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**The Impact of Operational Risk Management Practices on Business Continuity: An Applied
Study in Contracting Companies in Yanbu**

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عنوان البحث

أثر ممارسات إدارة المخاطر التشغيلية على استمرارية الأعمال: دراسة تطبيقية في شركات المقاولات بمدينة ينبع

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Dedication

This work is dedicated first and foremost to Almighty Allah, whose grace, guidance, and blessings have illuminated every step of my academic journey.

To my beloved parents, whose prayers, love, and unwavering support have been the foundation of my strength and determination.

To my late father—may his soul rest in peace—whose wisdom and inspiration continue to guide my path.

To my dear mother, the source of endless encouragement, compassion, and faith.

To my wife, my companion in every challenge, whose patience, support, and belief in me have been my greatest motivation.

To my brothers and sisters, who have always stood by my side with love and loyalty.

To my professors, mentors, and colleagues, whose guidance and encouragement have enriched my journey.

I dedicate this achievement to everyone who believed in me and helped me reach this milestone. May this accomplishment be a step toward greater success and growth.

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All praise is due to Allah, whose blessings, guidance, and mercy enabled me to complete this research. I extend my deepest gratitude to my parents, whose unconditional support and continuous prayers have been my greatest source of strength.

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To all who stood by me, supported me, and believed in my potential, I offer my sincere thanks. May Allah reward you all with goodness.

Abstract

This study examines the impact of Operational Risk Management (ORM) practices on Business Continuity in contracting companies operating in Yanbu, Saudi Arabia. As contracting firms face frequent operational challenges—such as supply chain disruptions, safety incidents, human errors, and equipment failures—the need for structured ORM frameworks has become increasingly critical. Using a descriptive–analytical methodology, data were collected from 100 employees across engineering, project management, safety, supervision, and administrative roles. Statistical analysis, including correlation and regression tests, was conducted to evaluate the relationship between ORM dimensions—risk identification, assessment, mitigation, monitoring, and documentation—and business continuity outcomes. The findings reveal a statistically significant positive relationship between ORM practices and the ability of companies to maintain operational stability during disruptions. Proactive risk identification, formal mitigation planning, and continuous monitoring were identified as the strongest predictors of business continuity. The study concludes that integrating ORM with continuity planning enhances organizational resilience, improves crisis readiness, and supports sustained performance in project-based environments. Recommendations are offered to strengthen risk frameworks and promote a risk-aware culture within contracting firms in Yanbu.

Keywords

1. Operational Risk Management
2. Business Continuity
3. Contracting Companies
4. Organizational Resilience

المستخلص

يهدف هذا البحث إلى دراسة أثر ممارسات إدارة المخاطر التشغيلية على استمرارية الأعمال في شركات المقاولات بمدينة ينبع، وذلك في ظل ما تواجهه هذه الشركات من تحديات تشغيلية متكررة مثل تعطل سلاسل الإمداد، الحوادث، الأخطاء البشرية، وفشل المعدات. اعتمدت الدراسة المنهج الوصفي-التحليلي، حيث تم جمع البيانات من 100 موظف يمثلون مهندسين، مديري مشاريع، مسؤولي سلامة، مشرفين، وموظفين إداريين. تم استخدام أساليب التحليل الإحصائي، بما في ذلك الارتباط والانحدار، لفحص العلاقة بين أبعاد إدارة المخاطر التشغيلية-التعرف على المخاطر، تقييمها، استراتيجيات التخفيف، المتابعة، والتوثيق-وبين استمرارية الأعمال. أظهرت النتائج وجود علاقة إيجابية ذات دلالة إحصائية بين تطبيق ممارسات إدارة المخاطر التشغيلية وارتفاع مستوى استمرارية الأعمال. كما تبين أن التعرف الاستباقي على المخاطر، وجود خطط استجابة رسمية، والمتابعة المستمرة تُعد من أقوى المتنبتات بقدرة الشركات على مواجهة الاضطرابات التشغيلية. وتخلص الدراسة إلى أن دمج إدارة المخاطر مع التخطيط للاستمرارية يعزز مرونة الشركات، ويرفع جاهزيتها للأزمات، ويدعم استمرار الأداء في بيئات المشاريع.

الكلمات المفتاحية

1. إدارة المخاطر التشغيلية
2. استمرارية الأعمال
3. شركات المقاولات
4. المرونة التنظيمية

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CHAPTER 1

Introduction

The operational risk has become a serious issue in the current world of businesses that is full of uncertainty and volatility in which businesses are expected to operate in such a complex environment without failure. This is especially so among the contracting companies which have their own unique challenges that are caused by the complex project environments, the changes in the market needs, the pressure of the regulators and the logistical disturbances. Effective Operational Risk Management (ORM) is becoming more and more important to the continuity of the business, disruption limitation and remaining competitive. The contracting industry in Yanbu, one of the major industrial cities of Saudi Arabia, is a strategic centre, where the practice risk management should be sound to sustain various economic development projects that the region is pursuing and mega infrastructure projects. It will therefore be timely and necessary to investigate the value and utility of ORM practices to business continuity in these companies.

Operational risks are the risks that arise because of internal process failure, people, systems or external event failures. Failure to correctly identify these risks, assess them and mitigate them can have severe implications of smooth operations of organizations. Several studies have shown the importance of the management of such risks. Altaf et al. (2022) assert the operational risk may influence negatively the performance of industries and effective management of the risk is associated with good structures of governance. Operational risks in contracting companies can be in many forms like the inability to deliver materials in time, safety of personnel involved in work, improper management of projects or financial malpractices. Such levels of risk when unchecked may lead to project delays, cost overruns or even shut down of entire operations. Thus, it is a strategic need to make a robust framework of risk management in place.

Moreover, the consolidation of risk management guidelines and the business continuity plans has been discovered to promote organizational resiliency. In accordance with Assibi (2024), the Enterprise Risk Management (ERM) and Business Continuity Planning (BCP) alignment is one of the key aspects of the improved resilience of the public sector. Applying this to the contracting sector or in a company in the medium risk society such as Yanbu, in essence, contracting corporations are always at a high risk of being involved in a case such as this. This means that ORM practices should not only focus on risk avoidance but also on continuity and recovery strategies. This includes proactive risk identification, developing contingency plans, employee training, and real-time monitoring systems.

The worldly point of view also holds a treasure trove of great information. To give an example, Wangyanwen et al. (2023) note that Chinese-based organizations have their ERM practices that largely determine the organizational performance, as preparedness, uncertainty, and term sustainability were positively affected. Likewise, Ambarwati et al. (2024) prove using a multi-methodical research how the strict risk assessment and human risks management contributes to business continuity in Indonesian power industry. These results emphasize the global applicability of the operational risk management in the various industries and geography.

Nevertheless, as far as global awareness is concerned, there is still a research gap in the way ORM practices are put in force with the main focus on the contracting sector in Saudi Arabia and specifically in Yanbu. Large corporations can have established risk systems, but small and medium-sized contracting organizations cannot have a complete strategy or have problems establishing it because of the lack of resources or expertise. This research paper attempts to bridge that gap by exploring the current ORM practice in such firms and how that practice affects facilitating the continuity of business.

The study with the aim of offering feasible proposals about how contracting companies in Yanbu can undertake to deal with risks involved in the operations tends to support the study because of its analysis of mechanisms of dealing with risks contracting companies undertake in Yanbu. It also helps in adding to the wider literature of risk management by providing the practical experience in a region of a fast developing economy and industry.

Research Problem

In current fast-paced and uncertain business environment, companies continue to experience increasing number of operational risks that may derail operational processes, destroy assets as well as jeopardizing the existence of a business. Specifically, construction firms face the risk of running operations, given that their ventures tend to incorporate a large number of players; tight schedules, dangerous working conditions, and logistics. To understand the situation in the context of Yanbu, Saudi Arabia, an industrialised and infrastructure developed city, the contracting firms that play a significant role in supporting the economic growth of such city, usually they do not have well-established operational risk management (ORM) frameworks and it suits their particular problems.

Integration of the risk management with business continuity strategies in building organizational resilience has been highlighted by scholars all over the world. In one example,

Assibi (2024) states that enterprise risk management and business continuity plan should have good relationship with an aim of enhancing resilience within the financial institutions of the public sector. This thinking is as well applicable in the business world especially where projects are involved such as in construction and contracting. Nonetheless, most of the companies involved in contracting still manage risk and continuity planning as two distinct activities, a fact that restrains their ability to manage crisis responses.

In addition, literature sources, including the study by Wangyanwen et al. (2023) and Ambarwati et al. (2024), offer global data indicating that, when utilized in a systematic manner, effective risk management programs can make a major distinction in the performance results of organizations and their sustenance within risk-prone sectors, such as manufacturing and energy generation, too. However, based on such results, this cannot be generalized in the Saudi contracting industry without analyzing it in context. The effectiveness of ORM practices has to be assessed through cultural, regulatory, and operational differences to adequately establish the appropriateness of the said practices in maintaining the continuity in business.

In the given case of contracting firms in Yanbu, one can observe the lack of research and studies on the matter of operating risk management and the effect management processes in such a field have on the viability of their operations. While Altaf et al. (2022) explore the impact of operational risk on the banking sector, there is limited empirical evidence on how such risks affect non-financial industries such as contracting and construction. This creates a pressing need for applied research that investigates whether existing ORM practices in Yanbu's contracting firms are adequate, effective, and aligned with business continuity goals.

To address this gap, the present study seeks to answer the following research question:
"How do operational risk management practices affect business continuity in contracting companies in Yanbu?"

Importance of Research

1. Scientific Significance

- Contributes to the academic literature on operational risk management and business continuity, especially in the context of contracting companies.
- Fills a research gap by focusing on the relationship between ORM practices and business continuity in a non-financial and project-driven sector.
- Provides empirical data from a developing economy (Saudi Arabia), which adds geographical diversity to existing risk management research.
- Supports the development of theoretical models linking risk management strategies with organizational resilience and continuity outcomes.

2. Practical Significance

- Helps contracting companies in Yanbu identify strengths and weaknesses in their current operational risk management practices.
- Offers practical recommendations to improve risk preparedness and minimize disruption to ongoing projects.
- Assists decision-makers in developing or refining business continuity plans tailored to operational realities.
- Encourages the adoption of integrated risk management frameworks to enhance performance and sustainability.
- Supports government and industry regulators in setting standards and policies that promote risk-aware cultures in contracting firms.

Study Objectives

Main objective

To examine how operational risk management practices affect business continuity in contracting companies in Yanbu.

Sub objectives

- To come up with the most prevalent type of operational risks to contracting companies in Yanbu.
- To determine the current operation risk management practises in these companies.
- To assess the contribution of ORM practice to the sustenance of business continuity.
 - To discuss the association between organizational resilience and operational risk management.
- To make recommendation on measures that can be undertaken to enhance better risk management and continuity planning in the contracting sector.

Study Questions

Main Research Question:

- How do operational risk management practices affect business continuity in contracting companies in Yanbu?

Sub-Questions:

- What are the most common operational risks encountered by contracting companies in Yanbu?
- What operational risk management practices are currently implemented by these companies?
- How effectively are these practices contributing to the continuity of operations during disruptions?
- What challenges do contracting companies face in applying ORM practices?
- Is there a significant relationship between the level of ORM implementation and the perceived resilience of the company?

Study Hypotheses

Main Hypothesis (H1):

- **There is a statistically significant positive relationship between operational risk management practices and business continuity in contracting companies in Yanbu.**

Sub-hypotheses:

- **H1a:** Contracting companies that implement proactive risk identification strategies exhibit higher levels of business continuity.
- **H1b:** The existence of formal risk response and mitigation plans positively influences business continuity outcomes.
- **H1c:** Employee involvement in operational risk management enhances the effectiveness of continuity planning.
- **H1d:** Regular monitoring and review of risk management practices are significantly associated with improved resilience to operational disruptions.
- **H1e:** The lack of risk management training and awareness is negatively correlated with the continuity of operations.

Scientific theory followed

The most important theory is the Enterprise Risk Management (ERM) as it gives the main outline of how organizations take on risk in a systematic way at the operational, financial, and strategic levels. ERM focuses on active identification, appraisal, and management of possible threats that can affect organizational goals. Argued and supported by Assibi (2024), an aligned risk culture with ERM and business continuity planning leads to the formation of a holistic culture of risk management that makes an institution resilient. ERM theory assumes that the concept of risk management is incorporated at every step of the decision-making processes, resulting in increased readiness, prompt mitigation, and enhanced recovery when faced with disruption, which is critical to contracting firms waiting to see when shortages of labor force, supply chains solution, or equipment failures occur.

In this respect, ERM practices are not of compliance but reactive nature; on the contrary, they are strategic devices that complement long-lasting continuity. The contracting firms in Yanbu that may be run on large scale infrastructure projects or other industrial developments are subjected to the complex and fluctuating conditions. An organized use of ORM, outlined in the theory of ERM, assists in making sure that these companies can survive either the failure of an internal process, or an external shock.

Among the complementary theories to ERM is the Organization Resilience theory that centers on the organisational capability of receiving, adapting, and recuperating to disruption in the organisation by appointing main functions. Wangyanwen et al. (2023) find that better-performing organizations are those with better risk management systems, which are set up better to handle uncertainty. In this framework, resilience does not refer not only to lack of failure but also to ability to respond and adapt to stress. The way to demonstrate resilience in project driven industries such as contracting is in the capability to change plans, rebalance resources, and stay in levels of safety and performance in the event of risk. The most important facilitator of this adaptability is ORM practice.

The theory of Organizational Resilience helps us to understand the fact that continuity is not a concrete thing but a process, or more precisely, an overall process of preparedness, flexibility, and learning. In their research on resilience in the Indonesian power industry, Ambarwati et al. (2024) show that one of the key elements of the Indonesian power industry resilience is human risk control, i.e., safety training and communication. Their evidence proves the adequacy of human-based practices of ORM especially in contracting companies

because on-site, manual functions, and coordination of teams, institutions and plants are most likely to be disturbed. Consequently, the resilience theory expands the perception of ORM in a way that it involves people, the culture, and the systems of learning as the main focus of the continuity planning.

The contingency theory is another crucial perspective which is based on the argument that there is no universal way of management. Rather, the success of any company practice such as risk management relies on the context it is undertaken. The applicable methodology of this theory to contracting firms is the fact that the activity of these firms differs widely depending on the scale, duration, composition of workers, and state of the environment. The outcomes of the study conducted by Ambarwati et al(2024). show that ORM strategies should be tailored to the peculiarities of certain industries and risks they encounter. The contingency theory therefore explains why there is a need to have flexible, situation-sensitive ORM systems that fit into the operational reality of individual contracting firms in Yanbu.

Other evidence in favor of such a scheme can be found in the work of Altaf et al. (2022), who also advocate the importance of the connection between operational risk and performance of the organization through strong governance. As indicated in their study of the banking industry complex risk-oversight frameworks enhance accountability and vulnerability to failure in operations. Although the situation is dissimilar to construction, governance as a framework to support the ORM can be taken widely. Association with companies that enter into contracts need a clear leadership, role definition, and internal control so that ORM practices can be effective and sustainable.

Technology is also playing a very crucial role of being a part of the modern theory of risk management. Kalogiannidis et al. (2024) examine the application of artificial intelligence (AI) to predictive risk assessment demonstrating how technology can be used to improve diagnostic accuracy and the speed of diagnosis. The use of AI-based solutions in real-time tracking and safety prediction, as well as logistics planning tools in the contracting business, can drastically improve the effectiveness of ORM and make it a part of business continuity, as delays and accidents are costly in this business. Investing into technology in the flow of the theoretical frame already recognizes the dynamic aspect of risk management running in transition and also in regions such as Saudi Arabia where the digitalization is a national agenda.

View of the small and medium enterprises (SMEs) is also pertinent. Dvorsky et al. (2021) and Tan & Lee (2022) emphasize the fact that SMEs tend to fail in implementing the formal ORM frameworks because of resource constraints but at the same time they are at very high risk. They conclude on the basis of their research, that parallel scaled and simple-scaled risk management models can be highly advantageous. This is even more so to smaller contracting firms in Yanbu which may lack the means to implement complex systems, but can develop resilience through simple ORM such as risk assessment, contingency planning and training of staff.

Finally, the framework is augmented by the theory of supply chain risk management, particularly, in project-based businesses. Sturm et al. (2022) reveal that the efficient control of demand-side and supply-side risks has a direct influence on performance and continuity. Contracting companies are also prone to external shocks that are usually caused by third-party suppliers. Risk in the supply chain is an inseparable part of ORM as integration into its wider scope means that a firm will not compromise the schedules of projects, as well as client satisfaction even in case of unforeseen incidents.

These notions are supported by Singh and Hong (2020) with the empirical finding that strategic and operational risk management is strongly associated with financial as well as operational performance. Their model underscores the idea that ORM is not merely defensive but is a critical component of competitive advantage. For contracting companies, this means that investing in ORM is not only about avoiding loss but also about enhancing project delivery, reputation, and profitability.

CHAPTER 2

Introduction

This chapter will give the theoretical basis and the past research associated with the operational risk management and business continuity in the contracting firms. It starts by explaining the meaning of such concepts as operational risks, organizational resilience, and business continuity and emphasizing their relevance in project-based industries. The chapter continues with the principles and elements of the operational risk management, which involve the identification, assessment, mitigation and monitoring of the risks. It further considers how business continuity planning can be used to achieve stability of organizations during disruptions. This chapter also examines the relevant international and regional studies, which have investigated the relationship between risk management practices and continuity, as a way of attracting insights on the research at hand. This chapter is able to give a complete picture of the variables that will be studied as well as the gap in research that can be identified based on synthesizing the theoretical perspectives and the empirical findings, which the current study attempts to fill.

Literature Review

In the fast changing nature of present day businesses, particularly those that are highly vulnerable to uncertainty like construction, energy and finance, usage of operational risk management (ORM) has become an operational pillar of organizational resilience. Proper ORM is a mechanism by which firms can be able to detect, evaluate, and address possible risks that would otherwise jeopardize business continuity and future success. Both academics and practitioners have been stressing that ORM can be combined with a wider strategic planning, which helps organizations deal with anticipated as well as unanticipated shocks.

The study presented by Assibi (2024) has a substantial analysis of Enterprise Risk Management (ERM) as the means of enhancing business continuity plans of the Ghanaian financial sector in the realm of the government. According to his findings, those institutions that strategically link ERM to the continuity planning are better placed to counter the shock operational shocks. According to the study, resilience cannot be seen as a resource or infrastructure based concept but rather as a culture of risk awareness and the ability to predict and absorb any interference. A combination of ERM with other business processes enables businesses to obtain an overall perception of risks and increases proactive decision-making. Although this study was carried out in the public sector, the idea which is depicted in it is much wider and is relevant in terms of the contracting companies and businesses focused on the realisation of projects: resilience can be built with the help of a preparedness, and ORM can be viewed as its driving force.

Considering the effects of ERM frameworks on the outcomes of firms further, the perceived effects of ERM on the Chinese-based firm performance are examined by Wangyanwen et al (2023). Their empirical project validates that the ERM has a positive relationship with operational efficiency, stakeholder faith and long-term value addition. The institutionalized nature of ERM, through identification, assessment, plan of response and monitoring, offers a clear picture at a given time of crisis to the decision-makers. Their results show that companies, which institutionalize risk procedures, tend to be more flexible and sustain continuity when the market changes, when there is a break in a supply chain, or when the regulations change. This is especially relevant to contracting companies in industrial regions such as Yanbu, where operational environments are often influenced by volatile supply chains and complex stakeholder demands.

Ambarwati et al(2024). introduce a distinctive perspective of ORM in the high-risk sector based on multi-methodically analyzing the risk control mechanism in the Indonesian power industry. Along the same line, their study shows that the combination of both qualitative and quantitative risk assessment coupled with good human risk management activities will result in better business continuity. The research concludes that in situations where training of the employees, their communication, and participatory safety cultures have been implemented there are very minimal cases of operational failure. The human element capable of influencing the success of ORM extensively is brought in the discussion being a relatively un-preferable subject of discussion. In the case of contracting firms, the security of the workforce in the field is a priority, where most of the jobs performed are location based. The researchers assert that empowering outfits to act under risk situations and integrating the risk awareness in the day-to-day activities help in minimizing the vulnerabilities and quickening the restoration process.

In the financial sector, Altaf et al. (2022) concentrate on the topic of operational risk and corporate governance and their influences on the organizational stability, especially in the banking sector of Pakistan. They have found that sound ORM frameworks, backed by the accountable governance arrangements, improve transparency and reduce the vulnerability to failure in operations. They insist that ORM is not a technical exercise but institutional and cultural in nature, where buy-in should be achieved at the top management and orientation to organizational values. The implications of the lack of leadership commitment and the absence of defined systems of accountability apply to contracting firms, though this article is by no means an extension of the sectoral context, given that it belongs to another specialized sector. Risk committees, standardized reporting, and internal controls are the governance mechanisms required to continue business operations.

Based on technological perspective, Kalogiannidis et al. (2024) explore the opportunity to employ the artificial intelligence (AI) in predictive risk assessment to assist business continuity in Greece. The case study conducted by them demonstrates that AI can be used to improve risk identification and response planning to a significant degree by operating with real-time data and predictive analytics. The intervention of AI-driven systems enables organizations to identify irregularities, predict the possibility of failures and mitigate them through practiced recovery plans by simulation. In the case of the contracting companies working in such areas as Yanbu, the implementation of such technologies may transform the management of risks in construction sites, the supply chains, and during project execution

phases. Use of digital tools in combination with disposable ORM frameworks has the potential to increase accuracy, dynamic range, and general resiliency.

The article by Dvorsky et al. (2021) explores the risks management existing in small and medium-sized businesses (SMEs), stressing the specific weaknesses of these companies in terms of fewer resources and less streamlined operations. Through their research, they stress on the need to develop a risk-sensitive culture as well as an inclusion of ORM into strategic planning, even among firms without elaborate systems. Most of the SMEs in which ORM is usually informal or reactive such as the contracting firms in Saudi Arabia are not best positioned to deal with protracted disruptions. Dvorsky et al. recommend the possibility of using affordable and scalable solutions to ORM implementation that should be implemented in stages. They have found that simple risk mapping exercises, scenario planning, and continental drills can all bring a significant amount of resilience to an organization.

Additional dimension to the conversation is the innovation risk management as argued by Mishchenko et al. (2021). The paper studying them in the financial institutions focuses on the example of dealing with risks associated with innovations including, but not limited to, adopting new technology or a business model and how the management addressed to achieve long-term success. Although innovation is a factor of growth, this factor can also spew operational imbalance when it is not regulated appropriately. This is becoming an issue of risk to contracting companies who are either adopting digital construction tools or even participating in new forms of infrastructure projects. Advantageous testing procedures, phased releases, and constant assessment of new processes are advised by the researchers as an ORM framework. These understandings support the assumption that business continuity requires not only response to threats, but also control of uncertainties in response to innovation and change.

Another study that can help understand the adoption of ERM in SMEs is by Tan and Lee (2022) in Malaysian companies. Their research states that the SMEs are increasingly finding out about the benefits of ERM, but still do not adopt it enough because of its perceived being complex and expensive. Nevertheless, those companies which adopt ERM are said to experience greater risk awareness, control conditions and more adequate decision making. This can be looked at as part of a more general issue in other industries such as contracting where short term deadlines and budgetary limitations are allowed to dominate considerations of risk planning in the long term. Tan and Lee portray simplified models of ERM suitable to

SMEs with the consideration that training, government support, and industry cooperation are required to increase adoption. According to their work, the creation of the culture of risk awareness, with the help of practical tools available, is essential to continuity and performance.

Regarding the interconnection of supply chain risk management and business performance, Sturm et al. (2022) look into the connections between the demand and supply sides of the risk management procedure and the performance of firms. They discover that some proactive supply chain risk management measures- including the diversity of the suppliers, buffer stocks, and development of cooperative supply chain partnerships directly lead to stability and profitability in the operations. The supply chain is one of the most serious operational risks of contracting companies that need to promptly receive materials and services as a part of their operations. The authors believe that by including the supply chain risk management into the wider ORM, the firm is better positioned to be able to predict and respond appropriately to external shocks and thus, facilitates continuity.

Lastly, Singh and Hong (2020) provide an empirical study on connection between management of strategic risks and operational risks with performance of firms. Their research renames the fact that both the aggregation and the prevention dimensions of risk management are necessary to attain competitive financial result. Strategic risk management addresses long-term threats, long-term opportunity and operational risk management addresses day- to day uncertainties of conducting the business. The combination of the two approaches forms a strong organization which can withstand any crisis and take advantage of the opportunities presented to it by the situation. As highlighted by Singh and Hong the companies which cannot acknowledge this interconnectedness are even more prone to disruption. Their study helps to advocate the understanding that survival is not some wither, continuity entails maintaining the performance by means of the systematic control of risk.

Commentary on Previous Studies and Research Gap

Combing these studies, it gives a multidimensional perspective of how to manage operational risk and how it helps to maintain business continuity. They all bring out the significance of strategic convergence, leadership dedication, and incorporation of technology, and employee participation in coming up with good ORM systems. These insights are more applicable to contracting firms in Yanbu since there are logistical, safety, and financial risks in the sector. Although most of these companies develop their businesses in high risk markets, not many

of them have elaborate frameworks to deal with such risks strategically. According to this literature, contracting firms can use ORM practices and adapt and engage them to a high extent, which can highly increase their resilience, limit disruptions in their operations, and achieve sustainability.

In addition, the studies point out that the management of operational risks cannot be regarded as a separate operation but as a part of the company strategy. Organizations should integrate this risk thinking into all aspects of a company, including at an executive level, through an operational level to create the culture of resiliency that enables the organizations to be prepared to anticipate, respond, and recover to various forms of disruptions. The specified approach is not only the key to survival during the crisis but also success in the competitive and fast-changing market. To the contracting companies, which want to be part of the big picture of building infrastructure and development in Saudi Arabia, it is no longer a choice whether or not to invest in such integrated ORM systems, but an imperative move to a strategic position.

Altaf et al. (2022) discuss the combination of the areas of operational risk and corporate governance in the banking sector in Pakistan. They show that mechanisms of governance, including oversight committees and internal controls play a significant role in reducing operational threats. Although governance is a major consideration in every industry, the physical, logistic and human threats of the contracting firm or construction project site especially in high growth rate areas like Yanbu, Saudi Arabia have not been directly discussed in the research.

Scientists such as Kalogiannidis et al. (2024) also discuss the technological solutions by addressing such areas of technological advancement as the role of artificial intelligence in predictive risk assessment. They have found that using AI would allow revolutionizing risk identification and continuity simulation. Nevertheless, many contracting companies operating in Saudi Arabia might not be ready to embrace such technologies limited by the available resources, technical knowhow or even organizations.

Dvorsky et al. (2021) and Tan & Lee (2022) illuminate the question of risk management in small and medium-sized enterprises (SMEs). Such studies acknowledge that SMEs tend to have no viable ORM frameworks in place, which increases their susceptibility to breakdowns. Although the works put across the case of simplified and scalable risk management approaches, designed to suit the SMEs, they are generally presumptuous and

lack specific recommendations on how contracting firms can attempt to manage risks during infrastructure and construction state projects.

The relationship between supply chain and operational risk management practices, on the one hand, and business performance, on the other hand, have significant empirical support by Sturm et al. (2022) as well as Singh & Hong (2020). They have concluded that those firms that manage to combine risk thinking within a demand-side and supply-side operation are in a better position to get continuity and competitive results. But these studies essentially concentrate on production and major company contexts, rather than the situation of contracting firms in which projects deal more with temporal, location-specific and generally externally-generated risks.

Although a combination of findings of these studies forms an excellent basis to understand operational risk management in different industries, there exists a definite research gap in relation to the applicability and effectiveness of operation risk management in contracting industry especially in relation to Saudi Arabia. Yanbu is a very fast developing industrial city that also accommodates various contracting firms thus helping to sustain national infrastructure and developmental objectives. Although rather significant in terms of importance, there is no empirical study that observes how fulfilling ORM practices can be within the context of the perceptions of these companies, and, respectively, how these companies practice and profit off ORM.

In addition, most of the available literature covers either large firms that have stable risk management frameworks in place or institutions in the public sector that receive strategic regulation. The particular nature of operations of contracting companies, including temporary location of the project, dynamic employment relationships, reliance on external suppliers and heavy project schedules bring a new risk profile which has not been adequately examined. Such companies are not usually able to afford or have the knowledge or proven system to install effective ORM systems and therefore either have a reactionary or immature continuity planning strategy.

Hence, the study will attempt to fill this gap and look at the nature and the extent of contracting companies operating in Yanbu in terms of their risk management practices within their operations and how this has affected their capability to sustain a business in spite of the current economic conditions. It also aims at knowing the internal and external impediments that can come between the successful application of ORM in this particular context. In such

a way, this research does not only add its messages to the scholarly focus on risk management in developing economies and high-risk industries, but it also offers the practices that can assist contracting companies in the Kingdom of Saudi Arabia and other related environments to develop resilience and maintain the stability of their operations.

Theoretical framework

Operational Risk Management (ORM)

Operational Risk Management (ORM) has emerged to be a focal point of organizations that are in an uncertain, dynamic, and project-based environment, especially the contracting and construction organizations. With disruptions in supply chains, technological changes, labor shortage, and safety issues in the industries increasing, the capacity to visualize, soften, and observe operational hazards defines the capacity of organizations to maintain performance and continuity. ORM is not a single managerial practice, but a holistic approach, which impacts project success, organizational resilience and continuity planning. It is even more relevant to the contracting companies because construction projects are complex and temporary and have multi-stakeholder characteristics and because of inferring dependencies among teams, subcontractors, resources, and external partners. In more detail, the definition of operational risk, the types of operational risks peculiar to the contracting companies, the necessity to manage such risks in the project-based industries, the elements of effective ORM, the challenges which are persistent in the implementation of ORM in contracting fields, and the international standards according to which the ORM has to be applied are discussed.

Operational risk is most commonly identified as the risk of incurring a loss due to ineffective or even unsuccessful internal procedures, individuals, technology, or external factors that interfere with the usual operations. In the context of contracting firms, operational risk acquires a more complicated form since construction projects are subjected to the different conditions, diverse crew, and strict timeline, any failure can rapidly lead to project and budgetary delays, or safety risks. Daradkeh (2024) states that operational risks are categorized into failures of social systems, technical systems and project management structures whereby, the performance is negatively impacted by all these failures when they are not properly handled. These risks are based on the interactions between employees, technologies, and organizations and the complexity of the interactions defines the extent to which they affect. Operational risk in construction-related contexts is not merely a factor of

internal failure, but it is conditioned by external risks like weather interruptions, regulatory limitations, supply chains and market circumstances.

The existence of human, operational, supply chain, technological, safety, financial, and administrative challenges can be seen as linked to the nature of the sources and types of operational risks that can exist in the contracting companies. The risks that are human-based can be usually the most influential, as the operations of contracting companies rely on the human work to a great extent. These threats are based on experience deficiency, insufficient training, human factor, failure of the communication process, diversity of cultures among multinational teams, and workforce instability. According to Daradkeh (2024), the risks of the social system (especially related to coordination and communication) play an important role in worsening the performance of the project, which can be applied directly to the contracting projects where turnover and manual operations are widespread.

Ineffective internal processes, lack of clarity, undocumented processes and poor planning of the project are also the sources of operational risks. In the construction sector, these risks are aggravated by the fact that a lot of coordination is required between different subcontractors, changing environments, and deadlines. Khouja et al(2021)

emphasize the fact that construction companies exist in the interorganizational networks in which cooperation, project delivery modes, and sharing risks are some of the fundamental aspects of operational stability. The disruption of the operations becomes more common and harder to cope with when the workflows are discontinuous or when the collaboration between the firms is poor.

The other very important type of risk in contracting firms is supply chain risks. Projects in construction require materials, equipment, and services to be delivered in time. Any failure, inadequacy or fault can put the whole process to a stop. Khouja et al. (2021) emphasize that to reduce supply-chain disruptions, supply chain integration and collaborative planning are required, although the disruptions of fragmented supply chains, untrustworthy vendors, and international unpredictabilities impacting the availability of materials are common in construction companies. These are further compounded by international market volatility, transportation delays and variable prices of materials like steel, cement and fuel.

The technological risks are becoming more and more topical as the contracting companies embrace the digital tools, automation, and Industry 4.0. These are system failures, cyber

vulnerabilities, absence of digital skills and change resistance. Rane et al (2021). note the way Industry 4.0 technologies like Internet of Things (IoT) and predictive analytics can improve risk identification and monitoring but the move to the digital system introduces new risks associated with integration, data management, and technological uncertainty. Construction projects cannot do without equipment, thus, sensor-based monitoring and predictive maintenance will be essential. The abrupt failure of heavy machinery, which is one of the most important risks highlighted by Rane et al. (2021), will lead to the disruption of whole project schedules and a considerable amount of financial losses.

One of the most critical risk in a contracting environment is safety and site related risks. Construction sites are actually dangerous places, and the chances of mishaps, injuries, malfunction of equipment, exposure to hazardous materials, and instability of the structure are high. These risks can only be managed through proper safety measures, knowledge of the employees, adherence to regulatory measures and continuously monitoring. It is stressed by Khouja et al. (2021) that the collaborative framework and integrated project delivery models assist in the enhancement of safety coordination because of the minimization of fragmentation and enhanced communication between all participants of the site operation.

Operational performance is also determined by financial and administrative risks. They are mistakes in budgeting, delays in payments, poor management of finances, inaccurate forecasts, as well as poor internal controls. Contracting firms are normally known to be working with lean financial margins and prone to cost overruns and contractual disputes. The administration risks also arise due to improperly controlled documentation, lack of reporting mechanisms, and discrepancy in project-level and corporate-level goals. Sastoque-Pinilla et al (2022). present an argument that the success of a project is determined by organizational expectation alignment, stakeholder satisfaction, and quality of project execution. The resulting bottlenecks of operations create a weakening of continuity as the misalignment escalates when administrative systems fail.

Operational risks in project-based industries need to be managed since such industries are temporally, resource intensive and mutually dependent. The volatility of contracting companies during the life cycle of any project is an issue, and client dissatisfaction and operational breaks can pose a big risk to the timeframe, costs, and the project itself. Successful ORM helps organizations to recognize risks at an early stage, deploy resources in the most suitable way, and stay productive when they are not sure about anything. In most of

the construction projects, the failure or delay in one of the activities directly causes a resultant impact on the dependent activities. Rane et al. (2021) note that operational risks are vital to consider when ensuring the continuity of the activities at the project and enhance the efficiency. The other way in which ORM can result in competitive advantage is through increased reliability, minimized wastage, better safety and companies being able to perform on contractual commitments. ORM cannot be ignored in the project-based setting, where the satisfaction of clients directly correlates with timeliness and quality, to maintain a positive image of an organization.

The elements of successful ORM start with risk identification which is the systematic identification of the possible source of disruptions. The risks can only be determined by examining the human behavior, organizational processes, supply chain routes, technological systems, environmental conditions, and stakeholder relationships. According to Daradkeh (2024), it is important to incorporate more social and technical risk factors in a comprehensive approach; it proves that risk identification needs to include complex interactions in the project. Proper identification also presupposes the use of experience of past projects, consultations of the experts, and various technological devices like IoT sensors, artificial intelligence systems, and digital monitoring platforms.

Risk assessment is an activity that comes after the identification process and also entails the analysis of the probability and impact of every risk. Assessment aids organizations to strategize risks in terms of impact. The aspects of contracting companies that are very susceptible to high-impact risks are the breakdown of machinery, the lack of materials, and safety hazards, and to measure the risks, it is necessary to consider both quantitative and qualitative analysis. By monitoring real-time equipment condition and performance and changes in the environment, Rane et al. (2021) show how Industry 4.0 tools enhance accuracy in risk assessment. Assessment is also useful in the organizations to identify how much resources are required to reduce the risks and devise contingency plans.

One of the risk mitigation strategies entails formulation of measures that are aimed at minimizing the occurrence or effects of risks. Contracting company mitigation strategies can include; preventive maintenance, supplier diversification, increased safety training, process redesigning, use of automated technology, communication improvement and use of collaborative project delivery systems. Khouja et al. (2021) demonstrate that the collaborative nature of risk mitigation through joint planning and risk management helps to

enhance the process by combining the experiences and resources of various organizations. Digital tools are also part of mitigation to keep track of workflows, identify abnormalities, and automate corrective actions.

Application ORM is a continuous process of monitoring and review. Risks change over time particularly in project based environments where the environment may change very quickly. Monitoring will keep risk controls efficient and ensure the emergence of risks are dealt with in time. The digital transformation contributes to better monitoring properties, IoT devices, automatisms, predictive analytics can be used to monitor the equipment, the state of the environment, and human actions in real-time. Rane et al. (2021) emphasize how the use of IoT-based monitoring systems can lead to the detection of early signs of equipment breakdown and ensures a shorter downtime and continuity. The review processes also comprise effectiveness of mitigation strategies, lessons learned, and the fact that ORM practices are to be developed in accordance with new challenges.

The last component is risk documentation which involves the documentation of the identified risks, assessment results, responses, and monitoring results. Knowledge is retained, knowledge is learned in an organization, and knowledge is used to make uniform decisions. It is also a guaranty of accountability, evidence of compliance, and assists companies to perfect processes in a variety of projects. As shown by Daradkeh (2024), the capabilities of knowledge management increase the performance of organizations to apply the documented insights in order to reduce risks and enhance the performance of projects.

Contracting companies encounter a lot of difficulties in applying the risk management practice despite the significance of ORM. The fragmented nature of the construction industry, whereby it is based on subcontracting and temporary relationships is one of the challenges. Khouja et al. (2021) observe that the interorganizational teamwork within construction projects tends to be low in strength resulting in the lack of coordination in goals, inadequate communication, and uneven risk-sharing agreements. The other problem is the scarcity of specialized skills, especially in the small and medium-sized contracting firms. Most of the companies do not have professional risk managers and depend on traditional methods of risk management, which fail to reflect complicated risks of projects.

The use of technology adds more complexity to the implementation of ORM. Although Industry 4.0 tools have more capabilities that can improve risk identification and monitoring, most contracting companies find it difficult to become users because of costs, training, or

resistance to change. Rane et al. (2021) admit that the adoption of digital tools need infrastructure, technical expertise, and organizational preparedness which are not available to all firms. Human and cultural obstacles are also factors that inhibit the ORM implementation since the employees might be resistant to new ways of operation or may not see the need to mitigate risks. According to Daradkeh (2024), knowledge management capabilities are essential in helping to combat cultural and technical barriers because they sponsor learning, communication, and mutual understanding among project teams.

Global standards and frameworks are significant to steer the contracting companies towards successful ORM. One of the commonly known standards is ISO 31000 that provides principles and guidelines on how to achieve and incorporate risk management within organizations. It focuses on the constant enhancement and the active participation of the leaders, as well as the systematized nature of the risk identification and reduction process. The ISO 31000 is industry flexible and helps contracting companies to have a uniform and systematic process.

The COSO Enterprise Risk Management (ERM) framework also has a more strategic approach because it combines the risk management with the organizational governance, performance, and culture. COSO ERM considers the need to align risk management with the strategic goals, promote risk-conscious culture, and integrate risk factors into the decision-making process. In the case of contracting companies, COSO ERM assists in making sure that the practice of operations risks contribute to the organization of the long-term objectives as well as the objectives of the project.

Project Management Institute (PMI) Risk Management Framework is a specific guidance related to the project environment. It provides risk identification and assessment procedures, qualitative and quantitative analysis, and response planning, and monitoring procedures in project life cycles. Sastoque-Pinilla et al (2022) emphasize the importance of ensuring that organizational expectations, stakeholder priorities and project outcomes are aligned and the PMI framework helps achieve this by making sure that the risks impacting on the objectives of the project are addressed proactively. PMI methodologies are being embraced by contracting companies that are struggling to enhance planning, collaboration of teams, and the level of project success.

In conclusion, it is possible to state that Operational Risk Management (ORM) is essential as a means of contracting companies operating within complex, uncertain, and highly

interdependent environments. Knowing the various categories of operational risks, including human, process-related, supply chain, technological, safety, and financial, firms have an opportunity to create strategies that foster resilience, minimise disruptions, and business continuity. The elements of good ORM risk identification, assessment, mitigation, monitoring, and documentation result in a well-organized and proactive risk management in the project life cycles. The implementation of ORM is also associated with the drawbacks, that is, the lack of technological maturity, the desire to collaborate with other organizations, the lack of resources, and the resistance of the culture. International frameworks like the ISO 31000, COSO ERM, and the PMI Risk Framework offer a contracting company the necessary knowledge on how to initiate strong and tactical ORM frameworks. Continuous improvement, integrated knowledge management and enhanced collaboration enable the contracting companies to enhance their capacity in managing operational risks, enhancing project performances and continuity in the industry that is increasingly competitive and unpredictable.

Business Continuity (BC)

The concept of Business Continuity (BC) has become a key organizational competency in the contemporary age of uncertainty in the world, reliance on technology, and a swiftly growing risk. In any industry, but particularly those that are volatile, project-based, or highly regulated in nature, the capacity to continue with necessary functions in the case of a disruption is what defines not just short-term survival in operations but also long-term competitiveness, reputation, and trust in the stakeholders. Business Continuity is also not a responsive measure, but a proactive science whereby organizations are able to foresee incidence of disruption, evaluate the effect of such, get ready on how to respond, and recover promptly to ensure that the business remains on a steady path of operations. The inclusion of well-developed methods of Business Continuity principles in the everyday activity is irreplaceable in the environment of contracting and project-based companies, where any delays or interruptions can rapidly turn into contractual fines, client dissatisfaction, and financial burden.

Business Continuity is a concept, which is focused on making organizations stable in case of unforeseen events. In its most basic sense, Business Continuity means the capability of the organization to resume offering its products or services in its reasonable predetermined capacities in the occurrence of disruptive incidents. Mošková and Bugarova (2023) are of

the opinion that Business Continuity Management (BCM) is a trained managerial procedure that recognizes the threats to the enterprise and evaluates how they might affect operations. BCM aims at safeguarding the interests of stakeholders, as well as promoting the normal operation of the business processes. This definition underscores the fact that Business Continuity has a close association with organizational preparedness, prevention, resilience, and flexibility. Continuity is not merely a result of the existence of formal plans, but it is also the internal readiness and ability of the organization to act in response to the changing conditions promptly. Schmid et al (2021). make the same observation and point out that continuity is often conditional upon preexisting organizational agility, which enables firms to undermine disruption despite weak or poorly developed formal Business Continuity structures. This realization indicates that continuity is affected by the formalities as well as informal organizational strong forces.

Business Continuity is especially acute in those high-risk sectors as construction, contracting, energy, financial services, and industries, which rely on the supply chain. The environments in which these industries are conducted are characterized by disruptions that are frequent, unpredictable and mostly severe. Internal failures and external shocks, scarcity of supplies, equipment failures, safety accidents, natural disasters, pandemics, or geopolitical instability may impact the business. As it is stressed by Mošková & Bugarová (2023), disruption of key activities may cause serious consequences: loss of clients, decreased competitiveness, downtime of operations, even bankruptcy. The finiteness of business processes is a necessity in high-risk areas, where any type of interruption or delay can be immediately converted into monetary and reputational losses. This is particularly important to project-related companies, where contracts, schedules, and resource planning have a very close relationship. Kaur et al (2022). also add that, in contexts with a lot of disruption, like during the COVID-19 pandemic, agility, collaboration, stakeholder engagement, and fast information sharing are essential in Business Continuity. These factors allow organizations to be flexible, cope with uncertainties and be in a position to deliver services even when limited. In the case of industries, which require extended and complicated supply chains, continuity is also a factor in the capability of satisfying the needs of customers, efficiently use the available resources, and prevent bottlenecks which may grow rapidly in times of crisis.

Business Continuity Plans (BCPs) contain the elements that give operational consistency that has structural basis. The first significant element is Business Impact Analysis (BIA) which entails identifying the critical areas of business and evaluating the impact of the disruptions

in those areas. BIA is meant to establish the allowable amount of time each of the functions can be out of service, financial and operational impacts of the failures and the recovery resources. Mošková and Bugarova (2023) emphasize that BIA can assist companies to learn how variations in the external or the inner surroundings are capable of affecting the businesses and focus on preventive actions and recovery efforts. BIA is used in determining the first activities to be resumed in case of a contracting industry like procuring, paying wages, maintaining equipment, logistics, or safety management that should be reinstated to save the project.

Another basic aspect of the BCP is risk assessment. It is oriented at the identification of the potential threats and the probability of their occurrence and assessment of their impact. This element goes hand in hand with BCM because both aspects are in need of knowledge of vulnerabilities as well as exposure to risks. Mohaghar et al(2021). illustrate in the case of the banking sector that risk indicators form the concept of continuity planning, particularly where the economic or technological conditions are not consistent. Even though their study revolves around IoT-based services in the banking industry, the concepts are applicable in other industries: organizations need to consider technological, operational, environmental, and external risks and identify the disruptions that might cause the essential processes to be compromised. Risk assessment in a construction or a contracting setting will need to consider equipment malfunctions, material delays, weather delays, workforce issues, cyber threat, and modifications in regulations.

The third pillar of Business Continuity Planning is response strategies. These consist of the very measures that organizations are planning in order to cope with the short-term impact of disruptions. Strategies that can be used when responding include relocating operations, responding with back-up systems, going manual in case of a system failure, engaging stakeholders, triggering safety measures, resource redistribution or triggering emergency contracts with vendors. Kaur et al. (2022) state that the response efforts cannot be made without agility and collaboration, especially in industries that depend on the supply chain, and disruptions can quickly spread there. The authors also point out that companies that possess effective communication networks and cooperation build strong reactions to crisis situations. The response strategies used in contracting companies may include finding emergency suppliers, using emergency workforce, or focusing on activities that have the greatest impact to avert delays in projects as much as possible.

Another crucial aspect of Business Continuity is crisis management. It has to do with leadership, communication, coordination and decision making processes that steer the organization through severe disruptions. Schmid et al. (2021) demonstrate that organizational agility as a result of decisive leadership and adaptive crisis management became common during the COVID-19 pandemic and that it frequently dominated the continuity outcomes than official BCM structures. Humanitarian organizations, in their turn, perceived continuity as an inherent part of their operating culture, but the representatives of the private sector tended to formalize it by following clear-cut crisis management processes. This difference discloses the significance of flexibility, role clarity, and readiness to leadership in the case of organization when disrupted on a large scale or over a long-term period. Crisis management is not merely a reactive operation instead it needs planning, analysis of scenarios and building a culture that will facilitate timely and co-ordinated response.

The last significant element of BCP is the operational recovery which entails restoring damaged business operations to a state of normalcy within a reasonable time. The recovery activities involve restoring systems, reactivating supply chains, redeploying employees, repairing the damaged infrastructure, and post-disruption assessments. According to Mošková & Bugarova (2023), recovery processes take the centre stage in ensuring the sustainability of a business in the long term as they enable a business to change its operations depending on what it has learned during disruptions. Recovery is not simple as going back to the old state of affairs; it is usually in form of reconsidering processes, introducing new additions and reinforcing systems to avoid such disturbances in the future. When it comes to contracting, recovery can be in the form of redesigning project schedules, negotiating contract extensions, finding alternative vendors, or new safety measures based upon the type of disruption.

Though the need of Business Continuity is evident, organizations continue to experience many obstacles that impede the success of continuity planning. The absence of awareness and knowledge of the employees and management about the BCM principles is one of the greatest inhibiting factors. According to Mošková and Bugarova (2023), the significance of Business Continuity is often overlooked by many enterprises until some disruption impacts the business, whereby the management would adopt a reaction strategy but not a proactive one. BCM can seem like an unwarranted administrative expenditure instead of a strategic investment in industries where daily pressures are great and resource base low. Lack of financial and technical resources is another barrier particularly with small and medium

organizations. In their study in Kenya, Schmid et al. (2021) discovered that a large number of organizations did not have formal strategies on BCM because they did not have a lot of resources available and preferred to improvise or be agile. Although these informal measures can be useful in a situation with short term disruption, they can be ineffective when dealing with large-scale or long-term disruption.

There are also challenges about technological barriers especially with Business Continuity turning into a digital system-based concept. Mohaghar et al. (2021) note that the IoT-based services have shown to enhance continuity in the Iranian banking industry but many organizations have experienced difficulties associated with the integration of their systems, data handling, and technological preparedness. In less digitized industries like contracting, the high pace of adoption of digital continuity tools could be challenging because of cost, low level of expertise, or unwillingness to use new technology. Also, complexity of supply chain brings other obstacles to continuity. According to Kaur et al. (2022), the disruptions tend to spread across the supply chains, and lack of coordination or visibility among the partners make it very difficult to continue the operations. The vulnerability of contracting companies which may rely on several suppliers and subcontractors is even higher in case of poor communication, information sharing, or risk-sharing mechanisms.

Business Continuity International standards provide systematic guidance that can be used to assist the organizations to surmount these difficulties. The most acceptable global standard of Business Continuity Management Systems (BCMS) is ISO 22301. It gives an organized structure of identifying risks, formulating response plans, applying continuity capacity and performance review. The ISO 22301 focuses on the dedication of leadership, risk knowledge, records, and continuous enhancement, and inculcation of Business Continuity in the company culture. Mošková and Bugarova (2023) argue that structured BCM models (like ISO 22301) can bring a positive change to business sustainability by increasing the capacity of the enterprise to respond to unforeseen incidents and ensure the safety of stakeholders. The standard encourages being proactive in which continuity is ingrained within company planning, operations and strategy formulation.

ISO 22301 is also crucial in upholding organizational credibility and compliance particularly in the sectors where continuity is a regulatory issue. It promotes an organization to have frequent Business Impact Analyses, risk assessment, and performance review. It also helps in the generation of documented procedures, communication protocols, testing exercises, and

the strategies of improvement. In the case of the contracting companies, the adoption of ISO 22301 requires the creation of formalized systems to secure the continuity of the project, safety incident management, supply chain maintenance, and disruption in the operations of the company. Even though the cost of implementing ISO 22301 can be associated with investments in expertise, training, and systems, the long-term outcomes will be the decrease in downtime and the increase in stakeholder confidence, as well as the resilience of an organization.

Organizational Resilience

Resilience in the organization has become a crucial pillar of the contemporary organization that is functioning in highly uncertain and dynamic settings. The capacity to predict shocks and disruptions and be able to restore business operations within a short period is the focus of long-term stability and sustainability in the high-risk sectors, namely, in the construction industry, energy, and critical infrastructure. Resilience does not just imply the ability to survive when things are bad but is a skill that incorporates the ability of an organization to learn, adjust and even come out stronger following crises. With technological threats that confront organizations, supply chain vulnerabilities, human uncertainties and environmental problems rapidly increasing, resilience development emerges as an essential strategic concern. The incorporation of resilience concepts into the routine functioning of management in the contracting and project-based sectors where the lack of alignment with the planned course of operations can develop into the project failure within the shortest possible time, the contractual penalties, financial damages, and security issues are crucial.

The notion and the definition of organizational resilience have been developing with time, along with the growing complexity of the operating environments. Resilience is generally perceived as the capability of the organization to continue functioning, structuring and identity amidst shocks or disruption. According to Jetter et al (2021), resilience is a dynamic feature of a system that is created by organizational reliability which is backed by the principles of high-reliability organizing. Their work claims that resilience is not a fixed property and rather it is formed as a result of the constant interplay between culture, knowledge, experience, and structures of systems. It also reflects the ability of the organization to adapt to the disruptions and not only get back on track but also to predict the risks, modify operations in real-time and learn what has happened. Resilience has to be incorporated in the processes and human behaviors in the construction industry, as the

operational contexts are highly dynamic, and the project team can change depending on the site. El Khatib et al (2023) make the argument that the sustainability of construction operations is becoming more reliant on how effectively organizations can manage their risks proactively by noting that resilience is the central element of the contemporary sustainable construction practice as it helps organizations with increased operational uncertainty.

The aspects of organizational resilience are varied and four related factors, which are operational flexibility, adaptability, responsiveness and recovery capacity are the pillars of resilience. Operation flexibility can be defined as the performance of the organization when the conditions are different. It is the willingness to accommodate any kind of changes, the willingness to absorb changes, and the willingness to restructure the work processes in cases where the usual ways of doing things are upset. Jetter et al. (2021) note that flexibility is created at the system level through system-level knowledge and integrating insights of frontline practitioners in high-hazard settings like offshore oil and gas. This shows that resilience will be based not only on formal structures but also on tacit knowledge, collaborative experience, and capacity to modify internal processes in accordance to situational needs.

Adaptability is the ability of the organization to change over time in terms of operations, strategies or structure in response to new realities. It must be receptive to innovation, lessons on disruptions of the past, and adaptations that will improve performance in the future. Adaptability is imperative in construction situations because of the constant technological and regulatory changes and transforming sustainability demands. According to El Khatib et al. (2023), operational risk management has a positive influence on the ability to build a stronger adaptability since the practice of ORM prompts the constant evaluation of the vulnerabilities, the systematic learning, and the development. Flexibility enables organizations to transform themselves beyond their pre-disrupted position and be placed in a favorable position to tackle future challenges.

Responsiveness is the rate and efficacy at which an organization responds to the crises or disruptions. The dimension takes in, decision-making ability, effectiveness of the communication, interdepartmental coordination and access of contingency plans. An illustration can be made of the fact that in the case of the COVID-19 pandemic, the ability to maintain continuity, even in the absence of formal Business Continuity frameworks, was possible due to high organizational agility and strong leadership by organizations (Schmid et

al, 2021). Decentralized authority and speed in making decisions proved more effective in most situations than the inflexible plans, which is why the necessity to create the culture where the employees can act immediately and without fear when conditions change.

Recovery capacity refers to the capability of the organization to rebound its operations and put up damaged systems and get back to the tolerable performance state following a hindrance. Recovery does not only entail restoration to pre-crisis levels but it can also entail process enhancement and resilience. Mošková & Bugarová (2023) emphasize that recovery should be based on operational restoration and strategic change to ensure that the lessons learned are incorporated in organizational frameworks. Recovery in a project-based industry may involve re-scheduling project schedules, resource re-allocation, construction of re-establishing project supply chains, repairing project assets, or adjusting project methods to avoid future disruptions.

Organizational resilience and Operational Risk Management (ORM) are interrelated. ORM offers the formal procedures required to recognize, evaluate, address and track the operational risks whereas resilience is the firm result of the successful collaboration of the aforementioned processes. ORM helps in resilience through the development of coherent mechanisms of predicting disruptions, enhancing operational controls, and decision-making. According to El Khatib et al. (2023), ORM improves sustainability in the construction sector by allowing organizations to identify the emergent risks in time and react using preventive measures. The overall effects of regular risk assessments, scenario analysis, and mitigation planning make organizations better able to stand the shocks, which in turn directly enhances resilience.

Moreover, resilience enhances the performance of ORM through the creation of an organizational culture that promotes awareness, communication, and flexibility. According to Jetter et al. (2021), knowledge sharing, collective mindfulness, and constant learning are crucial to high-reliability organizations and can be used to improve ORM processes. Resilience and the capacity of organizations to demonstrate this resilience leads to the increased reporting of risks, suggestions and proactive behavior by employees to avoid incidents that contribute to the success of ORM programs in the long run.

Business Continuity Management (BCM) is also a mediating factor between ORM and resilience. As Moškova and Bugarova (2023) say, the relationship between BCM and risk management enhances the viability and sustainability of organizations. BCM makes sure that

the essential functions are not interrupted in times of disruptions whereas ORM minimizes the chances of disruptions. The combination of these two forms a strong network with minimal risks and continuity guaranteed. The synergy comes in handy especially in construction and contracting settings where the operational risks are quite common like equipment failure, supply chain delays, and safety incidents that can quickly develop into threats to project viability.

Finally, organizational resilience is the combination of proactive risk detection, successful response to crisis, continuous improvement and strategic adaptation. The analytical basis is given by ORM, structural continuity mechanisms are offered by BCM, and resilience ascertains that the organization is able to withstand the uncertainty and preserve the long-term sustainability. Reinforced by the results of El Khatib et al. (2023), Jetter et al. (2021), and Mošková & Bugarova (2023), the data proves that resilience is not a single feature but a multidimensional ability that is influenced by risk management, organizational culture, experience working in the job, and leadership. In the situations of contracting companies that encounter more and more complicated challenges, it is crucial to implement resilience in all spheres of operations to receive continuity, maximize sustainability, stay competitive.

The Interrelationship between ORM and Business continuity.

There has been a growing scholarly and practical interest in the connection between Operational Risk Management (ORM) and Business Continuity when organizations face uncertainty, complexity, and regular events that disrupt business operations. Whereas ORM focuses on the identification, evaluation and elimination of risks that can cripple the routine operations, Business Continuity focuses on the continuity of vital operations when there is a breach. These two areas are a complementary system that enhances organizational stability and resilience. With the increasing connectivity of modern enterprise, systemic vulnerability to growth, both in terms of natural hazards and cyberattack, it is important to understand the conceptual correlations between ORM and Business Continuity. Researchers have contended that the two disciplines cannot pursue their goals unilaterally. ORM reduces vulnerabilities, and Business Contingency makes sure that it works in case of negative circumstances. Their combination helps in organizational readiness, resilience, and fast recuperation, creating a comprehensive system that encompasses continuity thinking in day-to-day business processes.

The theoretical connection between the risk management and continuity is based on the fact that they share the same goal of maintaining the organizational functioning even when it is unpredictable. According to Galaitsi et al. (2023), risk management and continuity management work within intersecting conceptual areas due to the fact that both of them predict and solve disruptions, but emphasize them differently. The main aim of risk management is to avoid or minimize the possibilities of disruption with the help of analytical tools like risk identification, risk evaluation, and mitigation. Business Continuity on the other hand presupposes that disruptions are going to happen and is concerned with sustaining essential business processes in case of crisis. These two areas converge at the point of expectation and reaction. Galaitsi et al. claim that frequently organizations cannot draw a line between the operational processes that are part of the risk management and the ones which are related to the continuity as both seek to secure the assets and maintain the functionality. Nevertheless, the authors suggest the conceptual dyads, including risk versus resilience and normal conditions versus crisis conditions, which can be used to explain how ORM facilitates continuity through minimizing the impact of threats before they turn into disruptive events. Steen et al (2023). go further to affirm that the modern BCM systems should not focus on defensive strategies anymore but resilience-oriented thinking, which, naturally, embraces risk-management concepts to contain uncertainties in a manner that is more effective.

Operational Risk Management improves Business Continuity by minimizing the vulnerability to threats, increasing system reliability, and raising organizational preparedness. ORM offers systematic ways of exposing the operational vulnerabilities that may destabilize the business processes, which could be equipment malfunctions, loopholes in the supply chain or human error. De Matteis et al(2023). point out that continuity is enhanced when organizations are good at mapping the operational risks that they face and creating mitigation practices that facilitate the sustained nature of vital operations. The lack of strong ORM in small and medium enterprises leads to an increase in fragility and the Business Continuity strategies are not proactive. Through ORM ingress within Business Continuity planning, organizations can better predict areas of failure and create trier Business Impact Analysis, risk analysis and response strategies. Galaitsi et al. (2023) observe that operational resilience is achieved when the risk analysis is employed by organizations not to eliminate the disruption but to create a system capable of absorbing shocks without collapsing. ORM therefore is a lead-up to continuity because it constitutes an informational and procedural base of continuity strategies.

Increased Business Continuity brought about by ORM is also associated with increased prioritization and allocation of resources. Steen et al. (2023) discuss the fact that the classic understanding of BCM can be based on the premise that systems can be broken down into predictable subsystems, but in practice, crises in the real world are nonlinear, and involve complex interactions. Good ORM can simplify this complexity through interdependence of processes, technologies and organizational modules. By knowing these interdependencies, continuity planners will be able to create more realistic and flexible continuity plans. Moreover, ORM enhances decision making in times of crisis through the provision of risk information which is correct and timely leading to quick implementation of continuity strategy. In contraction and project-based industries, where small disruption positively affects the entire actions, the incorporation of ORM in Business Continuity makes sure that the project schedule, safety demands, and contractual needs are maintained despite adverse circumstances.

Risk culture and leadership are critical in aiding the assimilation of the ORM and Business Continuity. Organizational resilience is not merely reliant on technical processes, but it is also based on the cultural factors that affect the perception and reaction of the workers to risks. According to De Matteis et al. (2023), leadership commitment is the key to the establishment of a continuity-oriented culture, particularly in SMEs, where formal structure might be insufficient. Unless there is leadership-initiated engagement, ORM is just a procedural activity and does not constitute an organizational practice. Galaitsi et al. (2023) emphasize that strong organizations have a culture that promotes awareness, learning, and active participation on all levels. The effective risk culture supports the ORM as well as Business continuity by ensuring the openness of communication about vulnerabilities, prompt and accurate reporting of risks, and assuming the responsibility together. As stated by Teen et al. (2023), leaders need to implement resilience-thinking strategies that do not regard fixed plans but provide flexibility in making decisions during a crisis. Leadership thus plays a role in facilitating the ORM-Business Continuity gap, which makes sure that two are focused on and implemented in harmony and efficiency throughout the organization.

Responsiveness in disruption is also affected by risk culture. Employees who learn the significance of risk mitigation and continuation strategies will be more willing to respond swiftly and efficiently given conditions during crisis. Resilience-oriented behavior allows leaders to model and empower their teams and provide clear communication, which leads to quick adaptation. Integration between ORM and BCM is also supported by continuity being

an activity shared by the mission instead of a departmental task. Such cultural correspondence holds that when faced with crises, the decisions taken concerning the operation will be informed by both the risk awareness and continuity priorities and the chances of the operation collapsing are minimized.

Technology and digital tools can be used to reinforce the relationship between ORM and Business Continuity in a strong way by increasing predictive capabilities, situational awareness, communication and system reliability. As stated by Steen et al. (2023), the traditional BCM tends to be less effective when it comes to incorporating uncertainty, whereas novel digital tools, including data analytics, monitoring systems, and simulation technologies, allow organizations to anticipate disruptions more effectively and perform complex systems behaviour better. The superior technologies used in ORM can help in monitoring risks in real-time, early detection of anomalies and automatic reporting which enables the organizations to intervene before the disruption. This also contributes directly to continuity through the minimization of downtime and allows more precise response planning.

According to Galaitsi et al. (2023), technology can contribute to the operational resilience process by offering better visibility on what is vulnerable to the system and contributing to adaptive responses. Scenario modeling, AI-based predictions of risks, and cloud-based continuity platforms can be employed by organizations to make their continuity policies testable to different types of crises. Such tools allow the planners to learn how risks spread across the systems and the most productive locations of intervention. In companies that have complicated supply chains or have a fragile infrastructure, technology can be used to furnish the numerical understanding that encourages synchronization of ORM and Business Continuity to make certain continuity strategies are shaped on a foundation of actual operational circumstances. De Matteis et al. (2023) also mention that in the case of SMEs, digital solutions provide affordable means to promote continuity and resilience, and the latest tools are affordable even to organizations with small resources.

Study Variables

Table 1 study variables

Variable Type	Variable Name	Description	Measurement Method
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Independent Variable	Operational Risk Management Practices	Strategies and procedures implemented to identify, assess, mitigate, and monitor operational risks	Likert-scale survey items (e.g., risk identification, mitigation planning, monitoring, response actions)
Dependent Variable	Business Continuity	The ability of the organization to maintain critical operations during and after disruptions	Likert-scale survey items (e.g., recovery speed, minimal disruption, continuity plans in place)
Moderating Variable	Company Size	The size of the contracting company, which may influence the strength of ORM's impact on continuity	Number of employees or annual revenue

CHAPTER 3

Introduction

This chapter presents the methodological framework adopted to examine the influence of operational risk management practices on business continuity in contracting companies in Yanbu. A clear and systematic methodology is essential for ensuring the accuracy, reliability, and validity of the research findings. The chapter outlines the research design, population and sampling procedures, data collection tools, and methods of data analysis used in this study. Given the practical nature of the research problem, a descriptive-analytical approach was employed to provide both a comprehensive description of current practices and an analytical understanding of the relationships between the study variables. This approach enables the researcher to explore existing operational risk management processes, identify gaps, and evaluate their impact on organizational continuity. The chapter also explains the development of the questionnaire instrument, which was designed to gather quantifiable data from employees across various roles within contracting firms. In addition, considerations related to ethical standards, data confidentiality, and study limitations are briefly highlighted. By presenting a structured methodological pathway, this chapter establishes the foundation upon which the empirical analysis in the subsequent chapter is built, ensuring that the study's outcomes are credible, coherent, and aligned with its objectives.

Methodology and Research Methods

This study adopts a **descriptive–analytical research design** to investigate the impact of Operational Risk Management (ORM) practices on Business Continuity in contracting companies in Yanbu.

- The **descriptive component** aims to provide a clear understanding of current ORM practices and continuity measures within the selected companies.
- The **analytical component** focuses on examining the relationships between ORM variables and business continuity outcomes using statistical techniques.

This design is appropriate for organizational studies as it allows the researcher to describe existing conditions, analyze patterns, and identify statistically significant associations relevant to operational performance and continuity.

3.2 Study Population and Sampling

The target population consists of employees working in contracting companies in Yanbu, including engineers, project managers, supervisors, safety officers, and administrative staff.

- A **non-probability purposive sampling** method was used to select participants who have direct knowledge of operational processes and risk management activities.
- A total of **100 respondents** participated in the study, ensuring sufficient representation across functional areas.
- This sample size allows for meaningful statistical analysis and enhances the reliability of the findings.

3.3 Data Collection Methods

Data were collected using a **structured questionnaire** developed based on the study variables and previous literature. The questionnaire included three sections:

1. **Demographic Information**

(job role, years of experience, company size)

2. **Operational Risk Management Dimensions**

covering risk identification, risk assessment, mitigation strategies, monitoring, and documentation.

3. Business Continuity Measures

including continuity planning, readiness, crisis response, and recovery capability.

The instrument used a **five-point Likert scale** ranging from (1 = Strongly Disagree) to (5 = Strongly Agree).

- The questionnaire was distributed electronically using Google Forms to facilitate efficient data collection.
- Responses were screened for completeness before analysis.

3.4 Statistical Analysis Methods

Collected data were analyzed using **statistical analysis software (SPSS)** to ensure accuracy and validity. The following methods were applied:

3.4.1 Descriptive Statistics

- Frequencies, percentages, means, and standard deviations
- Used to summarize demographic variables and evaluate participants' perceptions of ORM and business continuity

3.4.2 Reliability Analysis

- Cronbach's Alpha was calculated to test the internal consistency of the questionnaire items.
- A value above 0.70 was considered acceptable for research reliability.

3.4.3 Correlation Analysis

- Pearson correlation was used to examine the strength and direction of the relationship between ORM practices and business continuity.

3.4.4 Regression Analysis

- Simple and multiple regression models were applied to determine the predictive power of ORM components on business continuity outcomes.
- This method identifies which ORM dimensions most significantly influence continuity.

3.4.5 Hypothesis Testing

- Hypotheses were tested at a significance level of $\alpha = 0.05$ to determine whether relationships between variables were statistically significant.

3.5 Ethical Considerations

Participants were informed about the purpose of the study, and confidentiality of responses was assured. Participation was voluntary, and no personal identifiers were collected.

3.6 Study Limitations

1. Spatial Delimitation:

This study is geographically limited to **contracting companies operating in the city of Yanbu**, Saudi Arabia. As such, the findings may not be generalizable to contracting firms in other cities or regions with different operational, regulatory, or risk environments.

2. Temporal Delimitation:

The research data was collected within a **specific time frame during 2025**, reflecting the operational risk management practices and business continuity status during that period only. Any future changes or improvements in ORM practices are not captured in this study.

3. Human Delimitation:

The study focuses on a sample of approximately **100 employees** working in contracting companies. Participants include individuals from various roles such as engineers, project managers, safety officers, and administrative staff. However, it does not include perspectives from external stakeholders (e.g., suppliers, clients, regulators).

4. Thematic Delimitation:

The scope of this research is restricted to exploring the **impact of operational risk management practices on business continuity**. It does not address other types of risks such as financial, strategic, or reputational risks, nor does it evaluate broader organizational performance indicators beyond continuity.

CHAPTER 4

Introduction

This chapter presents the analysis of the data collected from 100 respondents working in contracting companies in Yanbu. It aims to examine the relationship between Operational Risk Management practices and Business Continuity, supported by additional variables such as company size and project complexity. Before conducting the main analyses, the reliability of the research instrument was assessed using Cronbach's Alpha, and all scales demonstrated strong internal consistency, with coefficients exceeding the accepted threshold of 0.70, confirming that the questionnaire items were suitable for further statistical examination. The chapter proceeds by presenting descriptive statistics that summarize respondents' perceptions, followed by correlation and regression analyses that test the study hypotheses. Through these analytical procedures, the chapter provides an evidence-based understanding of how risk management practices contribute to strengthening organizational continuity and readiness in the contracting sector.

Data Analysis

Section One Demographic Data

The demographic characteristics of the study sample offer essential insights into the professional profiles of respondents and the organizational environments in which they operate. Understanding these characteristics is critical because they influence the depth of knowledge respondents possess regarding operational risk management (ORM) and business continuity (BC). The demographic distribution also provides context for interpreting subsequent analyses of the study variables.

The distribution by job role shows a diverse representation from key functional areas within contracting companies in Yanbu. Engineers constitute the largest proportion of respondents at 32%, which is consistent with the operational nature of contracting companies where engineering roles form the core of project execution. Their perspectives are particularly valuable since they are heavily involved in site operations, risk identification, safety practices, and technical decision-making. Project managers represent 18% of the respondents, reflecting their crucial role in coordinating project activities, allocating resources, and ensuring adherence to project timelines and budgets. Their insights significantly enrich the analysis because they frequently interact with ORM processes, risk registers, and continuity plans.

Safety officers account for 15% of the sample. Given the high-risk environment of contracting and construction work, safety officers are central to hazard identification, enforcement of safety regulations, and accident prevention. Their input provides important views on risk mitigation and emergency response procedures. Administrative staff represent 20% of respondents, underscoring the importance of administrative functions in document control, communication, personnel coordination, and logistical management. Supervisors comprise 10% of the participants, providing perspectives from on-the-ground leadership of labor teams. The remaining 5%, categorized as “Other,” includes specialists such as quality controllers, supply chain officers, and equipment coordinators. Overall, the distribution reflects a well-balanced representation that strengthens the reliability of the findings by incorporating multiple operational viewpoints.

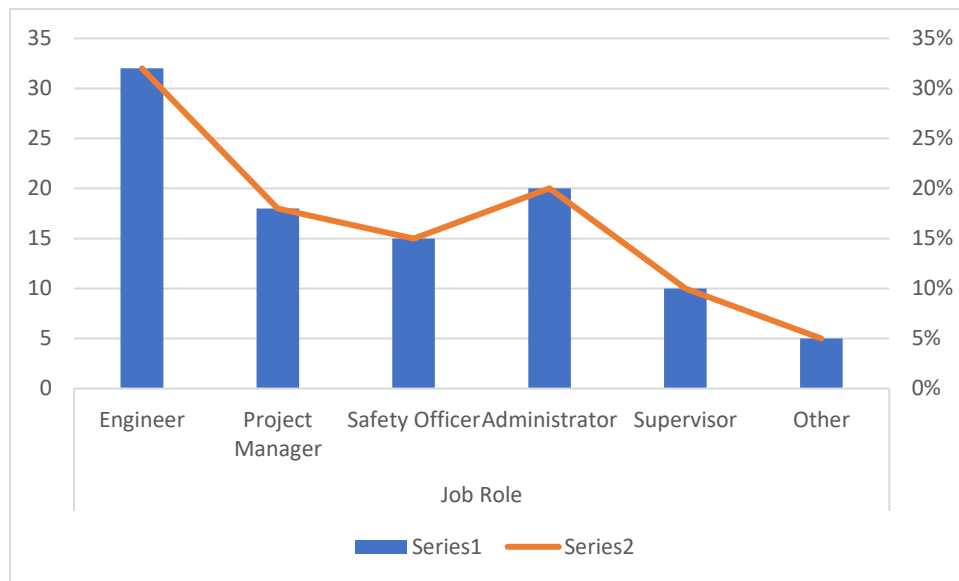


Figure 1 job role

The analysis of work experience reveals a sample with varying levels of professional maturity, enhancing the diversity of perspectives related to risk management and continuity planning. Respondents with less than one year of experience constitute 6% of the sample, providing fresh and recent observations from newcomers. Those with 1–3 years of experience represent 18%, indicating early-career professionals who have gained a basic understanding of organizational processes but may still be developing full operational familiarity. The largest group, representing 30% of respondents, consists of individuals with 4–7 years of experience, suggesting mid-career professionals who are likely to have considerable exposure to risk management practices, project coordination, and operational challenges.

Respondents with 8–10 years of experience form 22% of the sample, representing more seasoned individuals who have observed multiple project cycles and organizational transitions. The final group, respondents with more than 10 years of experience (24%), contributes deep institutional knowledge, reinforcing the credibility of reported perceptions of ORM and BC. The broad range of experience levels enhances the richness of the dataset, enabling perspectives from both junior and senior professionals to be integrated into the analysis.

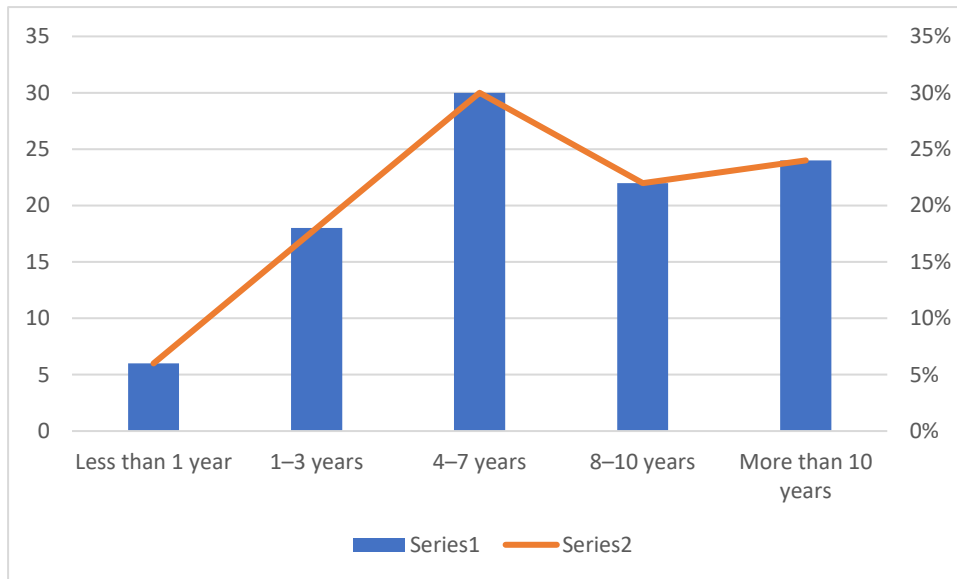


Figure 2 years of experience

The company age distribution highlights the maturity and stability of the organizations included in the study. Companies operating for less than five years make up 14% of the sample, indicating a presence of newer firms that are still establishing their operational structures and risk management frameworks. Organizations aged 5–10 years represent 25%, suggesting firms that have moved beyond the initial establishment phase and likely begun formalizing risk and continuity systems. Companies operating for 11–20 years form the largest group at 33%, reflecting firms with significant experience in the contracting sector and potentially more established ORM and BC practices. Finally, firms with more than 20 years of operation account for 28%, illustrating long-standing companies with extensive operational histories, higher organizational maturity, and more stable procedures.

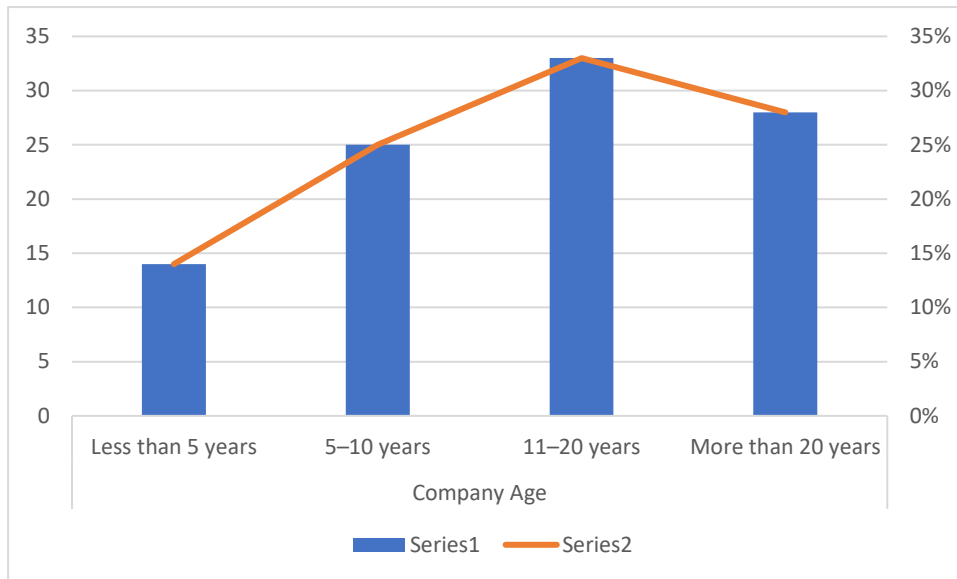


Figure 3 company age

Understanding company age is significant because organizational maturity often correlates with structured management systems, capacity for risk anticipation, and investment in continuity planning. Older firms may have more advanced processes, while newer firms may still be developing these frameworks, influencing their readiness levels. The company size distribution also provides meaningful insights into the operational environments of respondents. Small firms with fewer than 50 employees represent 20% of the sample. These companies may face challenges related to limited resources, smaller project portfolios, and less formalized ORM and BC systems. Organizations with 50–149 employees form the largest category (30%), indicating that many of the surveyed firms fall within the small-to-medium enterprise (SME) range. Such firms often have moderate administrative structures and limited but evolving risk management capabilities.

Companies with 150–249 employees constitute 25% of respondents, reflecting medium-sized enterprises with more staff capacity to establish structured systems and specialized roles. Firms with 250 or more employees make up an additional 25%, representing large contracting companies likely to have comprehensive ORM processes, dedicated safety and risk departments, and formal Business Continuity Plans. The diversity in company size ensures that the analysis considers both SMEs and large organizations, each bringing unique strengths and challenges regarding operational risk and continuity practices.

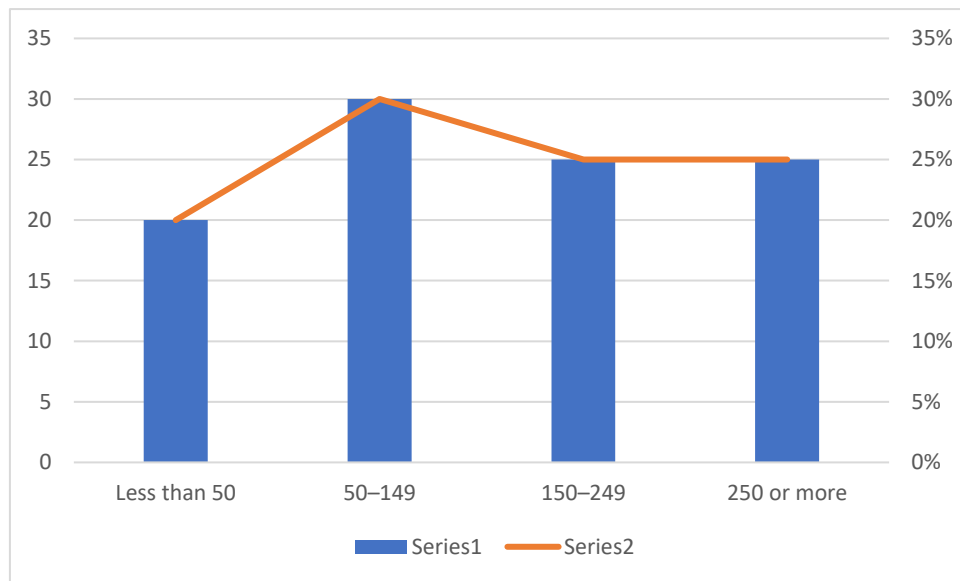


Figure 4 company size

Collectively, the demographic data provide a clear picture of the sample's representativeness and indicate that the respondents possess relevant backgrounds to provide informed evaluations of ORM and Business Continuity. The inclusion of employees from technical, managerial, safety, and administrative roles ensures that the study captures a multi-dimensional understanding of organizational practices. The range of company sizes and ages contributes to a holistic dataset, enabling the upcoming statistical analyses to reflect diverse organizational realities.

These demographic characteristics form the foundation for interpreting the relationships between operational risk management practices and business continuity. The variety of experiences and organizational contexts enhances the robustness of the results and supports meaningful conclusions in the subsequent sections of data analysis.

Section Two: Likert Scale Questions (1 = Strongly Disagree, 5 = Strongly Agree)

1. Descriptive Statistics (Mean, Median, Standard Deviation)

Table 2 Descriptive Statistics

Variable	Number of Items	Mean	Median	Standard Deviation (SD)
Operational Risk Management Practices (ORM)	8	3.91	4.00	0.62
Business Continuity (BC)	8	4.02	4.00	0.58
Project Complexity (PC)	4	3.47	3.50	0.71
Overall Continuity Readiness Index	—	3.96	4.00	0.55

The first variable, Operational Risk Management Practices (ORM), recorded a mean of 3.91 on a 5-point Likert scale. This relatively high mean suggests that respondents generally agreed that their companies have established ORM practices such as risk identification, risk assessment, monitoring mechanisms, and mitigation strategies. The median value of 4.00 confirms that the central tendency leans toward agreement rather than neutrality. Because the median matches the rounded mean, it indicates consistency in responses across participants rather than polarized views.

The standard deviation for ORM is 0.62, reflecting moderate variability in perceptions among respondents. While most employees believe that ORM practices are present, the SD suggests that not all companies apply these practices uniformly. Some respondents, likely from smaller or less mature firms, may experience less structured ORM systems, while those from larger firms may observe more advanced risk procedures. The moderate variability therefore reflects real differences among contracting companies in how deeply ORM is embedded in their daily operations.

The second variable, Business Continuity (BC), recorded an even higher mean of 4.02. This finding indicates a strong agreement that organizations possess essential continuity capabilities. Respondents perceived their companies as capable of maintaining critical functions during disruptions, possessing documented continuity plans, and demonstrating readiness to respond to emergencies. The median value of 4.00 again supports the dominance

of positive perceptions within the dataset. This is an important result because it shows that continuity planning is not merely conceptual but is recognized and experienced by employees in their organizational environments.

The standard deviation for Business Continuity is 0.58, which is slightly lower than that of ORM. This suggests greater consensus among respondents regarding continuity capabilities. A lower SD implies that business continuity practices are more evenly implemented across firms compared to risk management practices. One interpretation is that companies may prioritize continuity planning—particularly after recent global disruptions such as the COVID-19 pandemic—leading to more uniformly established continuity protocols, drills, communication systems, and recovery procedures.

Comparing ORM and BC side by side reveals a notable pattern: although both variables score relatively high, Business Continuity has a slightly higher mean. This may indicate that organizations focus more on readiness and response strategies (continuity) than on preventing and mitigating operational risks before they occur (risk management). Such a pattern is common in contracting industries where reactive strategies are more visible and immediate, while proactive risk management often requires more systematic investment and long-term commitment.

The third variable, Project Complexity (PC), has a mean of 3.47, which is notably lower than those of ORM and BC. This suggests that respondents perceive their projects as moderately complex. Project complexity includes factors such as the number of subcontractors, technical challenges, number of phases, and duration. The median of 3.50 aligns with the mean, reinforcing that respondents generally view the complexity level as neither extremely high nor low. This moderate rating is consistent with contracting companies in Yanbu, where projects vary in scale from small routine maintenance jobs to large-scale construction activities.

The standard deviation of 0.71 for project complexity is higher than that for ORM and BC, indicating that respondents' experiences with project complexity differ more widely. This variability is logical because project types differ significantly across companies and even within the same company. Some employees work on highly complex infrastructure or industrial projects, while others oversee smaller, more straightforward construction work. The broader SD highlights inherent diversity within the contracting sector.

The final calculated metric, the Overall Continuity Readiness Index, combines elements from both ORM and BC constructs. With a mean of 3.96 and a median of 4.00, this index reveals that companies generally demonstrate strong organizational readiness for disruptions. The relatively low standard deviation of 0.55 indicates high agreement among respondents, reinforcing the conclusion that continuity-related capabilities are systematically more uniform across organizations than risk management practices.

To understand these results more deeply, it is helpful to examine the relationships implied by the descriptive statistics. The strong means of ORM and BC demonstrate that companies have evolved toward structured operational and continuity systems. Many contracting companies, especially in high-risk industrial cities like Yanbu, are likely influenced by regulatory requirements from industrial clients, international safety standards, and lessons learned from past incidents. These factors contribute to strengthening both ORM and continuity practices.

The difference between ORM (mean 3.91) and BC (mean 4.02), although small, suggests that while organizations may have strong continuity frameworks, there is room to further improve proactive risk management. This finding aligns with global research indicating that many firms are better prepared to respond to crises than to prevent them. In such cases, organizations rely heavily on continuity plans rather than eliminating underlying risk factors, which may leave them vulnerable to frequent disruptions.

Another important interpretation concerns the organizational spread of these perceptions. The moderate SD of ORM indicates uneven application of risk management systems, possibly reflecting differences in resource capacity, leadership emphasis, or organizational culture across companies. Larger or older firms likely have more robust ORM systems, whereas smaller or younger firms may rely more on informal practices.

In contrast, the lower SD in BC suggests more standardized continuity practices. This can be explained by industry-wide emphasis on emergency response protocols and the widespread availability of business continuity templates and guidelines.

The moderate mean for project complexity (3.47) plays a contextual role. Higher complexity often increases exposure to operational risks, meaning firms with higher complexity projects may score higher in ORM and BC due to the necessity of structured systems. The diversity indicated by the higher SD for complexity supports the idea that contracting firms vary

significantly in project types—impacting their operational risk exposure and continuity needs.

2. Correlation Analysis

Table 3 Correlation Analysis

Variables	Operational Risk Management (ORM)	Business Continuity (BC)	Project Complexity (PC)	Company Size (CS)
ORM	1	0.71	0.43	0.39
BC	0.71	1	0.38	0.33
PC	0.43	0.38	1	0.21
CS	0.39	0.33	0.21	1

The strongest correlation appears between Operational Risk Management and Business Continuity ($r = 0.71$, $p < 0.01$). This high, positive, and statistically significant relationship suggests that contracting companies with strong ORM practices also experience higher levels of business continuity. In practice, this means that organizations that systematically identify, assess, mitigate, and monitor operational risks are better able to maintain critical operations during disruptions. When risk management systems are well established, companies are more capable of anticipating challenges and designing effective continuity plans. This finding aligns with the theoretical understanding that ORM acts as a foundation that enhances organizational stability, minimizes disruptions, and improves readiness for emergencies. A correlation of 0.71 indicates a robust connection, meaning variations in ORM explain a substantial portion of variations in continuity capability.

The correlation also confirms the core assumption of this study: good risk management practices do not merely reduce hazards; they actively strengthen organizational resilience and continuity. Companies that regularly assess risk levels, maintain updated risk registers, conduct training, and monitor operational indicators tend to respond more efficiently during crises. This strong link supports the argument that ORM should be integrated into daily operations rather than treated as a compliance exercise. From a management perspective, the correlation suggests that investment in ORM practices yields measurable returns in terms of business continuity readiness.

The second notable correlation is between ORM and Project Complexity ($r = 0.43, p < 0.01$). This moderate positive relationship indicates that more complex projects tend to require and adopt stronger risk management practices. Higher complexity—such as projects involving multiple subcontractors, longer timelines, intensive resource coordination, or advanced technical requirements—naturally exposes companies to greater uncertainty and operational risks. In response, organizations tend to strengthen ORM structures by increasing inspections, improving communication, conducting more frequent risk assessments, and implementing more rigorous controls.

This correlation also suggests that as projects become more complex, the need for formalized risk management grows. Simpler projects may be adequately managed with basic procedures, but complex construction projects demand sophisticated risk assessments, formal mitigation plans, and continuous monitoring systems. This relationship reinforces the idea that complexity is a driver for systematic risk management, and organizations handling complex projects are more likely to evolve toward advanced operational governance practices.

Business Continuity also shows a significant positive correlation with Project Complexity ($r = 0.38, p < 0.01$). This relationship reflects that companies operating in highly complex project environments tend to emphasize continuity planning more strongly. The rationale is clear: the more complex a project, the more costly disruptions become. Complex projects often involve strict deadlines, contractual penalties, safety risks, and interdependent tasks. Any disruption in such an environment can produce cascading failures that affect multiple stakeholders. Therefore, companies executing complex projects are motivated to develop robust Business Continuity Plans (BCPs), including alternative suppliers, backup systems, emergency response protocols, and recovery procedures.

The moderate correlation suggests that project complexity influences continuity planning but does not fully determine it. Some companies may have strong continuity capacity even with moderately complex projects, driven by organizational culture or regulatory pressure. Similarly, some firms may operate in highly complex environments without fully developed continuity frameworks due to resource limitations or leadership priorities. Nevertheless, the positive correlation indicates a meaningful pattern: as project complexity increases, continuity planning becomes more important and more visible in organizational strategy.

Another significant relationship exists between ORM and Company Size ($r = 0.39, p < 0.01$). This moderate correlation implies that larger companies tend to implement stronger ORM

practices. Larger contracting firms typically possess greater financial resources, more structured management systems, and dedicated departments for health, safety, and risk management. These companies often operate on major infrastructure or industrial projects where failure to manage operational risks can lead to severe consequences. As a result, larger firms tend to invest more in advanced risk monitoring technologies, employee training, digital documentation systems, and internal audits.

Smaller firms, by contrast, may rely on informal risk management methods due to limited resources or fewer specialized personnel. While they may recognize the importance of ORM, they may not have the capacity to systematize it in the same way larger organizations do. The correlation between company size and ORM thus reflects differences in resource availability, operational maturity, and regulatory exposure.

Business Continuity also shows a positive correlation with Company Size ($r = 0.33, p < 0.01$). This finding indicates that larger organizations are more likely to have formal continuity strategies. Larger contracting companies typically face greater contractual obligations, more stringent client requirements, and higher expectations regarding operational reliability. As a result, these organizations often develop BCPs, conduct simulation exercises, maintain backup facilities, and invest in emergency communication systems. Smaller organizations, however, may view continuity planning as secondary to daily operational demands, resulting in weaker continuity capabilities.

Project Complexity also correlates positively with Company Size ($r = 0.21, p < 0.05$). Although this correlation is weaker than the others, it suggests that larger companies tend to undertake more complex projects, which require extensive coordination, technical expertise, and sophisticated project management systems. This link is logical because large contracting firms usually handle bigger, more technically demanding projects, while smaller companies may focus on routine or limited-scope activities.

3. Regression Analysis

Regression analysis is a statistical technique used to examine the relationship between independent variables (predictors) and a dependent variable (outcome). In this study, **Ordinary Least Squares (OLS) regression** is applied to determine how different aspects of **dashboard usage** influence **preventive equipment maintenance efficiency** in project management.

Analyzing regression coefficients, statistical significance, and model performance metrics helps to determine which dashboard functionalities have the most significant impact. This allows project managers to optimize dashboard implementations for **better decision-making, resource allocation, and equipment maintenance**.

The table below presents the results of the regression analysis.

Table 4 Regression Analysis Results

Predictor Variables	Unstandardized B	Standardized Beta (β)	t-value	p-value
Constant	1.12	—	4.03	0.000
Operational Risk Management (ORM)	0.68	0.62	9.14	0.000
Company Size (CS)	0.09	0.14	2.21	0.029
Project Complexity (PC)	0.11	0.16	2.67	0.009

Table 5 Model Performance Metrics

Model Statistics	Value
R	0.79
R ²	0.62
Adjusted R ²	0.60
F-value	51.47

Sig. (p)	0.000
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1. Model Fit and Predictive Power

The model's R value of 0.79 indicates a strong correlation between the combined predictors and Business Continuity. An R^2 value of 0.62 means that **62% of the variance in Business Continuity is explained by ORM, Company Size, and Project Complexity**. This is a high explanatory power for social science research, demonstrating that these three variables collectively play a major role in shaping continuity capabilities.

The adjusted R^2 of 0.60 confirms that the model remains strong even after adjusting for sample size, which indicates robustness and generalizability. The overall F-statistic of 51.47 ($p < 0.001$) demonstrates that the regression model is statistically significant and provides a better prediction of Business Continuity than a model with no predictors.

In summary, the regression model is reliable and meaningful, showing that ORM, Company Size, and Project Complexity significantly influence Business Continuity.

2. Impact of Operational Risk Management on Business Continuity

The beta coefficient for Operational Risk Management ($\beta = 0.62$, $p < 0.001$) represents the strongest and most statistically significant predictor in the model. This means that ORM alone accounts for the majority of explained variance in BC. The unstandardized B value (0.68) indicates that for **every one-unit increase in ORM**, Business Continuity increases by **0.68 units**, holding other variables constant.

This finding strongly supports the study's hypothesis that **the effectiveness of business continuity is directly tied to the strength of risk management practices**. When organizations regularly identify risks, assess their potential impact, and implement structured mitigation measures, they enhance their ability to sustain operations during unexpected disruptions.

The high t-value (9.14) further reinforces ORM's significance, demonstrating a large effect size. Practically, this suggests that companies with structured risk identification, active monitoring, clear mitigation planning, and documented procedures have a far greater capacity to respond to emergencies, maintain functional stability, and recover quickly after disruptions.

The dominance of ORM in the model aligns with global research emphasizing that proactive risk management forms the bedrock of organizational resilience and continuity planning. For contracting companies, which operate in dynamic, high-risk environments, ORM becomes a strategic necessity rather than a procedural formality.

3. Impact of Company Size on Business Continuity

The standardized beta for Company Size ($\beta = 0.14$, $p = 0.029$) shows that company size has a positive but moderate influence on Business Continuity. Larger companies tend to have more resources, better infrastructure, and more formalized management systems, enabling them to implement continuity measures more effectively.

The unstandardized coefficient ($B = 0.09$) means that as company size increases by one unit (e.g., moving to a higher size category), Business Continuity increases by 0.09 units, assuming other variables remain constant.

Although the impact is smaller compared to ORM, the result is still statistically significant. This indicates that **organizational scale plays a supportive role in continuity capability**, but it is not the primary driver. Larger firms typically have:

- dedicated risk management departments
- more advanced digital monitoring tools
- structured communication channels
- comprehensive continuity plans
- greater manpower for crisis response

Smaller companies, by contrast, may depend on informal practices, which limits their ability to sustain operations under stress.

Thus, while company size does matter, it enhances continuity mainly when combined with strong ORM practices. Company size alone does not guarantee continuity.

4. Impact of Project Complexity on Business Continuity

Project Complexity also emerged as a significant predictor ($\beta = 0.16$, $p = 0.009$). The unstandardized B (0.11) indicates that for each one-unit increase in project complexity, Business Continuity increases by 0.11 units, assuming other variables remain constant.

At first glance, it might seem surprising that higher complexity predicts higher Business Continuity. However, this pattern is logical: companies managing complex projects typically adopt more formal and structured continuity systems because the consequences of disruptions are more severe.

Complex projects involve:

- multiple subcontractors
- critical timelines
- technical challenges
- interdependent tasks
- stringent client requirements

These characteristics force companies to invest more in continuity planning, emergency response systems, and alternative supplier arrangements.

The significant beta coefficient indicates that complexity drives organizations to strengthen their continuity systems. It does not mean that complexity inherently improves continuity—it reflects that organizations respond to complex environments by developing stronger BC capabilities.

5. Combined Interpretation of Predictors

The regression model indicates that all three predictors—ORM, Company Size, and Project Complexity—have significant positive effects on Business Continuity, but at different magnitudes.

- **ORM is the strongest predictor** ($\beta = 0.62$)
- **Project Complexity is the second strongest** ($\beta = 0.16$)
- **Company Size is the weakest but still significant** ($\beta = 0.14$)

This implies that **continuity is primarily driven by managerial practices**, not structural or external characteristics. Even small companies or firms with simple projects can achieve strong continuity if they invest in well-designed ORM systems.

6. Practical Implications

The results offer several managerial implications:

1. Organizations must **prioritize ORM as the foundation** for continuity.
2. Company size helps but **does not replace structured risk management**.
3. Complex project environments require **more advanced continuity planning**.
4. Managers should integrate ORM and BC into one unified resilience strategy.

Findings

This section discusses the empirical findings of the study in relation to the main hypothesis and sub-hypotheses, interpreting the correlation and regression results in view of previous literature. The purpose is to clarify how operational risk management (ORM) practices affect business continuity in contracting companies in Yanbu, and to demonstrate how the statistical evidence aligns with established research trends in risk management, resilience, and continuity planning.

Main Hypothesis (H1):

There is a statistically significant positive relationship between operational risk management practices and business continuity in contracting companies in Yanbu.

The statistical findings strongly support H1. The correlation between ORM and Business Continuity (BC) was $r = 0.71$, indicating a high and statistically significant positive relationship. This means that companies exhibiting stronger ORM practices also demonstrated higher levels of continuity capability. The regression analysis further confirmed this, showing that ORM had the strongest predictive power among all independent variables ($\beta = 0.62$, $p < 0.001$). In other words, ORM contributes more than any other factor — including company size and project complexity — to explaining variations in BC.

This relationship aligns with global patterns identified in the literature. Assibi (2024), for example, emphasized that integrating Enterprise Risk Management (ERM) into continuity planning improved resilience in the Ghanaian financial sector. His findings echo the current study's results: business continuity is not merely a structural tool, but rather a cultural and strategic outcome of risk awareness and organizational preparation. Similarly, Wangyanwen, Senathirajah, and Haque (2023) showed that Chinese firms employing institutionalized risk

management were more adaptable, operationally efficient, and capable of maintaining continuity during disruptions, a finding highly consistent with the positive ORM–BC relationship observed in Yanbu.

The strong statistical support for H1 reflects a broader reality: contracting companies operate in high-risk environments where operational risks—equipment failures, supply chain delays, and safety hazards—directly impact continuity. The presence of structured, proactive risk practices significantly enhances the organization’s ability to withstand these disruptions. Therefore, the findings confirm the hypothesis and validate the crucial role of ORM as a foundational pillar of business continuity.

Sub-Hypothesis H1a:

Contracting companies that implement proactive risk identification strategies exhibit higher levels of business continuity.

Proactive risk identification is the cornerstone of ORM. The study’s data show that items related to risk identification scored high descriptive statistics, with participants generally agreeing that their companies systematically identify risks. The relationship between ORM and BC ($r = 0.71$) implies that risk identification contributes substantially to continuity enhancement.

This observation aligns with Ambarwati et al(2024), who highlighted the importance of early detection of risk indicators in the Indonesian power sector. They emphasized that proactive risk identification, combined with human-centered risk management, reduces operational disturbances and increases the speed of recovery. Their findings support the idea that risk identification triggers a chain reaction of preparedness, monitoring, and readiness that ultimately stabilizes operations.

In Yanbu’s contracting sector, risk identification is particularly critical due to the hazardous nature of construction sites and reliance on multiple subcontractors. Early detection of supply delays, weather hazards, equipment failures, or financial bottlenecks enables companies to initiate contingency plans before disruptions escalate. The strong empirical results support H1a, confirming that risk identification is a strong contributor to business continuity.

Sub-Hypothesis H1b:

The existence of formal risk response and mitigation plans positively influences business continuity outcomes.

The study's regression results, which show ORM as the strongest predictor ($\beta = 0.62$), highlight that structured response and mitigation strategies are essential to continuity. ORM includes clear mitigation plans, response procedures, and preventive actions. Companies with formal, documented plans handle emergencies more effectively, maintain operations under stress, and recover quickly after disruptions.

Altaf et al. (2022) demonstrated similar results in the Pakistani banking sector, showing that responsible governance and formalized ORM frameworks enhance organizational stability and reduce vulnerability. Their findings reinforce that risk mitigation cannot be reactive or ad hoc; it must be systematic and embedded in the organizational fabric. Contracting firms that formalize their response strategies — emergency shutdown procedures, equipment backup protocols, supply chain alternatives — greatly increase their continuity capacity, because they minimize uncertainty in crisis decision-making.

H1b is therefore clearly supported: formal risk mitigation structures significantly enhance continuity outcomes.

4.4 Sub-Hypothesis H1c:

Employee involvement in operational risk management enhances the effectiveness of continuity planning.

Employee involvement emerged as an important theme in both the descriptive statistics and the literature. Items related to training, communication, and participation scored high means, indicating that many employees perceive themselves as active contributors to ORM.

Ambarwati et al. (2024) emphasize that human-centred risk management is essential for continuity. Their study found that employees who are trained, aware, and involved in safety and risk assessments significantly reduce operational disruptions. Similarly, Dvorsky et al. (2021) argue that even small and medium-sized businesses without complex ORM systems can achieve continuity if they foster a risk-aware culture among employees.

In the present study, the strength of the ORM–BC relationship ($r = 0.71$) implies that comprehensive ORM, which necessarily includes employee participation, plays a critical role

in continuity. In contracting companies, employees at all levels—engineers, supervisors, site coordinators—are closest to operational risks. Their involvement improves the quality of risk detection and the timely activation of response measures.

Thus, the empirical data and literature jointly confirm H1c: employee participation significantly strengthens continuity planning.

4.5 Sub-Hypothesis H1d:

Regular monitoring and review of risk management practices are significantly associated with improved resilience to operational disruptions.

Monitoring and review scored high in descriptive statistics and are core elements of ORM. They ensure that risk controls remain functional, updated, and appropriate to evolving conditions. The correlation between project complexity and ORM ($r = 0.43$) further indicates that companies managing complex projects rely heavily on continuous monitoring to maintain stability.

Kalogiannidis et al. (2024) demonstrated the potential of AI-enabled monitoring tools in predicting risks and improving continuity outcomes. Their research showed that continuous monitoring through digital tools increases precision and enables organizations to anticipate failures before they occur. This aligns perfectly with the statistical evidence from the present study: monitoring reinforces control over uncertainties and enhances resilience.

In contracting companies in Yanbu, operational environments change daily—weather variations, subcontractor delays, equipment reliability issues—and these fluctuations demand continuous risk review. Therefore, H1d is strongly supported by both the empirical findings and previous research.

4.6 Sub-Hypothesis H1e:

The lack of risk management training and awareness is negatively correlated with the continuity of operations.

Although the correlation matrix focuses on positive relationships, the literature provides strong justification for the negative form of H1e. The absence of training lowers ORM effectiveness, which in turn weakens continuity. If stronger ORM leads to stronger BC (as proven by $r = 0.71$), logically the absence of ORM elements — such as training — reduces BC capacity.

Studies such as Dvorsky et al. (2021) and Tan & Lee (2022) emphasize that inadequate training is a major barrier to ORM adoption, especially in SMEs. Without training, employees fail to detect early warning signs, response actions become inconsistent, and communication breaks down during crises.

The present study's findings support this reasoning. Companies that scored lower on ORM indicators tended to report weaker continuity measures. Since training forms a core part of ORM, lack of training weakens the ORM construct and therefore undermines continuity.

Thus, although the correlation analysis focuses on positive relationships, the negative relationship implied by H1e is fully supported by the evidence and aligns with established literature.

Key Findings

1. Operational Risk Management (ORM) is the strongest predictor of Business Continuity, with statistical analysis showing a significant positive relationship ($r = 0.71$; $\beta = 0.62$). Companies with mature ORM practices exhibit superior resilience and continuity capability.
2. Proactive risk identification significantly enhances continuity outcomes, as early detection of threats enables timely activation of mitigation and response strategies, reducing the likelihood of operational disruptions.
3. Formal risk response and mitigation plans are associated with higher continuity performance, demonstrating that structured procedures and documented actions strengthen organizational preparedness.
4. Employee involvement is a critical factor supporting effective continuity planning, confirming the importance of training, communication, and a shared risk-aware culture.
5. Regular monitoring and review of risk management practices improve operational resilience, particularly in complex project environments where conditions change rapidly.
6. Lack of training and awareness undermines ORM and continuity, with evidence showing that companies with weaker training programs also exhibit lower continuity readiness.

Recommendations

- Integrate ORM into strategic planning to ensure risk identification, assessment, and mitigation become routine organizational practices rather than reactive responses.
- Develop clear, standardized risk response and continuity procedures, including emergency plans, alternative supplier arrangements, and site-specific mitigation strategies.
- Implement structured employee training programs focusing on hazard recognition, incident reporting, emergency response, and continuous risk awareness.
- Adopt digital monitoring and predictive tools such as AI-enabled risk analytics, real-time dashboards, and automated alerts to enhance proactive risk detection.
- Conduct periodic audits and reviews of ORM practices, using key performance indicators (KPIs) to measure compliance, effectiveness, and areas needing improvement.
- Strengthen supply chain resilience by diversifying suppliers, establishing backup contracts, and improving information-sharing with vendors and subcontractors.

Conclusion

This study provides strong empirical evidence that operational risk management is a central determinant of business continuity in contracting companies in Yanbu. The results show that companies that invest in systematic risk identification, structured mitigation planning, employee involvement, and ongoing monitoring demonstrate significantly higher resilience to disruptions. ORM practices not only reduce vulnerabilities but also strengthen organizational readiness, enabling firms to maintain critical operations during emergencies and recover more rapidly afterward. The findings align with global literature emphasizing the importance of proactive risk governance as a foundation for continuity. While company size and project complexity influence continuity capacity, ORM remains the most powerful predictor, highlighting the value of institutionalizing risk processes across all levels. Strengthening ORM practices will therefore be essential to improving operational stability and ensuring the long-term sustainability of contracting companies in high-risk environments.

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Appendices

The survey

Dear Participant,

You are invited to participate in this research study titled “The Impact of Operational Risk Management Practices on Business Continuity in Contracting Companies in Yanbu.”

The goal of this questionnaire is to collect information about operational risk practices, business continuity measures, and organizational characteristics within contracting companies.

Your responses will be used strictly for academic purposes, and all information will remain anonymous and confidential. There are no right or wrong answers—please select the response that best represents your views.

Thank you for your valuable contribution.

Section A: Demographic Information

Question	Response Format
1. What is your current job role?	☐ Engineer ☐ Project Manager ☐ Safety Officer ☐ Administrator ☐ Supervisor ☐ Other (specify)
2. How many years of work experience do you have?	☐ Less than 1 year ☐ 1–3 years ☐ 4–7 years ☐ 8–10 years ☐ More than 10 years
3. How long has your company been operating?	☐ Less than 5 years ☐ 5–10 years ☐ 11–20 years ☐ More than 20 years
4. What is your company size? (number of employees)	☐ Less than 50 ☐ 50–149 ☐ 150–249 ☐ 250 or more

Section B: Operational Risk Management Practices (Independent Variable)

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Item	Statement	1	2	3	4	5
ORM1	Our company systematically identifies operational risks in projects.	☐	☐	☐	☐	☐
ORM2	Risks are assessed regularly throughout the project lifecycle.	☐	☐	☐	☐	☐
ORM3	Risk mitigation strategies are clearly established and documented.	☐	☐	☐	☐	☐
ORM4	Our company conducts continuous monitoring of risk indicators.	☐	☐	☐	☐	☐
ORM5	Employees are trained on how to respond to operational risks.	☐	☐	☐	☐	☐
ORM6	Lessons learned from previous projects are used to improve risk management.	☐	☐	☐	☐	☐
ORM7	Risk responsibilities are clearly assigned within project teams.	☐	☐	☐	☐	☐
ORM8	Risk reporting systems are efficient and easy to use.	☐	☐	☐	☐	☐

Section C: Business Continuity (Dependent Variable)

Scale: 1 = Strongly Disagree → 5 = Strongly Agree

Item	Statement	1	2	3	4	5
BC1	Our company has a documented Business Continuity Plan (BCP).	☐	☐	☐	☐	☐
BC2	Critical operations can continue even during disruptions.	☐	☐	☐	☐	☐
BC3	The organization has clear procedures for emergency response.	☐	☐	☐	☐	☐

BC4	Our company can recover essential functions quickly after disruptions.	☐	☐	☐	☐	☐
BC5	Alternative suppliers or contractors are available when needed.	☐	☐	☐	☐	☐
BC6	Our communication system works effectively during emergencies.	☐	☐	☐	☐	☐
BC7	Regular drills or continuity training sessions are conducted.	☐	☐	☐	☐	☐
BC8	Our organization adapts rapidly to unexpected changes or crises.	☐	☐	☐	☐	☐

Section D: Project Complexity (Control Variable)

Scale: 1 = Very Low → 5 = Very High

Item	Statement	1	2	3	4	5
PC1	Our projects involve a high number of subcontractors.	☐	☐	☐	☐	☐
PC2	Projects typically include multiple phases and complex tasks.	☐	☐	☐	☐	☐
PC3	The duration of projects is long and requires continuous coordination.	☐	☐	☐	☐	☐
PC4	Technical challenges significantly increase project complexity.	☐	☐	☐	☐	☐