often fall short and why practitioners continue to rely on subjective judgment, dialogue, and negotiation to manage risk in large-scale construction projects.

Risk Management Practices

While risk management is often presented as a standardized and rational process involving identification, analysis, and mitigation (Hillson, 2004), the findings from this study demonstrate that such formal structures only partially explain how risk is handled in large-scale construction projects. Rather than following linear procedures, practitioners described a situated and adaptive approach shaped by contextual demands, organizational

dynamics, and institutional expectations. This supports earlier critiques that question the usefulness of bureaucratized risk management systems and highlight the gap between formal frameworks and actual practice (Power, 2009; Cleden, 2009). Respondents described how formal tools such as risk matrices, frameworks, and processes often coexisted with more informal ways of working, such as relying on experienced colleagues or adjusting practices based on the current challenges. These practices were not neutral, but instead reflected the institutional logics that were salient in the project context. In commercially driven projects, risk management practices tended to reflect the assumptions of *market logic*, where time and cost performance dominated. The findings showed that risks were primarily assessed in relation to their financial implications, particularly in terms of budget overruns or scheduling delays. This logic promotes a short-term, efficiency-oriented perspective, where quantifiable risks are prioritized and risk tolerance is often determined by immediate financial exposure (Thornton et al., 2012). It also aligns with the dominance of the Iron Triangle in project success criteria, which continues to influence managerial focus despite its known limitations (Atkinson, 1999). Several respondents explained how cost estimates and time schedules drove what risks were taken seriously and what actions were prioritized. Risk was often seen through the lens of deviation from plan, with performance metrics functioning as an understanding for risk levels. In contrast, projects operating under the influence of *state logic* adopted more comprehensive and compliance-driven risk management practices. In these settings, formalized routines, reporting protocols, and documentation processes were central (Wang et al., 2025). Risk was framed not only as a matter of performance, but also of public responsibility and legitimacy (Reay & Hinings, 2009). Respondents emphasized the importance of transparency and traceability, especially when working with public clients or in highly visible infrastructure projects. Here, legitimacy was derived from following procedure, not from efficiency or results, and the function of risk management became closely tied to regulatory alignment and accountability structures.

However, this institutional structure also introduced challenges. Several respondents expressed frustration with how rigid procedures sometimes limited flexibility or delayed timely decisions. This tension aligns with Pemsel and Söderlund's (2024) distinction between governance for efficiency and governance for creativity, two requirements that are often difficult to balance in complex project environments. Professional logic introduced yet another mode of risk engagement. Here, risk management was not viewed merely as a set of tools but as a reflective practice grounded in expertise, judgment, and normative commitments (Thornton et al., 2012). Respondents emphasized the role of experience and intuition in identifying emerging risks and making practical decisions. Rather than following formal escalation processes, several interviewees described relying on internal networks, knowledge of who had done this before, and informal consultation across roles. Risk in this framing was not reduced to quantifiable categories, but understood through the complexity of materials, methods, and the uncertainties inherent in building something that had not been done before. The process was often dialogical and situated, emphasizing flexibility and learning over standardization. This perspective resonates with Chapman and Ward's (2003) call for an expanded view of risk management as uncertainty management, especially in settings characterized by novelty and interdependence. Across all project types, the

coexistence of multiple logics created a need to balance different demands. This often led professionals to engage in what Pache and Santos (2013) call selective coupling, strategically integrating elements from different logics to navigate context-specific challenges. In our findings, this was evident in how teams adapted formal processes to local realities: customizing templates, interpreting risk categories flexibly, or using structured systems more as a formality while relying on informal communication for decision-making. These hybrid practices align with Nicolini et al.'s (2016) concept of institutional knotting, where logics are temporarily combined in ways that allow organizations to function without resolving underlying normative tensions. Respondents also described how risk management was increasingly relational, especially in larger or more complex projects. Success depended not only on technical competence or structured procedures, but on the ability to foster shared understanding across roles, disciplines, and organizations. This orientation away from control and towards coordination reflects the broader developments in project management theory, where attention has shifted from mechanistic models toward more systemic and interactive approaches (Shenhar & Dvir, 1996; Zwikael et al., 2023). Institutional logics also shaped how coordination itself was enacted: under market logic, coordination focused on delivery performance and efficiency; under state logic, it was embedded in formal compliance structures; and under professional logic, it was driven by trust, communication, and expertise. As seen in the findings, project actors often navigated these tensions through role-based interpretation and judgment. In this framing, risk was not only a threat to be minimized but a central focus of negotiation, alignment, and learning across a multifaceted project environment. Taken together, the findings suggest that risk management in large-scale construction projects cannot be fully understood through formal models alone. Practitioners continuously adapt, combine, and reinterpret practices in response to institutional demands. These variations are not random, but are structured by the interaction of market, state, and professional logics that shape what risks are seen, how they are assessed, and what responses are considered legitimate.

Conclusion and Practical Implications

This study set out to explore how project professionals understand and manage risk in large and complex construction projects, with particular attention to how uncertainty is framed and how risk practices are shaped by institutional logics. By moving beyond conventional, technocratic perspectives on risk, and instead focusing on how uncertainty is lived, understood, and negotiated by practitioners in context, the study contributes to a more nuanced understanding of risk as a dynamic and situated phenomenon. The findings demonstrate that professionals do not operate according to a single, standardized definition of risk. Instead, their understanding and interpretation vary depending on role, experience, project setting, and institutional environment. Risk is sometimes treated as a calculable deviation, sometimes as a matter of reputational concern, or as a context-specific judgment of quality and feasibility. This ambiguity is not merely a matter of individual interpretation, but reflects the coexistence of multiple institutional logics that shape what is considered legitimate, urgent, or important in different project contexts. In line with the institutional logics framework, the study identified three dominant logics, *market, state,* and *professional,*

each of which offered a distinct lens for interpreting and responding to risk. Market logic emphasized efficiency and risk minimization, often framing risk in financial terms and reinforcing the Iron Triangle. State logic prioritized compliance and transparency, embedding risk within public accountability structures. Professional logic emphasized expertise, judgment, and long-term responsibility. These logics rarely appeared in isolation but coexisted and occasionally conflicted, creating institutional complexity that practitioners navigated through selective coupling and local adaptation. Ultimately, the study shows that risk management in large-scale construction projects cannot be fully understood through formal procedures or predictive models alone. While such tools remain important, they are constantly interpreted, adapted, or overlooked in everyday project practice. Professionals engage in ongoing sensemaking, balancing competing institutional expectations, operational constraints, and contextual judgments. Risk, in this view, is not only a variable to be minimized, but a central site of negotiation where project goals, responsibilities, and success criteria are contested and constructed. These findings also clarify how institutional logics shape concrete risk management practices. While market logic favors quantifiable tools and strict forecasting, state logic promotes procedural oversight and formal documentation. Professional logic, by contrast, encourages intuitive judgment, peer dialogue, and experience-based adaptations. As such, the choice of risk strategies, what tools are used, what is prioritized, and how risks are communicated, varies depending on which logic is most salient in the project context.

This study suggests that project organizations should recognize the inherent ambiguity of risk and actively promote dialogue across roles to build shared understanding. Risk frameworks should be flexible enough to accommodate local adaptation and professional judgment, rather than relying solely on standardized tools. Managers need to be aware of how different institutional logics influence risk priorities, and lead in ways that balance financial, regulatory, and professional concerns. Finally, training should combine technical methods with relational and communicative skills to support more responsive and context-sensitive risk practices in complex project environments.

Further Research

While this study offers a cross-sectional view of how institutional logics shape risk understanding and management across multiple projects, future research could benefit from a longitudinal case study of a single large-scale construction project. By following one project throughout its lifecycle, from planning to execution and closure, it would be possible to observe how institutional logics shift in salience across different phases, and how this affects the framing of risk, choice of management strategies, and professional decision-making. Such a design would also provide deeper insight into how project actors navigate institutional complexity over time, how moments of tension or alignment between logics unfold, and how practices are adapted in response to evolving project conditions. This would complement our findings by revealing the dynamic and processual aspects of institutional influence that are difficult to capture through snapshot interviews alone.

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1st Order Concept	2nd Order Concept	Aggregated Dimensions
Project Characteristics Emerging Elements Limited Standards	Project Specifics	Framing of Uncertainty
Multiple Actors Project Dependencies Role Based Experiences	Project Dynamics	
Unexpected Events Planing Frequent Adjustments	Uncertainties	
Own Risk Perception Ununified Risk Definition Meaning of Risk	Conceptual Ambiguity	Construction of Risk
Experience Based Task Specific Role-Based Framing	Situational Risk	
Risk Standards Risk Intuition Risk Practices	Definition of Risk	
Decisions Based on Intuition Fall-Outs Earlier Experience	Practical Judgment	Situated Practice
Risk Frameworks Maintaining Control Reactive Practice	Formal Risk Practices	
Industrial Standards Professional Norms Accountability	Compliance	

Alias	Role	Private/Public org.
Respondent A	Project Manager	Private
Respondent B	Project Engineer	Private
Respondent C	Site Manager	Private
Respondent D	Chief of Estimations	Private
Respondent E	Production Manager	Public
Respondent F	Project Manager	Public
Respondent G	Technical Manager	Private
Respondent H	Quality & Sustainability Manager	Private
Respondent I	Project Manager	Public
Respondent J	Project Engineer	Public
Respondent K	Project Engineer	Public
Respondent L	Project Engineer	Public
Respondent M	Project Engineer	Public
Respondent N	Project Manager	Private
Respondent O	Technical Advisor	Public
Respondent P	Project Engineer	Private
Respondent Q	Production Manager	Private
Respondent R	Project Manager	Private
Respondent S	Project Developer	Private
Respondent T	Project Manager	Private

1st Order Concept	2nd Order Concept	Aggregated Dimensions
Improvements Control Measurements Time & Cost Performance	Legitimacy	

Financial Risk Performance Deviation Time & Budget	Uncertainty	Market Logic
Efficiency Risk Minimization Successfactors	Performance Driver	
Accountability Standardized Models Governance Structures	Compliance	State Logic
Reputational Risks Communication Visible Projects	Transparency	
Social Sustainability Contractual Demands Organizational Coordination	Accountability	
Own Risk Perception Ambiguity of Risk Experience & Judgment	Definition of Risk	Professional Logic
Documentation Responsible Practices Decision-Making	Responsability	
Expertise Adaptive Risk Management Quality	Judgment	