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**Cost Containment Strategies and Their Impact on Hospital Financial
Performance in Saudi Arabia**

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Abstract

Healthcare systems in Saudi Arabia face mounting financial pressure arising from rising demand, an aging population, technological advancement, and the transition toward a value-based, strategic-purchasing model under the Health Sector Transformation Program. This study examines the relationship between cost containment strategies — administrative, clinical, supply chain, and technology-based — and the financial performance of Saudi hospitals, while accounting for the moderating effects of hospital type, size, and region. Grounded in the Resource-Based View, Agency Theory, Lean Management Theory, and Value-Based Healthcare, the study adopts a sequential explanatory mixed-methods design comprising a cross-sectional survey of 200 hospitals followed by qualitative case studies of six purposively selected hospitals. Findings are expected to extend theory to the Saudi context, inform health-financing policy, and guide hospital administrators in prioritizing cost containment investments consistent with Vision 2030 objectives.

Keywords: cost containment, hospital financial performance, Saudi Arabia, Vision 2030, lean management, value-based healthcare.

المستخلص

تواجه أنظمة الرعاية الصحية في المملكة العربية السعودية ضغوطاً مالية متزايدة ناتجة عن ارتفاع الطلب على الخدمات الصحية، وتزايد نسبة كبار السن، والتطور التقني، والتحول نحو نموذج الشراء الاستراتيجي القائم على القيمة في إطار برنامج التحول الصحي. تبحث هذه الدراسة في العلاقة بين استراتيجيات احتواء التكاليف - الإدارية والسريرية وسلسلة الإمداد والتقنية - والأداء المالي للمستشفيات السعودية، مع الأخذ بعين الاعتبار الأثر المعدّل لنوع المستشفى وحجمه ومنطقته الجغرافية.

وإطار الرعاية الصحية، (Lean) تستند الدراسة إلى نظرية الموارد، ونظرية الوكالة، ونظرية الإدارة الرشيدة القائمة على القيمة، وتعتمد تصميمًا منهجيًا متسلسلاً تفسيريًا مختلطاً يجمع بين مسح مقطعي كمي يشمل 200 مستشفى، ودراسات حالة نوعية معمّقة لسنة مستشفيات مختارة بعناية. يُتوقع أن تسهم نتائج الدراسة في تطوير الإطار النظري ضمن السياق السعودي، وتوجيه صنّاع السياسات الصحية، ومساعدة إداريي المستشفيات في تحديد أولويات الاستثمار في استراتيجيات احتواء التكلفة بما يتوافق مع أهداف رؤية 2030.

الكلمات المفتاحية: احتواء التكلفة، الأداء المالي للمستشفيات، المملكة العربية السعودية، رؤية 2030، الإدارة الرشيدة، الرعاية الصحية القائمة على القيمة.

Chapter One: Introduction

1.1 Background of the Study

1.1.1 The Global Context of Hospital Cost Pressure

Healthcare systems worldwide are under sustained financial strain from a combination of rising patient demand, population aging, the diffusion of costly medical technologies, and the growing burden of chronic disease. Hospitals, as the most resource-intensive nodes of any health system, absorb a disproportionate share of this pressure, since inpatient care, surgical services, and specialized diagnostics remain the most capital- and labor-intensive components of healthcare delivery. Shrank et al. (2019) estimate that waste accounts for a substantial share of total health expenditure in the United States alone, underscoring that financial strain is frequently as much a matter of inefficiency as of underlying demand growth. Health systems in middle- and high-income countries have therefore increasingly turned to structured cost containment programs — spanning payment reform, care standardization, and productivity improvement — as a means of protecting service quality while limiting the growth of expenditure (Stadhouders et al., 2019).

1.1.2 The Saudi Healthcare Financing Context

Saudi Arabia occupies a distinctive position within this global picture. The Kingdom is the largest healthcare spender in the Gulf Cooperation Council, with total healthcare expenditure exceeding USD 58 billion in 2024 (Statista, 2025). Government allocations to the health and social development sector have grown steadily, rising from roughly USD 46.6 billion in 2018 to about USD 68.2 billion in 2023, and the Ministry of Health's own budget share of total government spending increased from 6.5 percent in 2010 to 9.4 percent in 2023 (Alwazir, 2024). At the same time, health spending as a share of GDP has

fluctuated in recent years, falling from close to 5.9 percent in 2021 to roughly 4.6 percent in 2022 — below the global average of approximately 6.7 percent (The Global Economy, 2024) — a pattern consistent with Saudi Arabia's rapid nominal GDP growth as much as with any slowdown in absolute health spending. Government sources continue to fund the majority of national healthcare expenditure, with public spending accounting for more than 60 percent of the total even as the Kingdom pursues an explicit target of raising private-sector participation from 25 to 35 percent by 2030 (International Trade Administration, 2026).

This scale of expenditure coexists with structural inefficiencies. Alshehri et al. (2023) applied Data Envelopment Analysis to 91 Ministry of Health hospitals and found that most operated below the technical efficiency frontier, implying that meaningful cost savings are achievable without reducing the resource base available to hospitals. Alatawi et al. (2022) similarly documented weak health information systems, fragmented reporting, and limited data-driven decision-making capacity as recurring barriers to efficient hospital management across the public sector. These findings suggest that the central financial challenge facing Saudi hospitals is not simply one of inadequate funding, but of how efficiently existing resources are deployed.

1.1.3 Vision 2030 and the Health Sector Transformation Program

The Health Sector Transformation Program (HSTP), launched in 2021 as one of the Vision 2030 realization programs, seeks to reposition the Ministry of Health from a direct service provider toward a regulatory and stewardship role, while encouraging the corporatization of public hospitals into semi-autonomous Health Clusters operating under the Health Holding Company (Alasiri & Mohammed, 2022; Alwazir, 2024). This transition is

accompanied by a shift in the underlying financing model: rather than receiving budgets through direct government allocation, hospitals are increasingly expected to operate under a strategic purchasing arrangement in which a national payer — anchored by the National Health Insurance model — contracts with providers on the basis of activity and performance (Health Sector Transformation Program, 2022). The rollout of Diagnosis Related Groups (DRGs) as an activity-based reimbursement mechanism, alongside the expansion of digital platforms such as NPHIES for claims and revenue-cycle management and NUPCO for centralized medical-supply procurement (International Trade Administration, 2026), signals that Saudi hospitals will increasingly be paid according to standardized, activity-linked rates rather than historical budget allocations.

This reform trajectory has two direct implications for the present study. First, it means that hospitals unable to align their internal cost structures with fixed, activity-based reimbursement rates will face growing fiscal exposure, making cost containment capability a determinant of institutional survival rather than a discretionary efficiency initiative. Second, it means that the financial performance of Saudi hospitals can no longer be understood purely through the lens of budget execution; it must instead be understood through market-oriented indicators such as operating margins, cost per patient day, and revenue-cycle efficiency — indicators that are only meaningful once a hospital's cost base is well understood and actively managed.

1.1.4 Cost Containment in the Hospital Setting: A Conceptual Overview

In the hospital setting, cost containment is best understood as the ensemble of structured interventions, policies, and management practices that limit or manage the growth of expenditure without compromising the quality of care provided. Such practices typically

span four domains that recur throughout the international literature and structure the analytical framework of this study: administrative restructuring and standardization; clinical-pathway and utilization management; supply chain and procurement optimization; and the deployment of information technology in support of billing, utilization review, and revenue-cycle management. A substantial international evidence base links these practices to improved financial performance. Wackers et al. (2022) found that hospitals combining quality improvement with cost management strategies outperformed those pursuing either approach in isolation, while Berwick and Hackbarth (2012) estimated that a considerable share of health expenditure could be eliminated through targeted waste-reduction strategies without harming outcomes. Despite the breadth of this international evidence, the relationship between specific cost containment strategies and financial performance remains empirically underexplored within the Saudi hospital sector specifically, a gap that motivates the present study.

This study responds to that gap through an extensive, mixed-methods investigation of the relationship between cost containment strategies and financial performance in Saudi hospitals, informed by three complementary theoretical lenses — the Resource-Based View, Agency Theory, and Lean Management Theory — and situated within the normative frame of Value-Based Healthcare. The mixed-methods design is intended to generate both quantitative and qualitative evidence, strengthening both the practical and theoretical contribution of the research.

1.1.5 The Demographic and Epidemiological Transition

The financial pressure on Saudi hospitals is compounded by a rapid demographic and epidemiological transition. The ratio of people aged over 65 to those aged 20-64 is

projected to almost double between 2020 and 2030, and non-communicable diseases (NCDs) already accounted for 67.4 percent of all disability-adjusted life-years lost in the Kingdom in 2019 (Boettiger et al., 2023). Modeling of ten priority NCDs — including ischemic heart disease, stroke, type 2 diabetes, chronic obstructive pulmonary disease, and chronic kidney disease — indicates that treatment costs for these conditions alone will place substantially increased demands on the national health budget over the coming decade as prevalence rises alongside population aging (Boettiger et al., 2023). Because chronic and age-related conditions are disproportionately managed through inpatient and specialist hospital care, this epidemiological shift will fall most heavily on exactly the hospital cost structures examined in this study, reinforcing the urgency of identifying which cost containment strategies can absorb rising demand without a proportional increase in expenditure.

1.2 Statement of the Problem

Saudi Arabia's healthcare sector is increasingly required to deliver quality services to a growing and aging population while confronting rising costs and an anticipated reduction in government subsidy. The Kingdom's population is projected to reach 39.5 million by mid-2030, with the elderly population more than doubling its current size (Alasiri & Mohammed, 2022), driving sustained growth in demand associated with non-communicable diseases.

Many Saudi hospitals continue to exhibit considerable technical and allocative inefficiency. Alatawi et al. (2022) identified systemic barriers to cost-effective management, including weak health information systems, fragmented reporting, and limited capacity for data-driven decision-making. The absence of standardized costing

systems in many hospitals further prevents financial managers from accurately calculating the cost-to-value ratio of clinical procedures, generating considerable operational waste.

The healthcare system is simultaneously moving from global budgeting toward activity-based reimbursement through Diagnosis Related Groups (DRGs), fundamentally altering the payer-provider relationship under a Strategic Purchasing model. Hospitals unable to align their internal cost structures with fixed reimbursement rates risk substantial fiscal deficits, a risk compounded by limited institutional capacity to support the emerging National Health Insurance directives.

While prior research has examined internal controls in the private sector (Al Rahahleh et al., 2023), a critical gap remains regarding the specific cost containment strategies that influence financial outcomes across both public and private Saudi hospitals. In the absence of robust local evidence, policymakers and administrators are often compelled to rely on anecdotal evidence or on models imported from Western health systems that may not reflect the particularities of Saudi Arabia's health system in transition. This study therefore addresses the following central research problem: to what extent do cost containment strategies adopted by Saudi hospitals contribute to their financial sustainability?

1.3 Importance of the Study

1.3.1 Scholarly Contribution

Much of the existing research on hospital cost containment is grounded in the experience of the United States, the United Kingdom, and Western Europe, whose financial systems, regulatory environments, and cultural contexts differ substantially from those of Saudi Arabia. This study extends the applicability of the Resource-Based View and Agency

Theory to a Middle Eastern healthcare context, contributing to a stronger theory-informed understanding of the relationship between cost containment and quality (Bal & Wallenburg, 2023).

1.3.2 Policy Relevance

The findings are expected to have direct implications for health-financing policy in Saudi Arabia. Institutions such as the Ministry of Health, the Council of Health Insurance, the Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI), and the National Center for Privatization and PPP require empirical evidence to support the ongoing corporatization of public hospitals, the expansion of mandatory health insurance, and the development of public-private partnerships consistent with Vision 2030.

1.3.3 Managerial Implications

Hospital administrators and financial officers stand to benefit from evidence-based guidance identifying which cost containment strategies are most effective under differing institutional conditions, supporting the prioritization of resources and the development of internal financial competencies. This is particularly relevant given evidence that the relationship between financial performance and quality of care is not straightforward (Dubas-Jakobczyk et al., 2021).

1.3.4 Alignment with Vision 2030

The Health Sector Transformation Program explicitly targets efficiency improvement, financial sustainability, and private-sector expansion as core objectives. This study directly supports these goals by generating evidence to inform the ongoing reform of hospital financial management, including the transition toward Accountable Care Organizations (Health Clusters) operating under the Health Holding Company.

1.4 Objectives of the Study

- To identify and categorize the cost containment strategies implemented by Saudi hospitals across administrative, clinical, supply chain, and technology-driven domains.
- To assess the level of implementation and perceived effectiveness of these strategies from the perspective of financial managers and administrators.
- To examine the influence of cost containment strategies on financial performance using efficiency ratios (e.g., cost per patient day) and sustainability ratios (e.g., revenue efficiency, operating margin).
- To examine the moderating effects of hospital type (public, private, health cluster), size, and geographic region on this relationship.
- To identify institutional, regulatory, and managerial barriers to the implementation of cost containment strategies.
- To formulate a conceptual framework and evidence-based recommendations for enhancing hospital financial performance consistent with the Health Sector Transformation Program.

1.5 Research Questions

1.5.1 Primary Research Question

What is the relationship between cost containment strategies and financial performance in Saudi Arabian hospitals, and what moderating effects do institutional and contextual factors have on this relationship?

1.5.2 Secondary Research Questions

- What cost containment strategies are currently used in public and private Saudi hospitals across administrative, clinical, supply chain, and technology domains?
- What impact do current cost containment strategies have on financial performance indicators such as operating cost ratio, cost per patient day, and net profit margin?
- Do hospital type, size, and location significantly moderate the relationship between cost containment strategies and financial performance?
- What institutional, regulatory, and managerial barriers hinder effective cost containment implementation, and how do these differ between public and private hospitals?
- How do hospital managers and financial officers perceive the effectiveness of existing cost containment initiatives, and which organizational capabilities are most associated with successful implementation?
- What evidence-based policy and managerial recommendations can be derived from a comparative analysis of high- and low-performing hospitals?

1.6 Research Hypotheses

1.6.1 Main Hypotheses

- H1: Cost containment strategies have a statistically significant impact on the financial sustainability of Saudi hospitals, controlling for hospital type, size, and region.
- H2: Administrative cost containment strategies are positively associated with operational efficiency (e.g., budget variance, resource utilization).

- H3: Clinical cost containment strategies are positively associated with reduced cost per patient day and improved resource utilization.
- H4: Supply chain optimization strategies are positively associated with reduced pharmaceutical and medical supply costs.
- H5: Technology-based cost containment strategies are positively associated with Revenue Cycle Management (RCM) performance and financial sustainability.

1.6.2 Moderating Hypotheses

- H6: Hospital type moderates the relationship between cost containment strategies and financial performance, with a stronger association in private hospitals.
- H7: Hospital size moderates the relationship through economies of scale, with a stronger association in larger hospitals.
- H8: Institutional and regulatory barriers (e.g., DRG readiness, information-system fragmentation) weaken the positive association between cost containment strategies and financial performance.
- H9: Technology-based and clinical cost containment strategies interact synergistically, producing a combined effect on financial performance greater than the sum of their individual effects.

1.7 Alignment of Objectives, Research Questions, and Hypotheses

The table below cross-references the study's objectives (Section 1.4), research questions (Section 1.5), and hypotheses (Section 1.6) to make explicit how each element of the research design serves the others, a mapping that will also guide the organization of the discussion in Chapter Five (Section 5.1).

Objective (Sec. 1.4)	Related Research Question(s) (Sec. 1.5)	Related Hypothesis/Hypotheses (Sec. 1.6)
Identify and categorize CCS across four domains	RQ1	H1
Assess implementation level and perceived effectiveness	RQ1, RQ5	H2, H3, H4, H5
Examine CCS influence on financial performance	RQ2	H1, H2, H3, H4, H5
Examine moderating effects of type, size, region	RQ3	H6, H7, H8
Identify institutional/regulatory/managerial barriers	RQ4	H8
Formulate conceptual framework and recommendations	RQ6	All (synthesis)

1.8 Theoretical Basis of the Study

This study is guided by three complementary theoretical perspectives — the Resource-Based View (Barney, 1991), Agency Theory (Jensen & Meckling, 1976), and Lean Management Theory (Teich & Faddoul, 2013) — situated within the normative frame of Value-Based Healthcare (Porter, 2010). Together, these perspectives explain, respectively, why hospitals with similar cost containment strategies can achieve different financial outcomes (resource-based competencies), why misaligned incentives between payers and providers can undermine cost discipline (agency relationships), how waste can be systematically identified and removed from clinical and operational processes (lean principles), and why cost containment should be pursued in a manner that preserves or

enhances patient outcomes rather than simply minimizing spending (value-based care). The full theoretical framework, including the proposed conceptual model linking cost containment strategies to financial performance, is developed in Chapter Two.

1.9 Summary of Chapter One

This chapter has situated the present study within the intersecting pressures of rising global healthcare costs, Saudi Arabia's distinctive financing context, the transformation agenda of Vision 2030 and the HSTP, and an accelerating demographic and epidemiological transition. It has articulated the central research problem — the extent to which cost containment strategies contribute to the financial sustainability of Saudi hospitals — and translated that problem into six objectives, one primary and six secondary research questions, and nine testable hypotheses spanning both direct and moderating relationships. Chapter Two now turns to the existing literature and theoretical foundations that inform how these questions will be answered.

Chapter Two: Previous Studies and Theoretical Framework

2.1 Introduction

This chapter synthesizes the existing literature on hospital cost containment and financial performance across four thematic areas — hospital efficiency and cost management in Saudi Arabia, lean management, supply chain and technology-enabled cost reduction, and system-level cost-containment policy — before identifying the research gap addressed by this study. The chapter concludes with the theoretical framework underpinning the proposed conceptual model.

2.2 Previous Studies

2.2.1 Hospital Efficiency and Cost Management in Saudi Arabia

In the post-Vision 2030 era, several studies have examined hospital efficiency in Saudi Arabia. Alshehri et al. (2023) applied a Casemix Index and Data Envelopment Analysis to 91 Ministry of Health hospitals, finding that average efficiency scores fell below the technical frontier, suggesting that cost savings are achievable through improved management practices without additional resource allocation. This finding is consistent with an earlier and methodologically related DEA study by Alatawi, Niessen, and Khan (2020), who assessed the same population of 91 MOH-affiliated hospitals using input-oriented Charnes-Cooper-Rhodes and Banker-Charnes-Cooper models and reported that 75.8 percent of hospitals (69 of 91) were technically inefficient, with considerable scope to reduce inputs such as beds, physicians, and nursing staff without any accompanying reduction in outputs. That two DEA-based studies, conducted using different data years roughly five years apart, arrive at broadly convergent conclusions suggests that

inefficiency in Saudi public hospitals is a persistent structural feature of the system rather than an artifact of a single dataset.

In a companion analysis, Alatawi and colleagues examined the external environmental and institutional determinants of hospital performance, using Spearman's rank correlation and Tobit regression to link demographic and socioeconomic catchment-area characteristics to observed efficiency scores. Their results indicated that factors beyond managerial control, such as the demographic profile of a hospital's catchment population, help explain some of the variation in technical efficiency across regions, implying that efficiency benchmarks and cost containment targets may need to be calibrated for regional context rather than applied uniformly across all Saudi hospitals.

Alatawi et al. (2022), drawing on stakeholder interviews conducted across MOH facilities nationwide, identified weak health information systems, poor inter-departmental coordination, and limited clinical governance as key contributors to inefficiency, while noting that stronger integrated reporting systems were associated with improved resource utilization — a theme that recurs throughout the technology-focused literature discussed in Section 2.2.3.

With respect to the private sector, Al Rahahleh et al. (2023) examined the financial performance of 78 private hospitals using Agency Theory and Partial Least Squares Structural Equation Modeling (PLS-SEM), finding that internal control mechanisms and financial accountability structures positively affect financial performance, with financial accountability acting as a partial mediator. This suggests that governance-level, rather than purely operational, cost-management tools may be critical prerequisites for improved

financial performance. Rahman (2020) examined the privatization of the Saudi healthcare system, noting that privatization creates cost-control incentives but risks widening access and quality gaps absent effective regulation.

2.2.2 Lean Management and Cost Containment

Lean management, adapted from the Toyota Production System, is among the most extensively studied cost containment approaches in global healthcare. Kaur et al. (2024) found that lean implementation in healthcare facilities between 2019 and 2024 was associated with increases in patient volume of 15 to 68.9 percent alongside reduced length of stay and lower operational costs. Rundall et al. (2021) presented national-level evidence from United States hospitals showing a positive relationship between lean implementation and financial performance that strengthened with the extent and duration of implementation. Ayaad et al. (2022) applied lean principles in an oncology hospital setting, reporting improvements in service quality, cost, and time management amid rising demand for cancer treatment in Saudi Arabia.

Direct evidence of lean management's impact within Saudi hospitals comes from Hassanain et al. (2017), who implemented a lean-based intervention across the operating rooms of twelve hospitals throughout the Kingdom, combining visual dashboards for first-case starts, computerized surgical-list management, optimized time allocation, and a formal pre-anesthesia clinic governance structure. The intervention produced statistically significant improvements in on-time first-case starts and room-turnover times at several sites, although improvements in overall OR utilization and weekly procedure volumes were not uniformly detected — a result the authors attributed to the need for sustained monitoring rather than a one-time implementation. This finding is instructive for the

present study because it illustrates that lean interventions in the Saudi hospital context can generate measurable efficiency gains on some financial-performance-relevant metrics while leaving others unchanged, underscoring the value of examining multiple performance indicators simultaneously rather than relying on a single summary measure.

Wackers et al. (2022), reviewing 19 international case studies of hospitals that successfully reduced costs while improving quality, found that lean management, Six Sigma, and value-based healthcare were the most commonly used approaches among top performers, with the integration of cost management and value-creation strategies as a defining success factor — a perspective consistent with Porter (2010) and later operationalized by Bernstein et al. (2024), who emphasize that cost containment should be value-driven rather than cost-cutting-oriented.

2.2.3 Supply Chain Optimization and Technology-Enabled Cost Reduction

Supply chain management has been identified as a significant lever for hospital cost containment. De Silva Etges et al. (2022) found that hospitals employing sophisticated cost-measurement practices, including time-driven activity-based costing, achieved greater cost visibility and were better able to identify waste within their supply chains, with optimized care pathways associated with cost reductions of 10 to 25 percent per episode of care. Time-driven activity-based costing is particularly relevant to the Saudi market given its alignment with Vision 2030's objectives of fair pricing and transparent resource allocation within the newly formed Health Clusters.

Within the Saudi hospital sector specifically, Ayadi (2024) surveyed 214 Saudi hospitals to examine how supply chain integration and innovation affect supply chain performance

through the mediating mechanism of supply chain resilience, drawing on the Resource-Based View and dynamic capability theory. The study found that both supply chain integration and innovation positively affect resilience and, in turn, overall supply chain performance, with resilience acting as a partial mediator — evidence that a hospital's internal supply chain capabilities, not merely its procurement volume or price negotiation, are what ultimately translate into cost and performance gains. This finding directly reinforces the Resource-Based View's relevance to the present study's supply chain dimension, discussed further in Section 2.3.1. Earlier work by Alshahrani, Rahman, and Chan (2018) similarly linked hospital-supplier integration to hospital performance in the Saudi context, suggesting that the benefits of supply chain optimization identified internationally by de Silva Etges et al. (2022) extend meaningfully to the Saudi setting despite its distinct regulatory and procurement environment, which is anchored by the centralized National Unified Procurement Company (NUPCO).

Technology-enabled cost containment, including electronic health records and hospital information systems, has similarly been linked to improved billing accuracy, reduced duplicate testing, and stronger revenue cycle management, although adoption barriers persist, particularly regarding cost and organizational readiness in public-sector hospitals.

2.2.4 Effective Healthcare Cost-Containment Policies

At the system level, Stadhouders et al. (2019) conducted a systematic review of cost-containment policies across OECD healthcare systems, identifying budget caps, reference pricing, payment-system reforms, and co-payments as among the most effective macro-level strategies. In the Saudi context, Al-Hanawi et al. (2023) describe the ongoing shift

from fee-for-service to value-aligned payment systems, which presents both opportunities and challenges for cost management at the hospital level.

2.2.5 Synthesis Across Thematic Areas

Read together, the four thematic areas reviewed above point toward a consistent underlying pattern: Saudi hospitals possess considerable latent capacity for cost improvement (Section 2.2.1), a range of internationally validated tools — lean management (2.2.2), supply chain optimization and technology (2.2.3), and system-level payment policy (2.2.4) — capable of realizing that capacity, and at least preliminary Saudi-specific evidence that each of these tools can be implemented with measurable, if sometimes uneven, effect. What remains largely untested is how these strategies perform relative to one another, whether their effects are moderated by hospital type, size, or region, and how they translate into standardized financial performance indicators comparable across the public and private sectors — the central empirical task of the present study.

2.2.6 Research Gap

Despite this growing body of literature, no methodologically rigorous study has yet examined the relationship between cost containment measures and quantified financial performance across a sample of Saudi hospitals spanning both public and private sectors, while simultaneously controlling for institutional moderating factors and generating implications specific to the Saudi regulatory and cultural context. Whereas existing Saudi-based research has predominantly used DEA to measure hospital efficiency, or has examined single strategies such as lean management or supply chain integration in isolation, the present study extends this literature by explaining, rather than merely

measuring, hospital financial performance in relation to a multi-dimensional set of cost containment strategies considered jointly.

2.3 Theoretical Framework

Three complementary theoretical perspectives, together with a normative fourth, provide a comprehensive framework for examining the relationship between cost containment strategies and hospital financial performance in Saudi Arabia.

2.3.1 Resource-Based View (RBV)

Barney (1991) developed RBV theory, building on Penrose's (1959) theory of firm growth. According to RBV, organizations achieve competitive advantage through resources that are valuable, rare, inimitable, and non-substitutable. Applied to hospitals, RBV suggests that financial performance outcomes are not simply a function of adopting cost containment strategies, but of the differentiated resource-based competencies that allow some hospitals to execute those strategies more effectively than others — helping to explain why hospitals with similar strategies can achieve markedly different financial outcomes (Wackers et al., 2022).

2.3.2 Agency Theory

Developed by Jensen and Meckling (1976), Agency Theory examines the relationship between an agent (e.g., a hospital manager) and a principal (e.g., a hospital owner or government body) on whose behalf the agent acts. Misalignment between principal and agent incentives is a significant concern in healthcare, potentially contributing to cost inflation and waste. Al Rahahleh et al. (2023) demonstrated the theory's relevance to the Saudi context, finding that stronger internal control mechanisms were associated with improved financial performance. Agency Theory is especially pertinent as the Health

Sector Transformation Program establishes a purchaser-provider split, requiring hospitals (as agents) to demonstrate financial accountability to the National Health Insurance Center (as principal) in exchange for performance-based reimbursement.

2.3.3 Lean Management Theory

Derived from the Toyota Production System and adapted for healthcare, Lean Management Theory emphasizes the identification and elimination of waste as a means of reducing cost and improving quality (Teich & Faddoul, 2013). By distinguishing value-added from non-value-added activities, lean theory supports a value-stream approach to designing more efficient care delivery, and has been linked to improved efficiency, cost-effectiveness, and financial performance in healthcare settings (Kaur et al., 2024; Rundall et al., 2021).

2.3.4 Value-Based Healthcare (VBHC)

Porter's (2010) Value-Based Healthcare framework reorients cost management from input minimization toward outcome maximization, defining value as the outcome of care achieved per unit of cost. This approach is increasingly influential in Saudi health-system reform, underpinning the explicit adoption of value-based care as a guiding principle of the Health Sector Transformation Program (Alasiri & Mohammed, 2022). VBHC provides the normative foundation for examining how cost management strategies can reduce cost while sustaining quality and value.

2.3.5 Proposed Conceptual Model

Synthesizing these four perspectives, this study proposes a conceptual model in which cost containment strategies (administrative, clinical, supply chain, and technology-related dimensions) are hypothesized to directly influence hospital financial performance, operationalized as a composite index of operating cost ratio, cost per patient day, revenue

efficiency, and net profit margin. Hospital type, size, and regulatory environment are modeled as moderating variables, while organizational capabilities — resource base, governance, and lean maturity — are modeled as mediating variables that partially explain the relationship between strategy adoption and financial performance. This multi-layered approach is intended to capture both how and under what conditions cost containment strategies translate into financial sustainability.

2.3.6 Digital Transformation and Artificial Intelligence in GCC Healthcare

A growing regional literature complements the Saudi-specific technology studies reviewed in Section 2.2.3 by examining digital transformation across the wider Gulf Cooperation Council. AlDhaen (2025) surveyed 300 healthcare professionals across five hospitals in the GCC region to examine how artificial intelligence interventions affect patient safety, finding that AI adoption improves patient safety indirectly through gains in operational efficiency, and that this effect is further strengthened where healthcare professionals possess higher digital competence. This mediating role of operational efficiency is conceptually significant for the present study: it suggests that technology-based cost containment strategies (Section 2.2.3) may influence financial performance not only directly, through reduced billing errors or faster claims processing, but indirectly, through broader gains in operational efficiency that only materialize when staff possess sufficient digital competence to use new systems effectively. This raises the possibility that the technology dimension of the conceptual model (Section 2.3.5) is moderated by organizational digital readiness — a nuance not captured in the current hypotheses (H1–H9) but worth flagging as an avenue for future research in Section 5 of this thesis.

2.4 The Cost-Quality Trade-off: A Necessary Caveat

A recurring concern in the cost containment literature is that aggressive expenditure reduction can come at the expense of care quality if pursued without regard for clinical outcomes. Dubas-Jakobczyk et al. (2021), in a scoping review protocol examining the association between hospital financial performance and quality of care, note that the relationship between the two is neither simple nor uniformly positive: some studies find that financially stronger hospitals deliver better outcomes because they can invest in staffing and technology, while others find that cost-cutting pressure degrades quality, and still others find no significant relationship at all. This ambiguity is precisely why the Value-Based Healthcare perspective (Section 2.3.4) is treated as a normative constraint on the present study's conceptual model rather than as an afterthought: cost containment strategies are of interest here only insofar as they are compatible with sustained or improved care quality, not as a route to cost reduction at any cost. The present study does not measure clinical quality outcomes directly — a limitation acknowledged in Section 3.6.2 — but this theoretical caveat is intended to guard against a naive reading of the findings as a mandate for indiscriminate cost-cutting.

2.5 Summary of Chapter Two

This chapter has reviewed four thematic areas of the cost containment literature — hospital efficiency, lean management, supply chain and technology, and system-level policy — situating each within the specific context of the Saudi hospital sector wherever direct evidence was available. It identified a research gap concerning the joint, comparative examination of multiple cost containment strategies against standardized financial performance indicators across both public and private Saudi hospitals, and it developed the four-theory framework (Resource-Based View, Agency Theory, Lean Management

Theory, and Value-Based Healthcare) that underpins the conceptual model tested in this study. Chapter Three now translates this framework into a concrete research design and set of analytical procedures.

Taken as a whole, the literature reviewed in this chapter suggests that no single theoretical lens is sufficient on its own to explain hospital cost containment outcomes in the Saudi context: resource-based competencies help explain why similarly positioned hospitals diverge in performance, agency-theoretic misalignment helps explain why some cost containment mandates fail to take hold operationally, and lean and value-based principles together provide the practical and normative machinery through which cost containment is actually implemented at the point of care. It is this integrative, rather than single-theory, stance that most directly shapes the multi-dimensional conceptual model carried forward into Chapter Three.

Chapter Three: Research Methodology

3.1 Introduction

This chapter outlines the research design, sampling strategy, data-collection instruments, and analytical procedures employed to examine the relationship between cost containment strategies and hospital financial performance in Saudi Arabia.

3.2 Research Design

This study adopts a sequential explanatory mixed-methods design, combining quantitative analysis in the first phase with qualitative investigation in the second. This design is well suited to examining a complex organizational phenomenon such as cost containment, in which quantitative data establish the extent and direction of relationships while qualitative data illuminate the underlying mechanisms, processes, and contextual conditions. The approach is consistent with the methodological model successfully applied in the Saudi hospital financial-performance study conducted by Al Rahahleh et al. (2023).

3.3 Phase 1: Quantitative Cross-Sectional Survey

3.3.1 Population and Sampling Frame

The target population for the quantitative phase comprises all hospitals operating in Saudi Arabia. According to the General Authority for Statistics (2024), the Kingdom had 516 hospitals in operation, with Riyadh region recording the highest concentration at 115 hospitals; a closely aligned industry estimate places the figure at 499 hospitals, comprising 290 operated by the Ministry of Health, 59 operated by other government sectors, and 150 operated by the private sector (Alwazir, 2024). This population provides the sampling frame for the study, supplemented by the Saudi Health Council registry and the Council of

Health Insurance's list of CBAHI-accredited hospitals to ensure private-sector coverage is complete.

3.3.2 Sample Size Justification

A target sample size of 200 hospitals was set for the quantitative phase. Applying the widely used Krejcie and Morgan (1970) table for determining sample size from a finite population, a population of approximately 500 to 520 hospitals requires a minimum sample of roughly 217 to 220 units to achieve a 95 percent confidence level with a 5 percent margin of error; the target of 200 completed hospital-level responses was therefore set close to this threshold, with an oversampling allowance built into the distribution plan to offset anticipated non-response. This target also comfortably exceeds the minimum sample size conventionally recommended for Partial Least Squares Structural Equation Modeling (PLS-SEM), which is typically estimated using the 10-times rule or, more rigorously, through statistical power analysis based on the largest number of predictors pointing at any single construct in the model (Hair et al., 2021).

The sample will be stratified by hospital type (public, private), size (small, fewer than 100 beds; medium, 100–300 beds; large, more than 300 beds), and region (Central, Western, Eastern, Northern, Southern), with proportional allocation adjusted to ensure a minimum cell size sufficient for subgroup comparisons required by the moderating hypotheses (H6–H8). Financial managers, hospital administrators, and chief medical officers within each sampled hospital will serve as key informants, consistent with the respondent profile used in comparable Saudi hospital-performance research (Al Rahahleh et al., 2023).

3.3.3 Instrument Administration and Pilot Testing

Prior to full deployment, the questionnaire will be pilot-tested with a convenience sample of approximately 20 to 30 respondents drawn from hospitals outside the main sampling frame, in order to assess item clarity, completion time, and preliminary reliability. Following the pilot, the instrument will be refined and distributed electronically, with follow-up reminders issued to non-respondents at fixed intervals to maximize the response rate. Given the sensitivity of financial and operational information, particular attention will be paid to minimizing common method bias — for example, by separating the measurement of predictor and outcome constructs within the questionnaire flow and assuring respondents of anonymity — consistent with established guidance on mitigating common method variance in survey-based organizational research (Podsakoff et al., 2003).

3.3.4 Data Analysis Plan

Data will be analyzed using SmartPLS 4 or AMOS, employing Pearson's and Spearman's correlation coefficients, multiple linear regression, and structural equation modeling (SEM) to test the hypothesized relationships. Descriptive statistics (means, standard deviations, frequencies) will characterize the sample profile and the implementation levels of each cost containment dimension prior to inferential testing. Moderation analysis will test hospital type, size, and institutional-barrier hypotheses (H6–H8) using multi-group analysis or interaction-term approaches within the structural model, consistent with standard PLS-SEM moderation procedures (Hair et al., 2021).

To address the sensitivity of accessing clinical and financial information, the study will employ a triangulation approach, collecting self-reported information from senior executives — an approach recognized as effective in healthcare management research

where access to objective financial data is limited — alongside a strict ethical-clearance protocol to ensure respondent anonymity.

3.4 Phase 2: Qualitative Multiple Case Studies

The qualitative phase involves in-depth case studies of six purposively selected hospitals — three public and three private — representing diverse regions and levels of financial performance. Case selection will be informed by Phase 1 results to maximize variation in strategy implementation and financial outcomes. Between three and five in-depth interviews per hospital will be conducted with respondents such as CEOs, CFOs, quality managers, departmental heads, and procurement officers. Data will be analyzed thematically using NVivo 14, with trustworthiness established through member checking, thick description, peer debriefing, and reflexive practice, following Braun and Clarke's (2022) approach to reflexive thematic analysis.

3.5 Study Tools and Instruments

3.5.1 Primary Instrument: Structured Questionnaire

The questionnaire comprises five sections. Section A collects demographic and institutional information. Section B contains 15 items on administrative cost containment strategies, adapted from scales developed by Al Rahahleh et al. (2023) and Wackers et al. (2022), rated on a five-point Likert scale (1 = not implemented; 5 = fully implemented and formally evaluated). Section C contains 12 items on clinical cost containment strategies — including clinical pathways, length-of-stay protocols, evidence-based prescribing, and quality-based incentive systems — adapted from Ayaad et al. (2022). Section D contains 18 items on supply chain and technology-based strategies, adapted from de Silva Etges et al. (2022) and Rundall et al. (2021), including items on integration with national digital

platforms such as NPHIES and NUPCO. Section E contains 10 items assessing financial performance through a composite index combining objective ratios and perceptual assessments, based on the instrument validated by Al Rahahleh et al. (2023).

Content validity will be established through expert-panel review by five healthcare-finance experts and three academic researchers. Construct validity will be assessed through confirmatory factor analysis, internal reliability through Cronbach's alpha (threshold 0.70), and discriminant validity through the Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2015).

3.5.2 Secondary Financial Data

Secondary financial data will be collected from MOH statistical yearbooks, the Saudi Health Information Survey, CBAHI reports, and hospital annual reports, including total operating costs, cost per patient day, bed-occupancy rates, revenue per available bed, operating margin, return on assets, budget variance (public hospitals), and claims denial rate.

3.5.3 Semi-Structured Interview Protocol

A separate interview schedule will be developed for executive, financial, clinical, and operational informant groups, aligned with the conceptual model and covering strategy adoption, implementation, organizational enablers and barriers, and perceived financial impact. Data storage and handling will comply with the Saudi Personal Data Protection Law (PDPL), with all digital data stored in encrypted cloud folders accessible only to the primary researcher.

3.6 Scope and Limitations of the Study

3.6.1 Scope

- Spatial scope: all five administrative regions of Saudi Arabia, with particular focus on Riyadh, Jeddah, Dammam, Mecca, and Medina.
- Institutional scope: MOH-registered hospitals, Health Cluster hospitals under the Health Holding Company, CBAHI-accredited private hospitals, and military/special-sector hospitals.
- Temporal scope: cross-sectional data on cost management and financial performance for 2021–2023, capturing the post-COVID-19 recovery period and the early stages of Health Sector Transformation Program implementation.
- Thematic scope: the relationship between cost management practices and financial performance; clinical quality is not treated as a dependent variable, although its relationship to cost is acknowledged.

3.6.2 Limitations

- The cross-sectional design does not permit causal inference; a longitudinal design would be required to establish temporal relationships.
- Self-reported financial performance data may be subject to social-desirability bias, mitigated through triangulation with secondary financial data.
- Access to detailed financial information from public hospitals may be limited by government confidentiality regulations.
- Findings may not generalize to other GCC countries given Saudi Arabia's distinct health-system structure and financing model.

- Key-informant interviews may be subject to impression-management bias, potentially resulting in overly favorable self-presentation of cost-management practices.
- The study does not examine clinical quality outcomes as a dependent variable, and therefore cannot fully address the cost-quality trade-off (see Section 2.4).
- The study is conducted during a period of rapid institutional and regulatory transition; evolving financial dynamics may limit the long-term stability of findings beyond the current transformation phase.

3.7 Validity and Reliability Procedures

Quantitative validity will be addressed at three levels. Content validity is established through expert-panel review, as described in Section 3.5.1. Construct validity is assessed through confirmatory factor analysis prior to structural model testing, examining factor loadings, average variance extracted (AVE), and composite reliability for each latent construct. Discriminant validity is assessed using the Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2015), which is now generally preferred over the older Fornell-Larcker criterion for PLS-SEM models. Internal consistency reliability is assessed through Cronbach's alpha and composite reliability, both benchmarked against the conventional 0.70 threshold.

Qualitative trustworthiness follows the framework implied by Braun and Clarke's (2022) reflexive approach to thematic analysis, operationalized through four mechanisms: member checking, in which preliminary themes are shared with a subset of interview participants to confirm they resonate with lived experience; thick description of the

institutional context of each case-study hospital, to support reader judgments about transferability; peer debriefing, in which coding decisions are discussed with the supervisory team to surface alternative interpretations; and reflexive memoing throughout data collection and analysis to make the researcher's own assumptions and positionality visible rather than treating analysis as a purely mechanical exercise.

3.8 Ethical Considerations

This study will be conducted in accordance with the ethical principles set out in the Declaration of Helsinki as applied to organizational and survey-based (rather than clinical) research, and in compliance with the Saudi Personal Data Protection Law (PDPL). Prior to data collection, ethical clearance will be sought from the relevant institutional research ethics committee, and individual permission will be obtained from the administration of each participating hospital in addition to informed consent from individual respondents (see Appendix C).

- Informed consent will be obtained from all quantitative and qualitative participants prior to data collection, using the consent form in Appendix C.
- Participation is voluntary; respondents may withdraw at any point without penalty or effect on their employment.
- All data will be de-identified prior to analysis; no hospital or individual respondent will be named in any report or publication arising from this study.
- Digital data will be stored in encrypted, access-controlled cloud storage accessible only to the principal researcher, consistent with PDPL requirements.

- Given the commercial and reputational sensitivity of hospital-level financial data, aggregated rather than hospital-identifiable results will be reported wherever findings are shared with participating institutions or external stakeholders.
- Data will be retained for a minimum of five years after study completion in accordance with common institutional research-integrity requirements, after which raw identifiable data (e.g., any optional contact emails collected in Appendix A) will be permanently deleted; de-identified analytic datasets may be retained longer to support replication requests.
- Any deviation from the approved data collection or storage procedures will be reported promptly to the supervisory team and, where required, to the institutional research ethics committee.

3.9 Project Timeline

The study is organized into six sequential phases spanning approximately twelve months from ethical clearance to final submission. This timeline is indicative and may be adjusted in consultation with the supervisory team depending on the pace of institutional approvals and survey response rates.

- Months 1–2: Ethical clearance, instrument translation and back-translation, pilot testing (Sections 3.3.3 and 3.8).
- Months 3–5: Quantitative survey distribution and follow-up reminders, targeting the 200-hospital sample described in Section 3.3.2.

- Months 5–6: Quantitative data cleaning, preliminary descriptive analysis, and case-study hospital selection based on Phase 1 results (Section 3.4).
- Months 6–8: Qualitative interviews across the six selected case-study hospitals, transcription, and initial coding.
- Months 8–10: Full quantitative analysis (CFA, PLS-SEM, hypothesis testing) and qualitative thematic analysis, integration of both strands.
- Months 10–12: Drafting of Chapters Four and Five, supervisory review, revisions, and final submission.

3.10 Significance of Expected Contribution

Beyond the scholarly, policy, and managerial contributions outlined in Section 1.3, the methodological design itself is intended to make a modest contribution to the regional literature. Few existing Saudi studies combine a nationally stratified quantitative survey with in-depth qualitative case studies within a single cost containment investigation; most either apply DEA to secondary efficiency data (e.g., Alshehri et al., 2023; Alatawi et al., 2020) or examine a single strategy in isolation (e.g., Hassanain et al., 2017 on lean; Ayadi, 2024 on supply chain). By integrating multiple cost containment dimensions within one explanatory sequential design, and by explicitly testing hospital type, size, and regional moderators, this study aims to produce a more complete empirical account of how cost containment translates into financial performance across the diversity of the Saudi hospital sector than any single prior study has attempted.

This integrative ambition also carries a corresponding methodological responsibility: because the study draws on multiple theoretical lenses and analytical strands

simultaneously, particular care is taken throughout Chapter Three to specify, in advance, exactly how each hypothesis will be tested and against which threshold it will be judged supported or unsupported, so that the eventual findings in Chapter Four are anchored to a pre-specified analytic plan rather than reverse-engineered from whatever pattern the data happen to show.

3.11 Summary of Chapter Three

This chapter has presented a sequential explanatory mixed-methods design comprising a stratified quantitative survey of Saudi hospitals, justified against the known national hospital population using established sample-size procedures, followed by six in-depth qualitative case studies. It has detailed the structured questionnaire, secondary financial data sources, and semi-structured interview protocol that together operationalize the conceptual model developed in Chapter Two, alongside the validity, reliability, and ethical safeguards that will govern data collection and analysis. Chapter Four presents the results of this design once real data collection has been completed.

Chapter Four: Results (Trial Run)

**TRIAL RUN — BASED ON A PLACEHOLDER/PILOT FILE UPLOADED BY THE STUDENT
(RespondentID: PILOT001-PILOT120), NOT ON DATA COLLECTED FROM REAL
HOSPITALS. ALL NUMBERS BELOW ARE REAL STATISTICAL OUTPUTS COMPUTED
DIRECTLY FROM THAT FILE (NOT INVENTED), BUT THE UNDERLYING RESPONSES
THEMSELVES ARE NOT GENUINE. THIS CHAPTER MUST BE RE-RUN ON REAL DATA
BEFORE SUBMISSION.**

4.1 Sample Profile (from uploaded file)

Total respondents in file: 120.

Hospital Type

Category	n
Public - MOH/Health Cluster	56
Public - other government	33
Private	31

Region

Category	n
Central	22
Southern	24
Northern	25
Western	29
Eastern	20

Hospital Size

Category	n
Small (<100 beds)	45
Medium (100-300 beds)	50

Large (>300 beds)	25
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Respondent Role

Category	n
Hospital Administrator/CEO	39
CFO/Financial Manager	45
Other	16
Chief Medical Officer	20

Years of Experience

Category	n
2-5 years	36
6-10 years	36
More than 10 years	30
Less than 2 years	18

CBAHI Accreditation Status

Category	n
Yes	69
No	19
In progress	32

4.2 Composite Descriptive Statistics and Reliability (computed)

Composite scores were computed as the mean of items within each dimension; Cronbach's alpha was computed directly on the uploaded item-level data.

Dimension	Mean	SD	Cronbach's alpha
Administrative (B)	3.36	0.74	0.92
Clinical (C)	2.87	0.61	0.84
Supply Chain/Tech (D)	3.51	0.66	0.90

Financial Performance (E)	2.88	0.60	0.75
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4.3 Item-Level Descriptive Statistics (computed)

The following tables report the mean, standard deviation, and corrected item-total correlation for every individual item, all computed directly from the uploaded file. The item-total correlation indicates how strongly each item covaries with the sum of the remaining items in its dimension; values below approximately 0.30 would conventionally flag an item as a candidate for removal or revision once real data are analyzed.

Section B — Administrative Cost Containment Strategies (B1–B15)

Item	Mean	SD	Item-Total r
B1	3.31	1.13	0.55
B2	3.37	1.05	0.65
B3	3.33	1.04	0.64
B4	3.31	1.14	0.66
B5	3.38	1.05	0.68
B6	3.33	1.03	0.68
B7	3.38	1.11	0.71
B8	3.32	1.18	0.68
B9	3.34	1.02	0.62
B10	3.42	1.04	0.66
B11	3.44	1.04	0.63
B12	3.38	1.01	0.64
B13	3.29	1.01	0.59
B14	3.43	1.12	0.62
B15	3.35	1.03	0.51

Section C — Clinical Cost Containment Strategies (C1–C12)

Item	Mean	SD	Item-Total r
C1	2.82	0.98	0.50
C2	2.79	1.01	0.46
C3	3.08	1.04	0.53
C4	2.73	0.96	0.53
C5	2.90	1.05	0.48
C6	2.82	1.09	0.47
C7	2.87	1.09	0.50
C8	2.98	1.10	0.56
C9	2.78	0.88	0.48
C10	2.81	0.97	0.43
C11	2.99	0.97	0.57
C12	2.83	1.05	0.48

Section D — Supply Chain and Technology Strategies (D1–D18)

Item	Mean	SD	Item-Total r
D1	3.59	1.02	0.54
D2	3.49	1.14	0.61
D3	3.49	1.10	0.59
D4	3.57	0.97	0.55
D5	3.42	0.98	0.49
D6	3.55	1.04	0.48
D7	3.58	1.11	0.54
D8	3.52	1.07	0.61
D9	3.49	1.14	0.60
D10	3.45	1.04	0.66
D11	3.40	1.10	0.59
D12	3.52	1.05	0.54

D13	3.48	1.13	0.68
D14	3.57	1.08	0.51
D15	3.57	1.02	0.52
D16	3.55	1.08	0.52
D17	3.51	1.11	0.52
D18	3.52	1.04	0.45

Section E — Financial Performance (E1–E10)

Item	Mean	SD	Item-Total r
E1	2.95	1.11	0.44
E2	2.97	1.03	0.43
E3	2.84	1.00	0.47
E4	2.88	1.13	0.51
E5	3.02	1.06	0.41
E6	2.86	1.02	0.41
E7	2.83	1.06	0.46
E8	2.83	1.02	0.47
E9	2.83	1.15	0.27
E10	2.81	1.10	0.31

4.4 Correlation Matrix (computed)

	Administrative	Clinical	Supply Chain/Tech	Financial Performance
Administrative	1.00**	0.65**	0.76**	0.47**
Clinical	0.65**	1.00**	0.65**	0.37**
Supply Chain/Tech	0.76**	0.65**	1.00**	0.46**
Financial Performance	0.47**	0.37**	0.46**	1.00**

* $p < .05$, ** $p < .001$ (Pearson correlation on composite scores, computed from the uploaded file).

4.5 Regression: Financial Performance on Cost Containment Dimensions (computed)

R-squared = 0.248 — the three predictors jointly account for about 24.8% of variance in the Financial Performance composite within this uploaded file.

Predictor	Beta (unstandardized)	p-value
Intercept	1.295	5.59e-6
Administrative CCS	0.212	0.046
Clinical CCS	0.044	0.688
Supply Chain/Tech CCS	0.212	0.075

4.6 Group Comparison: Public (MOH) vs. Private Hospitals (computed)

Independent-samples t-test on the Financial Performance composite: Public/MOH (n=56, M=2.87, SD=0.62) vs. Private (n=31, M=3.00, SD=0.62); $t = -0.92$, $p = 0.360$. Within this uploaded file, the difference is not statistically significant at the conventional .05 threshold.

4.7 Regional Comparison: One-Way ANOVA (computed)

One-way ANOVA of the Financial Performance composite across the five regions: $F = 0.54$, $p = 0.708$. Within this uploaded file, region does not show a statistically significant association with financial performance.

4.8 Hospital Size and Administrative Cost Containment (computed)

Mean Administrative CCS composite score by hospital size:

Hospital Size	Mean Administrative CCS
---------------	-------------------------

Large (>300 beds)	3.96
Medium (100-300 beds)	3.34
Small (<100 beds)	3.04

One-way ANOVA: $F = 15.77$, $p < .001$. Within this uploaded file, larger hospitals show higher administrative cost containment scores than smaller ones.

4.9 Summary and Status of This Chapter

Structurally, this trial run shows what the real Chapter Four will contain once genuine hospital data is available: full demographic tables, item-level and composite descriptive statistics, reliability coefficients, a correlation matrix, regression results addressing the main hypotheses (H1–H5), and group-comparison tests addressing the moderating hypotheses (H6–H8). The analytical pipeline used here (Cronbach's alpha, Pearson correlation, multiple regression, t-tests, ANOVA) matches the categories of analysis specified in Chapter Three, and can be re-run within minutes once a file containing real hospital responses in the same column structure is available.

This chapter, in its current form, does not describe real Saudi hospitals, because the underlying respondent rows (PILOT001–PILOT120) are not genuine field data. It must not be submitted as-is; every number above is to be replaced by output computed on real data collected via the instrument in Appendix A.

Chapter Five: Discussion, Conclusions, and Recommendations (Framework)

This chapter is presented as a structural framework rather than a completed discussion, since a genuine discussion of findings can only be written once Chapter Four contains results from real hospital data. It specifies, in advance, how each part of the discussion will be organized once that data is available, which reduces the risk of post-hoc rationalization and keeps the interpretation of results tied to the hypotheses and literature established in Chapters One and Two.

5.1 Discussion Structure by Hypothesis

Once real results are available, the discussion will proceed hypothesis by hypothesis (H1 through H9), following a consistent three-part structure for each: (1) restating the finding (supported, partially supported, or not supported, with effect size and significance level); (2) situating the finding relative to the specific prior studies reviewed in Chapter Two — for example, comparing an administrative cost containment finding (H2) against Al Rahahleh et al. (2023), or a technology finding (H5) against AlDhaen (2025); and (3) interpreting the finding through the relevant theoretical lens (Resource-Based View, Agency Theory, Lean Management Theory, or Value-Based Healthcare) established in Section 2.3. Where a hypothesis is not supported, the discussion will explicitly consider whether this reflects a genuine absence of relationship, an artifact of sample composition, or a measurement limitation, rather than treating non-significance as an inconvenient result to be minimized.

5.2 Theoretical Implications

The theoretical implications section will assess the extent to which the findings extend, qualify, or challenge each of the four guiding theories in the Saudi hospital context specifically. For example, strong support for H1 combined with a significant moderating effect of hospital type (H6) would extend Agency Theory's applicability to the emerging purchaser-provider split under the HSTP (Section 1.1.3), while a null result for the technology-clinical interaction (H9) would suggest that the synergistic effects proposed in Section 2.3.6 require boundary conditions (such as digital competence) not captured in the current model.

5.3 Practical and Policy Implications

Practical implications will be organized by audience, consistent with the significance argument developed in Section 1.3: implications for hospital administrators and CFOs (which strategies to prioritize given resource constraints), for the Ministry of Health and Council of Health Insurance (which system-level levers most reliably support cost containment across hospital types), and for CBAHI and the National Center for Privatization and PPP (how accreditation and privatization policy might be calibrated in light of the findings). Recommendations will be explicitly graded by the strength of the underlying evidence (e.g., a recommendation based on a hypothesis supported at $p < .001$ with a large effect size will be presented with more confidence than one based on a marginally significant finding).

5.4 Integration of Quantitative and Qualitative Strands

Consistent with the sequential explanatory design (Section 3.2), the discussion will explicitly integrate the qualitative themes from Appendix B interviews with the quantitative hypothesis-testing results, following a joint-display approach: for each major

quantitative finding, the relevant qualitative theme(s) will be presented alongside it to show where the two strands agree, where they diverge, and what the qualitative data adds in terms of mechanism or context that the quantitative data alone cannot explain.

5.5 Limitations Recap

The discussion will revisit the limitations identified in Section 3.6.2 in light of what was actually observed during data collection — for example, whether the achieved response rate and sample composition matched the target stratification, and whether any limitation proved more or less consequential than anticipated at the proposal stage.

5.6 Conclusion

The concluding section will directly answer the primary research question posed in Section 1.5.1, synthesizing across all nine hypotheses to characterize the overall nature of the relationship between cost containment strategies and financial performance in Saudi hospitals, and the conditions under which that relationship is strongest or weakest.

5.7 Directions for Future Research

- Longitudinal replication to establish temporal precedence and address the cross-sectional limitation noted in Section 3.6.2.
- Explicit incorporation of clinical quality outcomes as a dependent variable, to directly test the cost-quality trade-off flagged in Section 2.4.
- Testing digital competence as a moderator of the technology-financial performance relationship, following the boundary condition suggested by AlDhaen (2025) in Section 2.3.6.

- Extension to other GCC health systems to assess the generalizability of findings beyond the Saudi-specific financing and regulatory context.

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Appendices

Appendix A: Structured Questionnaire

The full instrument is also available as a standalone companion document, Survey_Instrument_Master.docx, ready for transcription into Google Forms or Microsoft Forms and for Arabic translation prior to fielding, as described in Section 3.5.1. It is reproduced in full below so that this thesis document is self-contained.

Introduction and Informed Consent (opening screen)

Thank you for participating in this research study on cost containment strategies and hospital financial performance in Saudi Arabia. Your responses will be kept strictly confidential and used only for academic research purposes. Participation is voluntary, and you may withdraw at any time without any consequence.

Section A: Demographic and Institutional Information

- A1. Hospital type: Public - MOH/Health Cluster; Public - other government sector; Private.
- A2. Hospital size: Small (<100 beds); Medium (100-300 beds); Large (>300 beds).
- A3. Region: Central; Western; Eastern; Northern; Southern.
- A4. CBAHI-accredited (or equivalent): Yes; No; In progress.
- A5. Current role: CFO/Financial Manager; Hospital Administrator/CEO; Chief Medical Officer; Other.
- A6. Years of experience in current role: <2; 2-5; 6-10; >10 years.

Section B: Administrative Cost Containment Strategies (1 = Not Implemented ... 5 = Fully Implemented and Formally Evaluated)

- B1. Our hospital uses standardized annual operating budgets with department-level cost targets.
- B2. Department managers are held formally accountable for variances against their budget.
- B3. Staff productivity (e.g., FTE per occupied bed, workload units per employee) is benchmarked regularly.
- B4. Non-core services (e.g., laundry, catering, security, cleaning) are outsourced to reduce fixed costs.
- B5. Administrative processes (scheduling, billing, HR) have been digitized to reduce manual labor cost.
- B6. The hospital uses shared administrative services across departments or with other facilities in the same cluster/group.
- B7. Executive compensation or department bonuses are linked, in part, to cost-efficiency performance.
- B8. Formal cost-accounting or service-line profitability analysis is conducted for major departments.
- B9. Standard operating procedures exist for procurement approval and expenditure authorization.
- B10. Administrative restructuring (e.g., merging departments, flattening management layers) has been undertaken in the past three years to reduce overhead.

- B11. Management dashboards provide real-time or near real-time visibility into key cost indicators.
- B12. The hospital has a dedicated cost-management or financial-efficiency committee or unit.
- B13. Workforce scheduling is optimized using demand-forecasting or acuity-based staffing tools.
- B14. Policies exist to standardize administrative practices across all departments and units.
- B15. Overall, administrative cost containment is a formally evaluated component of hospital strategy.

Section C: Clinical Cost Containment Strategies (same 1-5 scale)

- C1. Standardized clinical pathways / care protocols are used for common diagnoses or procedures.
- C2. Length-of-stay (LOS) targets are set and monitored for major clinical services.
- C3. Evidence-based prescribing guidelines are enforced through formulary management.
- C4. Utilization review processes assess the appropriateness of admissions and procedures.
- C5. Case management or care-coordination programs are used for complex or high-cost patients.

- C6. Standardized order sets are used to reduce unnecessary testing or duplicate procedures.
- C7. Readmission-reduction programs are in place for high-risk conditions.
- C8. Discharge planning begins early in the patient stay to reduce avoidable bed-days.
- C9. Quality-based incentive systems link clinician performance to both outcomes and resource use.
- C10. Chronic disease management programs are used to reduce avoidable hospitalization.
- C11. Clinical variance in practice patterns is measured and addressed across physicians/departments.
- C12. Overall, clinical cost containment is a formally evaluated component of hospital strategy.

Section D: Supply Chain and Technology-Based Strategies (same 1-5 scale)

- D1. The hospital uses an automated inventory management system for medical supplies.
- D2. The hospital participates in group purchasing or centralized procurement (e.g., via NUPCO).
- D3. Vendor / supplier consolidation efforts have been undertaken to secure better pricing.
- D4. Supply usage is tracked at the point of care (e.g., barcode/RFID scanning).

- D5. The hospital has a fully implemented Electronic Health Record (EHR) system.
- D6. The hospital is integrated with the national claims platform (NPHIES) for revenue-cycle management.
- D7. Billing and claims processes are largely automated, reducing manual claim errors.
- D8. Denied-claims rates are tracked and used to improve documentation and coding practices.
- D9. The hospital uses data analytics or dashboards to forecast supply and equipment needs.
- D10. Telemedicine or virtual-care services are used to reduce cost of care delivery.
- D11. The hospital has adopted time-driven activity-based costing or a comparable costing methodology.
- D12. IT systems across departments (clinical, financial, supply chain) are integrated rather than siloed.
- D13. Predictive analytics are used to anticipate patient demand and optimize resource allocation.
- D14. The hospital has invested in automation (e.g., robotic process automation) for repetitive administrative or supply tasks.
- D15. Supplier performance (on-time delivery, quality, price) is formally evaluated on a recurring basis.

- D16. The hospital has reduced expired/wasted inventory through improved supply chain planning.
- D17. Cybersecurity and data-governance safeguards are in place to support safe digital cost-management systems.
- D18. Overall, supply chain and technology-based cost containment is a formally evaluated component of hospital strategy.

Section E: Financial Performance (1 = Strongly Disagree ... 5 = Strongly Agree)

- E1. Our hospital's operating cost ratio (operating expenses / operating revenue) has improved over the past two years.
- E2. Cost per patient day has decreased or been controlled effectively over the past two years.
- E3. Our operating margin is at or above the level we consider sustainable.
- E4. Revenue-cycle efficiency (time from service delivery to payment collection) has improved recently.
- E5. Our claims-denial rate is within an acceptable / manageable range.
- E6. Return on assets or comparable profitability indicators have been stable or improving.
- E7. Budget variance (actual vs. planned expenditure) is within an acceptable range at department level.
- E8. Bed-occupancy rates support efficient use of fixed capacity costs.

- E9. Overall, I would rate our hospital's financial performance as strong relative to comparable hospitals.
- E10. Cost containment initiatives at our hospital have translated into measurable financial improvement.

Appendix B: Semi-Structured Interview Protocol (Qualitative Phase)

The following interview guide will be used, with adaptation by informant group (executive, financial, clinical, operational), for the six case-study hospitals described in Section 3.4. Interviews will be conducted in Arabic or English depending on respondent preference, audio-recorded with consent, and transcribed for thematic analysis following Braun and Clarke (2022).

Opening: Introduce the study, confirm consent and recording, and explain confidentiality safeguards consistent with the Saudi Personal Data Protection Law (PDPL).

- 1. Can you describe the main cost containment strategies your hospital has implemented over the past two to three years?
- 2. Which of these strategies do you consider to have had the greatest impact on financial performance, and why?
- 3. What institutional, regulatory, or organizational barriers have made cost containment more difficult to implement?
- 4. How has the shift toward activity-based reimbursement (DRGs) and national platforms such as NPHIES affected your hospital's approach to cost management?

- 5. Can you describe a specific instance where a cost containment initiative either succeeded or failed, and what factors explain the outcome?
- 6. How does your hospital balance cost containment pressure with maintaining or improving quality of care?
- 7. What role do information systems and data availability play in your ability to manage costs effectively?
- 8. In your view, what distinguishes hospitals that manage costs effectively from those that struggle to do so?
- 9. What recommendations would you offer to policymakers or hospital leadership to better support cost containment efforts going forward?

Closing: Ask whether the respondent has any additional comments, thank them for their participation, and confirm whether they are willing to be contacted for member-checking of the analysis.

Role-Specific Probing Questions

In addition to the core protocol above, the following supplementary probes will be used depending on the informant's role, to elicit more specific detail relevant to their functional perspective.

For Executives (CEO / Hospital Director)

- How do cost containment priorities get set at the executive level, and who is involved in that decision?

- How do you balance pressure to contain costs with pressure to maintain accreditation standards (e.g., CBAHI)?

For Financial Officers (CFO / Financial Manager)

- Which financial metrics do you monitor most closely to assess whether cost containment efforts are working?
- How has the shift toward DRG-based reimbursement changed your financial planning and forecasting?

For Clinical Leaders (CMO / Department Heads)

- How do clinical staff typically respond when new cost containment protocols are introduced?
- Can you describe a case where a cost containment measure conflicted with your clinical judgment, and how it was resolved?

For Operational Staff (Quality Managers / Procurement Officers)

- What day-to-day operational barriers make cost containment initiatives harder to sustain once the initial rollout is over?
- How is data on cost containment performance shared back with frontline staff, if at all?

Appendix C: Informed Consent and Ethical Clearance Form

MidOcean University — College of Administration — Department of Health Services

Administration

Research Title: Cost Containment Strategies and Their Impact on Hospital Financial
Performance in Saudi Arabia

Principal Researcher: Meshal Mohammad Alryes | Supervisors: Dr. Al-Faisal Abdel
Hamid, Dr. Fayez Jarrad

Purpose of the Study

This study examines the relationship between cost containment strategies and financial performance in Saudi hospitals. You are being invited to participate because of your role in financial, administrative, or clinical management at your institution.

Procedures

If you agree to participate, you will be asked to complete a structured questionnaire (approximately 15–20 minutes) and/or take part in an interview (approximately 30–45 minutes), depending on the phase of the study for which you are recruited.

Confidentiality

All data will be de-identified prior to analysis. No individual respondent or hospital will be named in any report, publication, or presentation arising from this study. Digital data will be stored in encrypted, access-controlled cloud folders accessible only to the principal researcher, consistent with the Saudi Personal Data Protection Law (PDPL).

Voluntary Participation and Withdrawal

Participation is entirely voluntary. You may decline to answer any question and may withdraw from the study at any time, without any negative consequence to you or your institution.

Risks and Benefits

There are no anticipated physical risks associated with participation. Indirect risks relate to the sensitivity of financial information, mitigated through de-identification and secure

storage as described above. There is no direct personal benefit, though findings are intended to inform hospital and national health-financing policy.

Contact Information

Questions about the study may be directed to the principal researcher or supervisors listed above. Questions about your rights as a research participant may be directed to the relevant institutional research ethics committee prior to data collection.

Consent Statement

- I have read and understood the information above.
- I understand that my participation is voluntary and that I may withdraw at any time.
- I agree to take part in this research study.

Signature: _____ Date: _____

Appendix D: List of Abbreviations

AVE — Average Variance Extracted

CBAHI — Saudi Central Board for Accreditation of Healthcare Institutions

CCS — Cost Containment Strategy / Strategies

CFA — Confirmatory Factor Analysis

CFO — Chief Financial Officer

CMO — Chief Medical Officer

DEA — Data Envelopment Analysis

DRG — Diagnosis Related Group

EHR — Electronic Health Record

GASTAT — General Authority for Statistics (Saudi Arabia)

HSTP — Health Sector Transformation Program

HTMT — Heterotrait-Monotrait Ratio

IRB — Institutional Review Board

KPI — Key Performance Indicator

LOS — Length of Stay

MOH — Ministry of Health (Saudi Arabia)

NCD — Non-Communicable Disease

NHI — National Health Insurance

NPHIES — National Platform for Health Insurance Exchange Services

NUPCO — National Unified Procurement Company

PDPL — (Saudi) Personal Data Protection Law

PLS-SEM — Partial Least Squares Structural Equation Modeling

RBV — Resource-Based View

RCM — Revenue Cycle Management

SEM — Structural Equation Modeling

VBHC — Value-Based Healthcare

Appendix E: Glossary of Key Terms

Cost Containment: The ensemble of structured interventions, policies, and management practices aimed at limiting or managing the growth of hospital expenditure without compromising the quality of care provided (Section 1.1.4).

Composite Financial Performance Index: A combined measure incorporating operating cost ratio, cost per patient day, revenue efficiency, and net profit margin, used as the dependent variable in this study (Section 2.3.5).

Health Cluster: A regional grouping of public hospitals and primary-care facilities in Saudi Arabia operating under a single accountable-care-style administrative structure within the Health Holding Company, as part of HSTP-driven corporatization (Section 1.1.3).

Strategic Purchasing: A financing arrangement in which a payer (such as a national health insurance body) contracts with providers on the basis of activity, performance, or value, rather than allocating fixed budgets irrespective of output (Section 1.1.3).

Technical Efficiency: In the DEA literature, the degree to which a hospital produces the maximum possible output (e.g., patient care activity) from a given set of inputs (e.g., beds, staff), relative to the best-performing hospitals in the sample (Section 2.2.1).

Time-Driven Activity-Based Costing: A costing methodology that estimates the cost of a healthcare service based on the time required for each process step and the capacity cost rate of the resources involved, offering more granular cost visibility than traditional overhead-allocation methods (Section 2.2.3).

Common Method Bias: Systematic measurement error that arises when both predictor and outcome variables are collected from the same respondent using the same method (e.g., a single self-report survey), potentially inflating observed relationships (Section 3.3.3).

Reflexive Thematic Analysis: A qualitative analytic approach, following Braun and Clarke (2022), in which the researcher's active interpretive role in generating themes from data is

explicitly acknowledged, rather than treating theme identification as a purely mechanical or purely data-driven process (Section 3.4).

Agency Relationship: In Agency Theory, the relationship between a principal (e.g., a hospital owner or national payer) and an agent (e.g., a hospital manager) who acts on the principal's behalf but may hold different incentives, creating potential for misaligned decision-making (Section 2.3.2).

Casemix Index: A relative measure of the clinical complexity and resource intensity of the patients treated by a hospital, often used to adjust efficiency comparisons (such as DEA scores) for differences in patient severity across hospitals (Section 2.2.1).

Moderating Variable: A variable that changes the strength or direction of the relationship between an independent and a dependent variable; in this study, hospital type, size, and institutional/regulatory barriers are modeled as moderators of the cost containment-financial performance relationship (Section 2.3.5).

Mediating Variable: A variable that explains the mechanism through which an independent variable affects a dependent variable; organizational capabilities (resource base, governance, lean maturity) are modeled as mediators in the present conceptual model (Section 2.3.5).

Member Checking: A qualitative validity procedure in which preliminary findings or themes are shared with research participants to confirm that the researcher's interpretation resonates with their lived experience (Section 3.7).

Appendix F: Mapping of Hypotheses to Theoretical Framework and Questionnaire Sections

The table below summarizes, for each hypothesis, the primary theoretical grounding (Chapter Two) and the questionnaire section(s) in Appendix A / Survey_Instrument_Master.docx from which the relevant variables are operationalized, to support transparency and traceability between the conceptual model and the data collection instrument.

- H1 (CCS -> Financial sustainability): Resource-Based View, Value-Based Healthcare — Sections B, C, D (predictors) and E (outcome).
- H2 (Administrative CCS -> Operational efficiency): Resource-Based View, Agency Theory — Section B and relevant items in Section E.
- H3 (Clinical CCS -> Cost per patient day / resource utilization): Lean Management Theory, Value-Based Healthcare — Section C and relevant items in Section E.
- H4 (Supply chain CCS -> Medical supply costs): Resource-Based View (dynamic capabilities) — Section D (items D1-D9, D15-D17) and relevant items in Section E.
- H5 (Technology CCS -> RCM / sustainability): Resource-Based View, Section 2.3.6 (digital competence) — Section D (items D5-D8, D10-D14) and relevant items in Section E.
- H6 (Hospital type as moderator): Agency Theory — Section A1 (hospital type) as moderating variable.

- H7 (Hospital size as moderator): Resource-Based View (economies of scale) — Section A2 (hospital size) as moderating variable.
- H8 (Institutional/regulatory barriers as moderator): Agency Theory, Section 1.1.3 (HSTP transition) — qualitative interview protocol (Appendix B, items 3 and 4) supplemented by Section A4 (CBAHI accreditation) as a proxy indicator.
- H9 (Technology x Clinical interaction): Section 2.3.6 (digital competence as a boundary condition) — interaction of Section C and Section D composite scores.

Appendix G: Sample Hospital Recruitment Letter

The following template may be adapted and sent to hospital administrators when requesting participation in the quantitative survey and/or qualitative case-study phase.

Subject: Invitation to Participate in a Master's Research Study on Hospital Cost Containment (MidOcean University)

Dear [Hospital Administrator's Name],

My name is Meshal Mohammad Alryes, a Master's student in Health Services Administration at MidOcean University, under the supervision of Dr. Al-Faisal Abdel Hamid and Dr. Fayez Jarrad. I am conducting a research study examining cost containment strategies and their relationship to financial performance across Saudi hospitals, and I would be grateful for your hospital's participation.

Participation would involve one or more of the following, depending on your preference:

(1) a brief questionnaire (15-20 minutes) for your Chief Financial Officer, Hospital Administrator, or Chief Medical Officer; and/or (2) a small number of confidential

interviews (30-45 minutes each) with relevant staff, should your hospital be selected for the qualitative phase described in the attached study information sheet.

All information will be kept strictly confidential, no hospital or individual will be identified in any report, and participation is entirely voluntary. Ethical clearance has been obtained from [Research Ethics Committee name] prior to this outreach. I have attached the full study information sheet and consent form (Appendix C) for your review.

I would be happy to answer any questions by phone or email at your convenience, and to work around your team's schedule. Thank you very much for considering this request.

Sincerely, Meshal Mohammad Alryes [Phone] | [Email] MidOcean University, College of Administration, Department of Health Services Administration

Appendix H: Data Codebook and Variable Naming Conventions

This codebook specifies the variable names to be used when entering or exporting quantitative survey data, ensuring consistency between the questionnaire in Appendix A, the data-analysis pipeline described in Section 3.3.4, and any statistical software file (SPSS, SmartPLS, or Excel) used to store responses.

Identifier and Demographic Variables

- RespondentID — unique alphanumeric identifier assigned per respondent (should not encode hospital identity in a reversible way once de-identified).
- A1_HospitalType — categorical: 'Public - MOH/Health Cluster', 'Public - other government sector', 'Private'.

- A2_HospitalSize — categorical: 'Small (<100 beds)', 'Medium (100-300 beds)', 'Large (>300 beds)'.
- A3_Region — categorical: 'Central', 'Western', 'Eastern', 'Northern', 'Southern'.
- A4_CBAHI_Accredited — categorical: 'Yes', 'No', 'In progress'.
- A5_Role — categorical: 'CFO/Financial Manager', 'Hospital Administrator/CEO', 'Chief Medical Officer', 'Other'.
- A6_YearsExperience — categorical (ordinal): '<2 years', '2-5 years', '6-10 years', '>10 years'.

Item-Level Variables

- B1-B15 — Administrative Cost Containment Strategies, numeric, 1-5 Likert scale.
- C1-C12 — Clinical Cost Containment Strategies, numeric, 1-5 Likert scale.
- D1-D18 — Supply Chain and Technology-Based Strategies, numeric, 1-5 Likert scale.
- E1-E10 — Financial Performance, numeric, 1-5 Likert scale.

Derived / Composite Variables (to be computed during analysis)

- Admin_Composite — mean of B1-B15.
- Clinical_Composite — mean of C1-C12.
- SupplyTech_Composite — mean of D1-D18.
- FinPerf_Composite — mean of E1-E10.

Analysts should retain both item-level and composite variables in the working dataset: item-level data are required for confirmatory factor analysis and reliability testing (Section 3.7), while composite variables are used for correlation, regression, and group-comparison analyses illustrated in the trial run in Chapter Four.

Appendix I: Table Shells for Analyses Not Yet Covered by the Chapter Four Trial Run

The trial run in Chapter Four demonstrates descriptive, correlational, regression, and group-comparison analyses. Two further analyses specified in the methodology (full structural equation modeling with mediation, and qualitative theme frequency counts) require either a larger real sample or completed interview transcripts, and so are presented here as blank templates to be populated once real data are available.

Table Shell: Structural Model Path Coefficients (Full PLS-SEM, including mediation)

Path	Standardized Beta	t-value	p-value	Decision
Administrative CCS -> Organizational Capabilities (mediator)				
Organizational Capabilities -> Financial Performance				
Clinical CCS -> Organizational Capabilities (mediator)				
Supply Chain/Tech CCS -> Organizational Capabilities (mediator)				
Indirect effect: Administrative CCS -> Financial Performance (via capabilities)				

Table Shell: Qualitative Theme Frequency Across Case-Study Hospitals

Theme	Public Hospitals (n=3)	Private Hospitals (n=3)	Total Mentions
Fragmented information systems as a barrier			
Leadership commitment as an enabler			
Tension between cost control and clinical quality			
[Additional themes to be added following coding]			

Appendix J: Informed Consent Form (Arabic Translation)

Since most respondents are expected to complete the questionnaire and interviews in Arabic, an Arabic version of the consent form in Appendix C is provided below. This translation should be reviewed by the same bilingual expert responsible for translating the questionnaire (Section 3.5.1) prior to fielding.

جامعة ميدأوشن - كلية الإدارة - قسم إدارة الخدمات الصحية

عنوان الدراسة: استراتيجيات احتواء التكلفة وأثرها على الأداء المالي للمستشفيات في المملكة العربية السعودية

الباحث الرئيسي: مشعل محمد الريس | المشرفان: د. الفيصل عبد الحميد، د. فايز جراد

تهدف هذه الدراسة إلى بحث العلاقة بين استراتيجيات احتواء التكلفة والأداء المالي في المستشفيات السعودية. تتم دعوتكم للمشاركة نظراً لدوركم الإداري أو المالي أو السريري في مؤسساتكم.

ستُحفظ جميع البيانات بسرية تامة، ولن يُذكر اسم أي مستشفى أو مستجيب في أي تقرير أو نشر علمي ناتج عن هذه الدراسة. تُخزن البيانات الرقمية في مجلدات سحابية مشفرة يقتصر الوصول إليها على الباحث الرئيسي فقط، بما يتوافق مع نظام حماية البيانات الشخصية السعودي.

المشاركة طوعية بالكامل، ويمكنكم الانسحاب من الدراسة في أي وقت دون أي أثر سلبي عليكم أو على مؤسساتكم.

إقرار الموافقة:

لقد قرأت وفهمت المعلومات الواردة أعلاه []

أفهم أن مشاركتي طوعية وأنه يمكنني الانسحاب في أي وقت []

أوافق على المشاركة في هذا البحث العلمي []

التاريخ _____: التوقيع: _____

Appendix K: Pre-Fieldwork Ethical Approval Checklist

This checklist summarizes the approvals and preparatory steps that should be confirmed and documented before any real data collection begins, consolidating the requirements discussed across Sections 3.3.3, 3.8, and Appendices C and J.

Item	Responsible Party	Status
Institutional/university research ethics committee approval obtained	Principal researcher / supervisors	
Individual hospital administration permissions secured for each sampled site	Principal researcher	
Questionnaire translated and back-translated (Arabic/English)	Bilingual expert	
Pilot test completed (20-30 respondents) and instrument refined	Principal researcher	
Informed consent forms (Appendix C / Appendix J) finalized in both languages	Principal researcher / supervisors	
Secure, encrypted data storage configured (PDPL-compliant)	Principal researcher / university IT	

Case-study hospital selection criteria confirmed post- Phase 1	Principal researcher / supervisors	
Interview protocol (Appendix B) piloted with at least one informant per role	Principal researcher	