

Dissertation

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Research Title: A study of the integration of risk management into different stages of the project life cycle in the UK

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Chapter 1

Introduction

Project Risk Management (PRM) is a systematic, ongoing discipline concerned with identifying, analysing, and managing potential events or conditions that could influence a project's key objectives—namely cost, time, scope, and quality (PMI, 2021). Its purpose goes beyond mitigating negative outcomes; it also seeks to leverage positive risks that may strengthen project performance. In contemporary project settings, characterised by increasing complexity, interconnected tasks, and heightened stakeholder expectations, risk has become an integral part of every stage of project delivery. From initiation and planning through to execution, monitoring, and closure, risk considerations must remain active and adaptive, especially in fields such as construction, information technology, and healthcare where uncertainties frequently evolve (Hillson & Murray-Webster, 2021).

Although PRM models such as PMBOK and PRINCE2 provide structured guidance, many organisations continue to rely on reactive or siloed methods, addressing risks only when problems have already emerged (Agarwal & Virine, 2019). This limited approach often results in schedule disruptions, cost escalations, compromised quality, or, in severe cases, complete project breakdown. By contrast, a fully integrated risk management approach embeds risk thinking across the entire project life cycle, enabling earlier detection, proactive responses, and continuous oversight. Such integration can significantly enhance organisational agility, strengthen stakeholder trust, and support more informed decision-making.

The purpose of this research is to investigate how UK organisations can embed PRM practices across all stages of the project life cycle in a structured and consistent manner. The study seeks to examine current organisational approaches, uncover challenges that hinder integration, and offer recommendations for positioning risk management as a core strategic component of project planning and delivery.

Background of the Study

Today's project environments are characterised by increasing volatility, uncertainty, complexity, and ambiguity (VUCA), driven by globalisation, rapid technological innovation, regulatory pressures, and evolving stakeholder demands. These conditions expose projects to a broader range of risks, from strategic and financial risks to operational, technological, and human-related challenges (Jafari et al., 2011). Although structured methodologies such as PMBOK and PRINCE2 offer robust guidance for managing these uncertainties, many organisations continue to rely on fragmented, ad-hoc, or late-stage approaches to risk management (Agarwal & Virine, 2019). In practice, risk identification and assessment are often front-loaded during planning, with limited

monitoring or proactive intervention during execution, monitoring, or closure phases (Naderpour, Mofid & Sard Rood, 2019). This tendency has resulted in persistent issues such as cost overruns, schedule delays, poor quality outcomes, and stakeholder dissatisfaction.

High-profile project failures in sectors such as construction, IT, and public infrastructure have further reinforced the limitations of traditional approaches. In many of these cases, risks were identified but not effectively monitored; emerging risks were overlooked; and decision-making lacked timely, risk-informed insights. Such examples highlight the importance of integrated PRM practices that extend across all project stages rather than being treated as an isolated activity. A more holistic approach ensures continual reassessment of risks, early detection of emerging threats, and the ability to respond to changing project conditions with agility and precision.

Problem Statement

A key problem in project management is the inconsistent and uneven application of risk practices across the project life cycle. Although risk registers and planning tools are commonly used during early project stages, they are not always updated or reviewed as the project progresses. This results in reactive rather than proactive management, leaving project teams unprepared for new or evolving risks. Consequently, many projects face significant delays, unexpected costs, diminishing quality, or challenges in meeting stakeholder expectations. The core issue this proposal seeks to address is the lack of integrated risk management—where each phase of the project life cycle is supported by continuous, systematic, and coordinated risk-related activities. By investigating this gap, the study aims to determine how embedding risk processes throughout all phases can improve project outcomes and promote more resilient project delivery.

Proposed Research Aim

The overarching aim of this research is to examine how risk management practices can be seamlessly and effectively integrated across all stages of the project life cycle—initiation, planning, execution, monitoring and controlling, and closure. This involves shifting from a static, checklist-based approach to a dynamic and iterative model in which risks are continuously identified, assessed, prioritised, and addressed. To achieve this aim, the study will evaluate the extent to which UK organisations currently apply integrated risk practices, analyse the strengths and weaknesses of existing methods, and identify opportunities for improvement. Through a combination of literature review, industry analysis, and case-based examples, the research intends to develop practical recommendations that project managers can use to enhance risk responsiveness, improve decision-making, and increase the likelihood of meeting project objectives within agreed time, cost, and scope constraints.

Proposed Research Objectives

The proposed research objectives of this study are to identify the key risk management practices relevant to each stage of the project life cycle, including initiation, planning, execution, monitoring and controlling, and closure.

The study also aims to evaluate the influence of integrated risk management on project performance, particularly in relation to cost, time, quality, and stakeholder satisfaction. In addition, the research seeks to examine common challenges and barriers that limit the adoption of continuous risk management practices, such as organisational culture, resource limitations, skills gaps, and communication barriers.

Finally, the study aims to recommend best practices and practical strategies for embedding risk management holistically across the project life cycle within UK organisations.

Significance of the Study

This research is significant because it addresses a persistent gap between theoretical models of risk management and their practical application in real-world projects. By exploring how risk management can be applied more holistically, the study contributes to improved project performance, enhanced risk preparedness, and more sustainable project outcomes. The findings may provide valuable insights for project managers, PMOs, and senior decision-makers seeking to strengthen their organisational risk culture and reduce instances of project failure. From an academic perspective, the research deepens understanding of how integrated risk management aligns with broader project governance principles and advances project management scholarship. Ultimately, the study supports the development of stronger, more resilient project systems capable of adapting to uncertainty throughout the project life cycle (PMI, 2021).

Purpose of the Study

The purpose of this study is to explore the practical value of embedding risk management practices across the entire project life cycle, focusing on project environments within the UK. By analysing how risks are anticipated, monitored, and acted upon from initial conception through project closure, the research aims to demonstrate the benefits of adopting a proactive and integrated risk management approach. It will also examine how organisational structures, industry contexts, and managerial behaviours influence risk-related decision-making. Through this exploration, the study seeks to highlight why continuous risk integration is essential for improving project predictability, reducing vulnerability to uncertainty, and enhancing overall project success.

Rationale of the Study

As contemporary projects become increasingly interdependent and exposed to diverse uncertainties—especially in the post-pandemic landscape—traditional risk approaches that rely on periodic assessment are no longer adequate. Integrated risk management enhances the organisation's ability to make timely, informed decisions and respond effectively to evolving project conditions (Cagliano, Grimaldi & Rafele, 2021). A holistic approach not only supports operational efficiency but also strengthens strategic alignment, improves communication across stakeholders, and builds organisational resilience. Understanding how to embed such practices across the project life cycle is therefore essential for sustaining successful project delivery in complex modern environments.

Chapter 2

Literature Review

The literature review critically evaluates academic research, professional guidance, and industry evidence relating to Project Risk Management (PRM), with a specific focus on how risk is defined, operationalised, and integrated across the full project life cycle. Existing scholarship consistently emphasises the importance of proactive, structured, and continuous risk processes; however, gaps remain between theoretical models and real-world practice, particularly concerning the level of integration across project phases. This review synthesises key themes, including conceptual definitions, major frameworks, the nature of risks at different life cycle stages, integration models, early versus late risk engagement, organisational challenges, and insights from case studies.

Definitions and Concepts of Project Risk Management

PRM is generally understood as a systematic and iterative process that aims to identify, analyse, and respond to uncertainties that may influence project outcomes (Hillson & Murray-Webster, 2021). Various authors emphasise different aspects of PRM. For instance:

Traditional definitions of risk management focus primarily on negative outcomes, viewing risk as events that pose threats to project cost, time, scope, or quality. In contrast, contemporary perspectives recognise risk as encompassing both threats and opportunities, thereby extending risk management beyond purely defensive strategies.

Moreover, risk is increasingly viewed as a *dynamic* element of project environments. Risks emerge, evolve, and interact across the life cycle, influenced by market conditions, stakeholder interests, organisational culture, and technological developments. This complexity means that a one-off risk assessment is insufficient; instead, risk must be monitored, updated, and re-evaluated continually.

Critically, several researchers argue that PRM is often approached as a compliance task—something done to “tick the box”—rather than as a strategic driver of decision-making (Willumsen et al., 2019). This gap highlights the need for deeper integration and more conscious use of risk insights to guide project decisions.

Risk Management Frameworks

Two dominant frameworks underpin much of global PRM practice:

PMBOK (PMI, 2021)

PMBOK outlines a detailed set of processes for managing risk, including identification, qualitative and quantitative analysis, planning responses, implementing actions, and

ongoing monitoring. It also provides tools such as risk registers, probability-impact matrices, and Monte Carlo simulations.

PRINCE2 (AXELOS, 2022)

PRINCE2 places strong emphasis on governance by clearly defining roles, responsibilities, and escalation paths, and by integrating risk management within formal decision-making structures, particularly through documents such as the risk management approach. Despite the robustness of frameworks such as PRINCE2 and PMBOK, several studies highlight a gap between theory and practice.

For example, many organisations fail to implement quantitative risk analysis due to a lack of expertise (Benta et al., 2022), while monitoring and updating risk registers often receive limited attention during the execution phase.

In addition, frameworks are frequently adopted in name only, with significant variation in the depth and consistency of their application across organisations. This indicates that although formal frameworks provide valuable structure, effective project risk management ultimately depends on organisational maturity, culture, and leadership commitment.

Characteristics of Risk by Phase

A key theme in the literature is that risk is not uniform across the project life cycle.

Initiation:

Risks at this stage are mainly strategic and relate to unclear objectives, misalignment with organisational goals, and uncertain stakeholder expectations.

Planning:

Planning risks commonly involve inaccurate cost and schedule estimates, incomplete requirements, and poorly defined project scope.

Execution:

During execution, risks become operational and technical, including coordination problems, performance failures, and contractor or supplier issues.

Monitoring and Controlling:

This stage is characterised by emerging risks, the accumulation of earlier decisions, and external changes such as regulatory or environmental shifts.

Closure:

Risks at closure relate to final acceptance, documentation accuracy, handover quality, and unresolved contractual or operational obligations.

Different stages introduce different sources of uncertainty (Jafari et al., 2011), including:

Integration Models

Integration is widely recognised in the literature as a critical component of effective risk management. Integrated models aim to embed risk awareness and analysis across all project activities and decision-making processes, rather than treating risk management as a separate or isolated function. Agarwal and Virine (2019) identify several key characteristics of fully integrated risk management, including early embedding of risk considerations during strategic planning and project initiation, continuous monitoring supported by real-time data, and the presence of feedback loops linking risk assessments to project plans. They also emphasise the importance of strong communication channels that enable open escalation of concerns and alignment between risk management practices and organisational governance structures.

By adopting integrated models, organisations gain a more holistic understanding of the project environment, allowing risk insights to inform areas such as scheduling, budgeting, procurement, and stakeholder engagement. This enhances project agility and improves the ability to respond to uncertainty. However, the literature also notes that successful integration requires a sufficient level of organisational maturity, as organisations with siloed structures or rigid hierarchies often struggle to implement integrated risk management effectively.

Early vs. Late Risk Management

The literature consistently indicates that early adoption of project risk management (PRM) is associated with more successful project outcomes. Naderpour et al. (2019) demonstrate that projects in which risk assessments are conducted only during the planning phase, or delayed until execution, are more likely to experience schedule overruns, budget deviations, scope creep, and quality issues. In contrast, early identification of risks supports more accurate project estimates, enables proactive mitigation strategies, and improves alignment among stakeholders. When risk management is introduced at a later stage, it often shifts into crisis management, where response options are more limited and more costly. This evidence reinforces the importance of integrating risk management across the entire project life cycle.

Barriers and Challenges

Despite the evidence supporting integrated risk management, implementation remains inconsistent. Barriers identified in the literature include:

Lack of Skills

Project teams may not possess the necessary expertise in risk analysis, especially quantitative methods.

Organisational Resistance

Cultural resistance to adopting structured risk processes is common, particularly in organisations accustomed to informal or reactive management styles.

Ambiguity in Roles

Lack of clarity about who “owns” risk within the project team can result in ineffective accountability.

Poor Information Flow

Inefficient communication channels lead to under-reporting of risks or delayed escalation.

Risk Culture

Some organisations view risk reporting negatively, leading to fear of blame rather than openness and learning.

Critically, literature shows that technical tools alone do not ensure effective PRM—success depends heavily on behavioural, cultural, and organisational factors.

Case Studies

The literature provides strong evidence of the negative consequences associated with poor integration of risk management practices. Cagliano, Grimaldi and Rafele (2021) found that projects characterised by fragmented risk processes frequently failed to identify emerging risks at an early stage and often made decisions without adequate risk-informed insight. As a result, such projects commonly experienced significant cost overruns and schedule delays. Importantly, these failures were not due to a lack of risk awareness, but rather to the inability to sustain risk management practices consistently across the different phases of the project life cycle.

Positive Case Examples

Al-Khazali and Ali (2023) present contrasting case studies demonstrating that integrated risk management contributes to improved project outcomes. Their findings show that projects adopting integrated approaches benefit from stronger stakeholder engagement, earlier identification of operational issues, faster response times, and improved performance in terms of cost, quality, and schedule. These results highlight that successful projects treat risk management as a strategic asset that supports decision-making, rather than as a purely administrative task.

Chapter 3

Research Methods and Methodology

Research Philosophy

This study adopts an **interpretivist research philosophy**, which assumes that reality is socially constructed and shaped by individuals' perceptions, experiences, and interactions rather than by objective or universally measurable phenomena. Interpretivism is particularly well-suited for research involving professional judgement, behaviour, and organisational decision-making, as it recognises that different individuals experience and interpret the same process or situation in diverse ways (Saunders et al., 2023).

In the context of project risk management, practitioners' interpretations of risk, the value they place on certain risk processes, and the extent to which they integrate risk activities across project phases can vary significantly across industries, organisational cultures, and project environments. An interpretivist stance allows the researcher to explore these variations in depth, focusing on subjective meanings, personal insights, and contextual influences. By embracing this philosophy, the research can produce rich, nuanced findings that reflect the complexity of real-world PRM integration in UK-based projects.

Research Paradigm

A qualitative research paradigm underpins this study, as the primary aim is to explore how project professionals experience and interpret the integration of risk management across the project life cycle. Qualitative inquiry allows for an in-depth examination of behaviours, decision-making processes, challenges, and contextual influences that cannot be fully captured through numerical or quantitative data alone.

This paradigm supports an exploration of how and why risk management practices are implemented in specific ways, with a strong focus on participants' lived experiences rather than predefined variables. By analysing patterns and meanings within participants' narratives, the qualitative approach provides rich insight into the organisational dynamics, human judgement, and sector-specific complexities that shape project risk management. As a result, the qualitative paradigm offers the most appropriate foundation for achieving the research aim.

Research Approach

The research adopts an **inductive approach**, allowing insights and theoretical understanding to emerge directly from the data collected. Rather than testing

predetermined hypotheses or existing theories, this approach supports the identification of patterns, relationships, and explanations based on participants' experiences and perspectives. This is particularly appropriate for research into integrated risk management, as existing theories often emphasise formal frameworks rather than the lived experiences of practitioners.

Furthermore, risk management practices vary considerably across sectors, levels of organisational maturity, and cultural contexts. An inductive approach enables the study to capture these variations and develop findings that are grounded in real-world practice. By focusing on practical insights rather than theory validation, the research adopts a flexible and exploratory stance, enhancing its ability to explain how risk integration occurs in practice and what factors influence its effectiveness.

Research Methodology

A qualitative methodology guides this study, providing the depth and flexibility required to explore complex organisational practices related to risk management. Qualitative methods enable the researcher to capture detailed accounts of professional experience, variations in how risk processes are interpreted, and meaningful examples of both challenges and successful practices. This approach also allows for an examination of the contextual factors that influence risk-related decision-making within different project environments.

By using open-ended survey questions, the methodology encourages participants to express their views in their own words, offering richer insight and contextual detail than structured or purely quantitative methods. This research design is therefore well aligned with the study's aim of understanding how professionals integrate risk management into their daily project activities across different stages of the project life cycle.

Research Strategy

The research strategy adopted for this study is survey-based qualitative research using online tools. This approach was selected because it allows participants from a range of UK industries to contribute without geographical limitations, thereby improving accessibility. The flexibility of online surveys enables professionals to complete the questionnaire at a time convenient to them, which supports higher response rates among participants with demanding work schedules.

The use of open-ended questions within the survey facilitates the collection of rich qualitative data, capturing detailed experiences and perspectives, while the survey format allows for broader participant reach than would typically be achievable through interviews alone. By targeting respondents from construction, IT, healthcare, and other

project-driven sectors, the strategy ensures a diverse range of industry perspectives. Although interviews are often used in qualitative research, the survey-based approach provides a practical and efficient method for collecting extensive experiential data within the limited timeframe of the research.

Sampling Methods

The study employs purposive sampling to select participants based on their professional relevance and expertise in project and risk management. This deliberate sampling approach ensures that data are collected from individuals with a minimum of five years' professional experience, direct involvement in managing risks across multiple stages of the project life cycle, and roles based within the UK to maintain contextual relevance. A minimum of ten qualified participants were recruited, providing sufficient diversity to capture perspectives from different industries while also allowing for in-depth qualitative analysis.

This sampling strategy supports the identification of meaningful patterns and themes within the data while remaining feasible within the ethical and practical constraints of the research. By targeting participants with substantial experience and direct exposure to risk management practices, the approach enhances the credibility, reliability, and relevance of the study's findings.

Data Collection Tools

Data were collected exclusively through online qualitative surveys distributed using platforms such as Microsoft Forms or Google Forms. This method was selected to ensure participant anonymity, accessibility, and convenience, while also allowing respondents to complete the survey at a time suitable to their professional schedules. The survey design combined open-ended questions, which enabled participants to provide detailed narratives, opinions, and reflections based on their professional experience, with closed-ended questions used to capture basic demographic and professional information to contextualise the qualitative responses.

Prior to participation, all respondents received an information sheet outlining the purpose of the research, confidentiality and data protection procedures, potential risks, and their right to withdraw at any stage without consequence. Informed consent was obtained electronically before survey completion. All data were stored securely, with access restricted to the researcher, and were managed in full compliance with GDPR requirements.

Data Interpretation

The data will be analysed using **thematic analysis**, a widely used qualitative method that allows for systematic identification of recurring ideas, attitudes, and patterns within the data. The analysis will follow Braun and Clarke's (2019) six-step model:

1. Familiarisation with the data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the final analysis

This approach supports the development of meaningful categories and themes related to how risk is perceived, integrated, and managed across project stages. Thematic analysis also allows for comparisons across industries and project types, offering a richer understanding of both common and unique practices.

Ethical Considerations

Ethical considerations were central to the design and conduct of this research. Ethical approval was obtained from the University of Wales Trinity Saint David (UWTSD) prior to the commencement of data collection, and all procedures were conducted in accordance with institutional ethical standards and the requirements of the General Data Protection Regulation (GDPR). Participation in the study was entirely voluntary, and participants were informed that they could decline to take part or withdraw from the research at any stage without any negative consequences.

To protect participant privacy, anonymity and confidentiality were strictly maintained throughout the research process. No personal identifiers were collected, and all responses were anonymised and coded to prevent identification. Data security was also prioritised, with all digital data encrypted and stored on password-protected devices accessible only to the researcher. In addition, participants were provided with clear and transparent information regarding the purpose of the study, how their data would be used, and any potential benefits or risks associated with participation. This ensured informed consent and upheld ethical integrity throughout the research.

Chapter 4

Findings and Discussion

This chapter presents and analyses the findings obtained from the qualitative data collected through an online survey of project professionals working within the UK. The purpose of the data collection was to examine how risk management is integrated across the different stages of the project life cycle, with specific attention given to general project risk management practices, IT-related risk management, and health and safety risk management.

The survey used open-ended questions to allow participants to provide detailed, experience-based responses reflecting real project environments. This approach enabled the collection of rich qualitative data on how risks are identified, monitored, and managed from project initiation through to closure. Particular emphasis was placed on understanding sector-specific risks, the role of stakeholders, organisational culture, and the impact of time, budget, and regulatory constraints on risk management practices.

The data were analysed using thematic analysis, which facilitated the identification of recurring patterns and key themes across participant responses. The findings are presented in line with the research objectives and offer practical insight into how integrated risk management is applied across infrastructure, IT, and health and safety contexts within UK-based projects.

Risk Management data collection

Participant 1

The participant explained that risk management in the HS2 project is applied continuously across the project life cycle. Strategic risks are addressed during planning, technical and interface risks are collaboratively managed during design, and operational risks are monitored through regular reviews and a centralised system during construction, ensuring ongoing risk visibility and control.

“After years working on HS2, I’ve realised that risk management is not a document—it’s a behaviour. The moment people stop speaking up, the project becomes vulnerable.”

The participant also mentions that effective risk management relies on individual **behaviour and open communication, rather than solely on formal processes**. This

suggests that when team members do not actively raise concerns, risks may remain unnoticed and increase the project's vulnerability.

Participant 2- Risk Analyst, HS2 Central Risk Team

The participant explained that a key challenge in HS2 is maintaining consistency in risk management across multiple joint-venture contractors who use different tools, cultures, and thresholds, which initially led to uneven data quality. This was addressed through standardised definitions, shared training, and a common escalation format. Additional challenges included unclear risk ownership across disciplines and the rapid pace of external change (e.g., political and funding shifts), which HS2 managed by setting clear accountability rules and using flexible forecasting with rapid review sessions to rescore risks within 24–48 hours.

Participant 3 — Civil Engineer, West Midlands Section (HS2 Phase One)

The participant described risk management in the HS2 project as a continuous process applied across planning, design, and construction stages. Strategic risks are identified during planning, technical and interface risks are refined collaboratively during design using investigations and modelling, and operational risks are managed through daily updates, regular briefings, and structured reviews during construction.

“Working on HS2 has taught me that real engineering risk rarely behaves the way it looks in the design model—once you get on site, the project starts teaching you its own truth.”

This quote highlights the **difference between predicted risks during the design stage** and the realities encountered during construction. The participant emphasises that on-site conditions often reveal unforeseen risks, reinforcing the need for continuous **monitoring and updating of risk assessments** throughout the project life cycle.

Data collection-IT-Related Risk Management in the HS2 project

Participant 1

The participant explained that early integration of risk management in HS2 IT projects significantly influenced project success. Early risk workshops identified interoperability risks between different BIM platforms, allowing standardised processes to be implemented before large-scale development, which reduced rework. In addition, early identification of cybersecurity risks enabled stronger data protection measures to be introduced during design, helping to safeguard sensitive engineering information.

“The biggest lesson HS2 taught me is that IT risks grow quietly—if you don’t catch them early, they become engineering problems, safety problems, and political problems all at once.”

The participant uses this statement to emphasise the interconnected nature of IT risks within large infrastructure projects. The quote suggests that unmanaged digital risks can spread beyond technical systems and affect engineering delivery, safety compliance, and stakeholder confidence, underlining the need for early and proactive IT risk management.

Participant 2

The participant identified several key technological risks in HS2 IT projects, including system interoperability failures, BIM model corruption, cloud service outages, inaccurate GIS data, and software version conflicts. Data loss during model federation was highlighted as the most significant challenge, which was mitigated through automated validation tools and modular model structures. Additional controls, such as mirrored backup systems, offline working protocols, and unified software version policies, were implemented to reduce disruption and improve system stability.

Data collection-Health & Safety Management

Participant 1

The participant explained that health and safety risks in the HS2 project are identified early during the planning phase through design-stage risk assessments, method statement reviews, and CDM hazard elimination studies. During execution, risk management becomes more dynamic, with daily briefings, on-site inspections, behavioural observations, near-miss reporting, and digital tools used to identify and escalate emerging health and safety risks in real time.

Participant 2- Occupational Health Advisor, HS2 Workforce Health Team

The participant explained that occupational health risks in the HS2 project are identified during the planning phase through hazard assessments, welfare planning, and analysis of site-specific activities such as tunnelling. During execution, health risks are managed through continuous monitoring measures, including dust and vibration tracking, noise testing, and occupational health surveillance, with risks reassessed whenever working methods or site conditions change.

After analysing the primary data collected from professionals working on the HS2 project, additional secondary research was undertaken to contextualise and support the findings. This review of publicly available information indicates strong alignment between participant responses and documented risk management practices within the HS2 programme.

Official HS2 documentation confirms that the programme operates **under a formal risk management** policy that emphasises consistent risk identification, assessment, ownership, and monitoring across all stages of the project life cycle (HS2 Ltd, 2023). This supports participants' accounts of lifecycle-wide risk integration, structured review processes, and the use of centralised risk systems from planning through construction and commissioning.

Further secondary evidence highlights the use of supplier and market risk monitoring tools within HS2 to manage economic volatility and supply chain uncertainty (HS2 Learning Legacy, 2022). These practices align with participant descriptions of real-time dashboards, digital reporting systems, and continuous risk updates used to maintain relevance and responsiveness during execution.

However, external oversight reports also **identify ongoing challenges related to risk** and change management. The UK National Audit Office has reported that early phases of HS2 underestimated complexity and risk, contributing to cost escalation and schedule delays (NAO, 2020; NAO, 2024). These findings reflect participants' experiences of **coordination difficulties**, inconsistent risk maturity across joint-venture partners, and the need to frequently revise risk baselines in response to political and funding changes.

In addition, independent analysis of HS2 cost performance highlights the consequences of **insufficient early risk integration and evolving scope decisions**, reinforcing the importance of proactive and adaptive risk management practices across all project stages (Institute for Government, 2024). Overall, the secondary data corroborates the primary findings of this study, demonstrating that while HS2 has implemented structured and integrated risk management processes, the scale and complexity of the programme continue to present significant risk management challenges.

Integration of Risk Management Across the Project Life Cycle

The findings demonstrate that risk management within the HS2 project is implemented as a continuous and lifecycle-wide process, beginning at project initiation and extending through to commissioning and handover. This strongly supports the arguments made by Agarwal and Virine (2019), who emphasise that effective risk management must be embedded across all project phases rather than treated as a one-off planning activity. Participants' descriptions of structured reviews, centralised risk

systems, and phase-specific risk focus reflect key characteristics of integrated risk management models discussed in the literature.

Consistent with Jafari et al. (2011), the findings show that different types of risks dominate different stages of the project life cycle. Strategic and contextual risks are prioritised during initiation and planning, while technical, operational, and interface risks become more prominent during design and execution. This alignment suggests that HS2 demonstrates a relatively mature approach to tailoring risk practices to lifecycle stages, addressing a common weakness identified in the literature where organisations apply generic risk processes across all phases.

Challenges to Risk Management Integration

Despite evidence of structured risk practices, the findings reveal several challenges that hinder full integration. One of the most significant challenges identified was the complexity of coordinating risk management across multiple joint-venture contractors with varying levels of maturity, tools, and organisational cultures. This supports the findings of Benta et al. (2022), who argue that organisational fragmentation and inconsistent risk cultures often undermine the effectiveness of formal risk frameworks.

The issue of “risk fatigue” highlighted by participants also reflects concerns raised in the literature regarding behavioural and cultural barriers to effective risk management (Hillson & Murray-Webster, 2021). When delivery pressures increase, risk reporting may be deprioritised, reinforcing the view that technical tools alone are insufficient without strong leadership, communication, and behavioural commitment. The use of digital dashboards and automated reminders in HS2 aligns with recommendations in the literature for maintaining engagement and ensuring continuous risk visibility.

IT-Related Risk Management and Early Integration

The findings relating to IT risk management strongly reinforce the literature’s emphasis on early risk identification. Participants described how early integration of IT risk management—particularly in relation to BIM interoperability and cybersecurity—prevented extensive rework and reduced downstream impacts. This supports the conclusions of Naderpour et al. (2019), who argue that delayed risk management often leads to cost overruns, schedule delays, and quality issues.

Furthermore, the interconnected nature of IT risks identified in the findings aligns with Smith and Dvir’s (2021) argument that risks in complex projects are rarely isolated. The escalation of unmanaged IT risks into engineering, safety, and political issues highlights the importance of treating IT risk management as a strategic concern rather than a purely technical function. The adoption of standardised software policies, backup environments, and data validation tools within HS2 demonstrates practical application of integrated risk principles discussed in the literature.

Health and Safety Risk Management Across Project Stages

Health and safety findings indicate a strong emphasis on early hazard identification and continuous monitoring, particularly through CDM-compliant design reviews and real-time site controls. This aligns with Cagliano, Grimaldi and Rafele (2021), who argue that sustained risk monitoring across project phases is critical for preventing incidents and ensuring compliance.

The findings also support the view that health and safety risk management must be adaptive and responsive to changing site conditions. Continuous occupational health monitoring, near-miss reporting, and behavioural safety observations reflect best practices identified in the literature and demonstrate how lifecycle-wide integration can reduce exposure to long-term health risks. These practices further reinforce the argument that risk management should be embedded into daily operational routines rather than confined to documentation.

Organisational Culture and Behavioural Influences

A key insight emerging from the findings is the importance of organisational culture and behaviour in effective risk management. Participants consistently emphasised that risk management depends on open communication, individual accountability, and a willingness to escalate concerns. This supports Hillson and Murray-Webster's (2021) assertion that risk attitude and organisational culture significantly influence risk outcomes.

The perception of risk management as a behavioural practice rather than an administrative task mirrors the literature's call for a shift from compliance-driven approaches to strategic, value-adding risk management. Where organisations foster a culture that encourages speaking up and learning from risk events, integration across the project life cycle becomes more effective and sustainable.

Summary of Discussion

In summary, the findings largely support existing literature on integrated project risk management, demonstrating that lifecycle-wide integration, early risk identification, and continuous monitoring contribute to improved project outcomes. While HS2 exhibits many characteristics of mature risk management practice, challenges related to scale, coordination, and behavioural factors remain evident. The discussion highlights that successful integration of risk management requires not only robust frameworks and tools but also organisational maturity, leadership commitment, and a supportive risk culture.

Chapter 5

Introduction

This chapter concludes the study by summarising the key findings, reflecting on how the research objectives were addressed, and presenting practical recommendations for improving the integration of risk management across the project life cycle. It also acknowledges the limitations of the study and identifies areas for future research. The chapter draws together insights from the literature review, qualitative findings, and discussion to demonstrate the contribution of the research to both academic understanding and professional practice.

Conclusion

The findings of this study indicate that integrated risk management plays a critical role in improving project performance across all stages of the project life cycle. Evidence from the HS2 project shows that when risk management is embedded from early planning through to construction and commissioning, organisations are better equipped to anticipate uncertainty, respond proactively to emerging risks, and maintain control over cost, time, quality, and safety outcomes.

The research found that different types of risks dominate different project phases, supporting the view that risk management must be adaptive rather than generic. Strategic and contextual risks were most prominent during initiation and planning, while technical, operational, IT-related, and health and safety risks became more significant during design and execution. Continuous monitoring, structured governance, and the use of digital tools were shown to be essential in maintaining the relevance of risk assessments throughout the project life cycle.

However, the findings also revealed persistent challenges, including coordination across multiple contractors, inconsistent risk maturity, behavioural barriers such as risk fatigue, and the impact of political and funding uncertainty. These challenges highlight that effective risk management depends not only on formal frameworks but also on organisational culture, communication, and leadership commitment.

Achievement of Research Objectives

The research objectives set out in Chapter 1 were successfully achieved. The study identified key risk management practices relevant to each stage of the project life cycle, evaluated the influence of integrated risk management on project performance, and examined common barriers limiting effective integration. Through qualitative insights from project professionals, the research also developed practical recommendations for

embedding risk management holistically across UK project environments. Collectively, these outcomes address the core research aim of understanding how risk management can be integrated more effectively across the project life cycle.

Limitations of the Study

Despite its contributions, this study has several limitations. The use of qualitative survey data limits the ability to generalise findings across all project types or industries. The sample size, while appropriate for qualitative thematic analysis, was relatively small and focused primarily on UK-based projects, particularly large infrastructure environments. In addition, reliance on self-reported data may introduce subjective bias, as responses reflect participants' individual experiences and perceptions.

Practical Recommendations

Based on the findings of this study, several practical recommendations are proposed for project managers and organisations:

First, risk management should be embedded as a core managerial behaviour rather than treated as a compliance-driven process. Organisations should actively encourage open communication and early escalation of concerns to strengthen risk culture.

Second, risk management practices should be tailored to the specific demands of each project life cycle stage. This includes prioritising strategic risk assessment during initiation, technical risk refinement during design, and operational risk control during execution.

Third, organisations managing large or multi-contractor projects should standardise risk frameworks, scoring systems, and escalation processes to improve consistency and coordination across teams.

Fourth, greater use of digital risk management tools—such as real-time dashboards, automated alerts, and integrated reporting systems—should be encouraged to maintain risk visibility and reduce the effects of risk fatigue.

Finally, early integration of IT and health and safety risk management should be prioritised, as delays in addressing these risks can lead to wider operational, safety, and reputational consequences.

Recommendations for Future Research

Future research could build on this study by incorporating a larger and more diverse sample across different countries and industries to enhance generalisability. A mixed-methods approach combining qualitative insights with quantitative performance data could provide a more comprehensive understanding of the relationship between

integrated risk management and project success. Longitudinal studies examining how risk practices evolve over time within large programmes would also offer valuable insights into the long-term effectiveness of integrated risk management strategies.

Final Conclusion

This study has demonstrated that the effective integration of risk management across all stages of the project life cycle is a critical determinant of project success within UK project environments. Drawing on both established literature and qualitative evidence from practitioners involved in the HS2 programme, the research confirms that risk management is most effective when it is treated as a continuous, dynamic, and behaviour-driven process rather than a static or compliance-oriented activity.

The findings show that risks evolve in nature and intensity as projects progress from initiation through to closure, reinforcing the need for phase-specific yet interconnected risk management practices. Early-stage integration enables more accurate strategic decision-making, while continuous monitoring during execution and control phases allows organisations to respond proactively to emerging technical, operational, IT, and health and safety risks. The HS2 case evidence illustrates that when risk management is embedded into daily project routines, supported by structured governance and digital tools, it can significantly enhance control over cost, schedule, quality, and safety outcomes.

At the same time, the research highlights that formal frameworks alone are insufficient to guarantee effective risk integration. Organisational culture, leadership commitment, communication quality, and individual accountability play a decisive role in shaping how risk management is practiced in reality. Challenges such as inconsistent risk maturity across contractors, behavioural resistance, and external political and funding uncertainty underline the complexity of implementing fully integrated risk management in large-scale projects.

Overall, this study concludes that integrated project risk management should be viewed as a strategic capability that supports resilience, adaptability, and informed decision-making throughout the project life cycle. By embedding risk awareness across all phases and aligning technical processes with supportive organisational behaviours, UK organisations can improve project predictability, reduce the likelihood of failure, and enhance long-term project value. This conclusion directly reflects and synthesises the evidence and analysis presented throughout the dissertation.

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Appendix

Open Ended Questions for Participants

Risk Management

1. Based on your experience, how is risk management currently implemented across the different stages of a project's life cycle in your sector?
2. What challenges have you encountered in trying to integrate risk management into all phases of a project, and how have you addressed them?
3. How do project managers ensure that risk assessments remain relevant throughout the project life cycle?
4. What role do stakeholders play in identifying and mitigating risks at different stages?
5. How are lessons learned from previous projects incorporated into new risk management plans?
6. In your opinion, does the organisation's culture support proactive risk management? Why or why not?
7. How do time and budget constraints affect the implementation of risk management strategies?

IT-related Risk Management

- 1 In your IT projects, can you describe situations where early integration of risk management influenced project success or failure?
- 2 What types of technological risks have you faced during the execution phase, and what strategies were most effective in mitigating them?
- 3 How do cybersecurity risks impact project planning and execution in your organisation?
- 4 What tools or systems do you use to monitor and manage IT-related risks?
- 5 How do you ensure that team members are aware of and trained to handle emerging technological risks?

- 6 Can you describe how vendor or third-party risks are managed in IT projects?
- 7 In your experience, how does data protection legislation (such as GDPR) influence risk management decisions in IT projects?

Health and Safety Risk Management

- 1 From your perspective, how are health and safety risks identified and managed during the planning and execution phases of projects in your sector?
- 2 Can you share an example where continuous monitoring of health and safety risks prevented incidents or ensured compliance with UK regulations?
- 3 What processes are in place to ensure that health and safety risks are reviewed and updated throughout a project's life cycle?
- 4 How are subcontractors or external partners integrated into your health and safety risk management framework?
- 5 What challenges do you face in maintaining compliance with UK health and safety standards across different project sites?
- 6 How does communication between teams contribute to the effective management of health and safety risks?
- 7 Can you describe how incident reporting and investigation improve future health and safety practices?