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National Competitiveness and Economic Transformation in Saudi Arabia: A Conceptual Analysis Using Porter's Diamond Model

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Abstract

National competitiveness has become a central policy concern for resource-dependent economies pursuing structural transformation. Saudi Arabia's Vision 2030 represents a comprehensive national strategy aimed at diversifying the economy, upgrading productivity, and strengthening institutional capacity. Despite extensive discussion of individual reforms, there remains a lack of integrated, theory-guided analysis that explains how these changes interact systemically at the national level. This study addresses this gap by applying Porter's Diamond Model as a conceptual descriptive analytical framework to examine Saudi Arabia's economic transformation. The analysis treats the Diamond determinants—factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry—as an interconnected system shaped by government intervention. Drawing on secondary data from official policy documents, international competitiveness indicators, (including the Global Innovation Index, IMD World Competitiveness Rankings, Logistics Performance Index, and Worldwide Governance Indicators), and institutional reports, the study maps key reform dynamics onto each determinant and examines their cross-determinant interactions and feedback loops. The findings suggest that Saudi Arabia has made substantial progress in upgrading factor conditions and generating sophisticated domestic demand, while systemic challenges remain in firm level rivalry and innovation ecosystem depth. The study highlights that sustainable national competitiveness depends on coordinated upgrading across all determinants rather than isolated reforms. By reframing Porter's Diamond as a dynamic, systems-oriented analytical tool, this paper contributes to the literature on national competitiveness in transformation economies and provides policy relevant insights for advancing productivity driven growth under Vision 2030.

Keywords: national competitiveness; economic transformation; systems analysis; Porter's diamond model; policy coordination; Vision 2030; Saudi Arabia



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1. Introduction

National competitiveness has reemerged as a central concern for policymakers in economies undergoing structural transformation. Beyond short term growth, competitiveness reflects a country's capacity to generate sustainable productivity, upgrade industrial capabilities, and adapt to global economic change [1,2]. For resource-dependent economies, this challenge is more complex. High income levels can coexist with weak diversification, limited innovation, and dependence on external capabilities [3,4].

Saudi Arabia represents a defining case of such a transition. Historically anchored in hydrocarbon revenues, the Kingdom has launched Vision 2030 as a comprehensive national strategy aimed at economic diversification, productivity upgrading, and institutional reform [5]. While many studies examine individual reforms or specific sectors, fewer attempts have been made to assess Saudi Arabia's transformation through an integrated national competitiveness framework that explains how reforms across different domains interact systemically.

This study addresses that gap by applying Porter's Diamond Model as a conceptual analytical framework to examine the dynamics of Saudi Arabia's economic transformation. Rather than treating competitiveness as a set of isolated indicators, the paper adopts a holistic perspective that emphasizes interactions between factor conditions, demand conditions, related and supporting industries, and firm strategy and rivalry, alongside the shaping role of government.

Accordingly, the central research question guiding this study is:

How does the interaction of national competitiveness determinants explain Saudi Arabia's economic transformation under Vision 2030?

The contribution of this paper is threefold. First, it provides a structured national-level competitiveness assessment of Saudi Arabia using Porter's Diamond as an integrative framework. Second, it advances a systems-oriented interpretation of the Diamond by emphasizing cross-determinant interactions and feedback loops under Vision 2030, rather than treating competitiveness determinants as independent pillars. Third, it derives policy implications that focus on coordination, sequencing, and system-wide upgrading as conditions for sustained competitiveness.

It is important to note that several policy and academic reports have already applied competitiveness indicators and institutional frameworks to analyze specific dimensions of Vision 2030 reforms. International benchmarking exercises [6–8] evaluate Saudi Arabia's performance across competitiveness pillars, while academic studies have assessed competitive advantages using the Diamond model [9], examined the relationship between governance and diversification [10], and analyzed specific reform dimensions such as labor markets and fiscal policy [11,12]. However, these studies share a common analytical approach: they tend to evaluate Diamond determinants descriptively or assess individual pillars in isolation. The distinctive contribution of the present study lies in its systems-oriented interpretation—specifically, its focus on cross-determinant interactions, feedback loops, and coordination mechanisms as the primary unit of analysis rather than individual determinants considered separately.

This study is explicitly conceptual and system-oriented, aiming to explain interaction mechanisms among national competitiveness determinants rather than to provide econometric testing. The research propositions generated by the analysis are framed as testable hypotheses for future empirical investigation.

2. Literature Review

2.1. National Competitiveness and Structural Transformation

National competitiveness is commonly understood as a country's ability to achieve sustained productivity growth that supports long-term economic prosperity. Porter's foundational work reframed competitiveness away from cost advantages and factor endowments toward productivity, innovation, and firm-level performance embedded within institutional and market structures [1,2]. Subsequent research emphasizes that competitiveness is not a static outcome but a systemic process shaped by interactions among firms, markets, institutions, and policy frameworks [3].

In economies undergoing structural transformation, competitiveness is closely linked to the capacity to convert temporary advantages, such as natural resource rents, into advanced productive capabilities. Studies on emerging and resource-based economies highlight the risks of path dependence, limited innovation incentives, and weak domestic rivalry when state revenues dominate economic activity [4–9]. As a result, modern transformation strategies increasingly emphasize diversification, human capital development, institutional reform, and private-sector upgrading as core pillars of competitiveness [13,14].

Recent scholarship on Gulf economies has further deepened this understanding. Hvidt [15] examines the institutional preconditions for economic diversification in resource-rich states, arguing that governance quality and regulatory credibility are necessary for private-sector upgrading. Cherif and Hasanov [16] provide cross-country evidence that sustained diversification requires moving beyond factor accumulation toward technology-intensive industrial strategies. Montambault Trudelle [17] analyzes the political and economic drivers of sovereign wealth management in Saudi Arabia, noting that the effectiveness of the Public Investment Fund in reshaping economic structures depends on the competitive and institutional environment in which it operates. More recent studies published since 2020 further illuminate the challenges facing Gulf economies: Kabbani and Ben Mimoune [18] argue that GCC diversification efforts have produced limited results partly because policy advice has failed to address the political-economic realities of the governing social contract; Al Naimi [19] finds that while Saudi Arabia has embarked on diversification through Vision 2030, oil price volatility and the traditional educational system continue to hinder progress toward a knowledge-based economy; and Sweidan and Elbargathi [20] provide econometric evidence that government expenditures encourage diversification in Saudi Arabia while oil prices and geopolitical risk constrain it, highlighting the tension between state-led transformation and external vulnerabilities. These studies collectively reinforce the view that competitiveness in resource-dependent economies is a systemic challenge requiring coordinated reforms across multiple institutional and market dimensions.

International benchmarking frameworks reinforce this perspective. Global assessments of competitiveness consistently identify productivity, institutional quality, infrastructure, and innovation ecosystems as mutually reinforcing determinants of economic performance [6–8]. These frameworks provide reference points for evaluating reform trajectories without implying purely ranking-based conclusions.

Saudi Arabia's Vision 2030 explicitly frames economic reform as a competitiveness challenge, aiming to transition from oil-dependent growth toward productivity-driven and diversified economic activity [5]. The IMD World Competitiveness Yearbook 2024 ranks Saudi Arabia 16th globally, reflecting significant improvements in government efficiency and infrastructure, while noting persistent gaps in innovation intensity and business dynamism [7]. The Global Innovation Index 2024 places Saudi Arabia at 69th, indicating progress in institutional frameworks and market sophistication but continued challenges in knowledge creation and research output [21].

2.2. Porter's Diamond Model and National-Level Applications

Porter's Diamond Model remains one of the most influential frameworks for analyzing the sources of national competitive advantage. The model identifies four interrelated determinants—factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry—while recognizing the roles of government and chance events [1]. A central insight of the framework is that sustained competitiveness emerges from interaction effects rather than from strength in any single determinant.

Subsequent scholarship extends the Diamond model beyond advanced industrial economies. Ketels [3] emphasizes that the framework should be interpreted dynamically,

as weaknesses in one determinant can constrain the effectiveness of others. Momaya [4] demonstrates that institutional quality and domestic rivalry are particularly important in emerging economies, where factor accumulation alone does not guarantee productivity growth. Cho and Moon [22] propose an extended Diamond that incorporates human factors and international dimensions, arguing that the original model requires adaptation for developing economies where government and multinational enterprises play outsized roles.

Empirical and conceptual applications across sectors and countries support the model's adaptability. Kharub and Sharma [23] show that competitiveness in developing-country firms depends on the joint influence of factor upgrading and competitive rivalry. Lin et al. [24] demonstrate the relevance of demand sophistication and cluster development in technology-intensive industries. Vlados [25] proposes a systemic reinterpretation of the Diamond emphasizing evolutionary dynamics and organizational innovation in peripheral economies. Collectively, these studies support the Diamond model as a diagnostic and analytical framework rather than a predictive or purely quantitative tool.

However, a critical review of these applications reveals a common analytical pattern: the Diamond determinants are typically evaluated independently, with each determinant assessed for its relative strength or weakness, and the resulting analysis presented as a profile of national or sectoral competitiveness. Jasimuddin [9], for example, evaluates Saudi Arabia's competitive position by assessing each Diamond determinant separately—identifying strengths in infrastructure and macroeconomic stability alongside weaknesses in innovation and domestic rivalry—but does not examine how these determinants interact to produce systemic outcomes. Kharub and Sharma [23] analyze Diamond determinants for MSMEs in developing economies, treating factor upgrading and competitive rivalry as parallel influences on firm performance rather than examining their feedback relationship—that is, whether factor improvements translate into productivity gains only when rivalry is present to transmit competitive pressure. Lin et al. [24] apply the Diamond to Taiwan's solar photovoltaic industry and provide valuable sectoral insights yet similarly evaluate each determinant as a discrete category rather than tracing how demand sophistication and cluster development reinforce or constrain one another dynamically.

Theoretical extensions of the Diamond have expanded the model's scope without fundamentally reinterpreting how its existing determinants interact. Cho and Moon [22] incorporate international dimensions and human factors through the generalized double-diamond model, broadening the range of influences considered but maintaining the evaluative structure of assessing determinants individually. Vlados [25] proposes a competitiveness web that introduces evolutionary dynamics and institutional dimensions, yet this extension primarily adds new analytical layers rather than reinterpreting the interaction mechanisms among the original four determinants.

The present study takes a fundamentally different analytical approach. Rather than evaluating determinants independently or expanding the model's scope with additional factors, it treats the standard Diamond as an interconnected system in which cross-determinant interactions, feedback loops, and coordination mechanisms constitute the primary unit of analysis. The central analytical question is not “how strong is each determinant”? but rather “how do the determinants interact, and where do reinforcing or constraining dynamics emerge across the system”? This systems-oriented interpretation is particularly suited to state-led transformation contexts such as Saudi Arabia, where government intervention simultaneously shapes multiple determinants and where the effectiveness of reforms in any single determinant depends critically on conditions in others. This distinction—from determinant-level evaluation to system-level interaction analysis—represents the core theoretical contribution of the present study.

2.3. Porter's Diamond in Emerging and Resource-Based Economies

Applying Porter's Diamond Model in emerging and resource-based economies requires contextual adaptation. Several studies argue that government intervention plays a more prominent role where markets are less mature and institutional frameworks are evolving [26]. In such contexts, policy can either reinforce competitive dynamics or crowd out private initiative if poorly designed.

In the Gulf region, applications of the Diamond framework highlight the dual role of the state as both regulator and economic actor. Jasimuddin [9] provides an early national-level analysis of Saudi Arabia emphasizing strong infrastructure and macroeconomic stability alongside limited domestic rivalry and innovation incentives. More recent policy-oriented studies suggest that competitiveness outcomes depend on how effectively state-led reforms translate into firm-level capability upgrading and sustained competitive pressure [3,27]. Albassam [10] examines the relationship between governance quality and economic diversification in Saudi Arabia, finding that regulatory effectiveness is a critical mediating variable in translating reform intentions into competitive outcomes.

These findings indicate that the Diamond model is particularly suitable for analyzing state-led transformation strategies, where competitiveness depends on coordinated reforms across multiple dimensions rather than isolated policy interventions. As argued in Section 2.2 above, however, most existing applications—including those in the Gulf context—evaluate Diamond determinants as independent categories rather than examining the interaction mechanisms that link them. In state-led transformation economies, this analytical gap is particularly consequential: because government simultaneously shapes multiple determinants (e.g., PIF investments affect factor conditions, demand conditions, and firm strategy concurrently), understanding competitiveness outcomes requires tracing cross-determinant effects rather than assessing each pillar in isolation. The present study addresses this gap directly by interpreting the Diamond as an interconnected system, with explicit attention to the feedback loops and coordination mechanisms that link determinants to one another.

2.4. Saudi Arabia, Vision 2030, and the Competitiveness Gap

Saudi Arabia's Vision 2030 has generated significant improvements in factor conditions, including large-scale infrastructure investment, education reform, digitalization, and institutional modernization [11,28,29]. Demand conditions have also evolved, driven by ambitious public investment programs—notably through the Public Investment Fund (PIF), which manages assets exceeding USD 930 billion—that impose increasingly complex performance requirements on domestic firms [30].

Existing work on Saudi Arabia's transformation tends to either report reforms descriptively or assess single pillars (e.g., investment, labor, innovation) without a framework that explains interaction mechanisms across competitiveness determinants. For example, the OECD Economic Survey of Saudi Arabia [12] evaluates regulatory reforms and labor market developments separately, while the IMF Article IV Consultation [11] focuses on macroeconomic stability and fiscal sustainability without mapping how these dimensions interact with firm-level dynamics and innovation ecosystems.

However, the literature consistently identifies firm strategy, innovation capacity, and domestic rivalry as ongoing challenges. While localization initiatives—such as the Local Content and Government Procurement Authority (LCGPA) requirements and sector-specific Saudization targets—and investment reforms aim to strengthen private-sector capabilities, their long-term effectiveness depends on whether competitive pressures are sustained beyond government-driven demand [3,4,12]. International competitiveness

assessments similarly suggest that continued progress requires deeper integration of innovation systems, stronger clusters, and more intense firm-level competition [6,8].

Despite extensive descriptive reporting on Vision 2030 reforms, few studies provide an integrated national-level analysis that links these developments within a coherent competitiveness framework emphasizing systemic interactions. This gap motivates the present study, which applies Porter's Diamond Model as a systems-oriented lens to examine Saudi Arabia's economic transformation.

3. Theoretical Framework: Porter's Diamond Model

Porter's Diamond Model conceptualizes national competitiveness as an outcome of mutually reinforcing conditions rather than isolated strengths. The four core determinants interact continuously, creating either virtuous cycles of upgrading or self-reinforcing stagnation.

Factor conditions include both basic inputs such as natural resources and advanced factors such as skilled labor, technological infrastructure, and innovation systems. Demand conditions reflect the size, growth, and sophistication of domestic demand. Related and supporting industries capture the presence of efficient suppliers, clusters, and complementary services. Firm strategy, structure, and rivalry describe how firms are organized, governed, and pressured to innovate through competition.

Government plays a systemic role by shaping incentives, standards, and investment priorities. In transformation economies, government intervention is often decisive in triggering change, but its effectiveness depends on whether it strengthens linkages across the Diamond rather than substituting for market forces.

In this study, the term "systems-oriented" refers to an analytical perspective that interprets the Diamond model as an interconnected structure in which determinants interact through feedback loops, reinforcement effects, and coordination mechanisms rather than functioning as independent pillars. This approach draws on systems thinking traditions in social and economic analysis [31,32], where the behavior of the whole system cannot be understood by examining components in isolation. Specifically, three core tenets guide the analysis: (1) interdependence—changes in one determinant alter conditions in others; (2) feedback effects—upgrading in one area can generate reinforcing or balancing dynamics across the system; and (3) coordination sensitivity—the effectiveness of reforms depends on their alignment across determinants, not merely their individual intensity. Throughout this paper, "systems-oriented" is used as the primary descriptor of the analytical approach, "systemic" describes properties of the national competitiveness system itself, and "holistic" is used sparingly to indicate comprehensive scope.

In this study, the Diamond model is used as an analytical lens to assess how Vision 2030 influences these determinants and their interactions. Figure 1 presents the standard Diamond Model as an interdependent system of national competitiveness determinants. The bidirectional arrows indicate that each determinant both influences and is influenced by others—for example, advanced factor conditions (such as skilled labor and digital infrastructure) enable firms to respond to sophisticated demand, while demanding customers in turn signal the need for further factor upgrading. Government and chance are positioned as external influences that shape the entire system rather than constituting determinants in themselves.

Figure 2 presents a systems-oriented adaptation of the Diamond framework for analyzing national competitiveness under Vision 2030. Unlike the standard representation, this diagram explicitly illustrates the non-linear interactions among determinants, including reinforcement effects (where factor upgrading and demand sophistication create positive feedback through firm learning and productivity gains) and coordination failures (where weak linkages among supporting industries constrain the transmission of benefits from

strong demand). Government policy coordination is depicted as a system-wide influence that can either activate or impede these reinforcing dynamics, depending on whether it strengthens cross-determinant linkages or substitutes for market-based mechanisms.

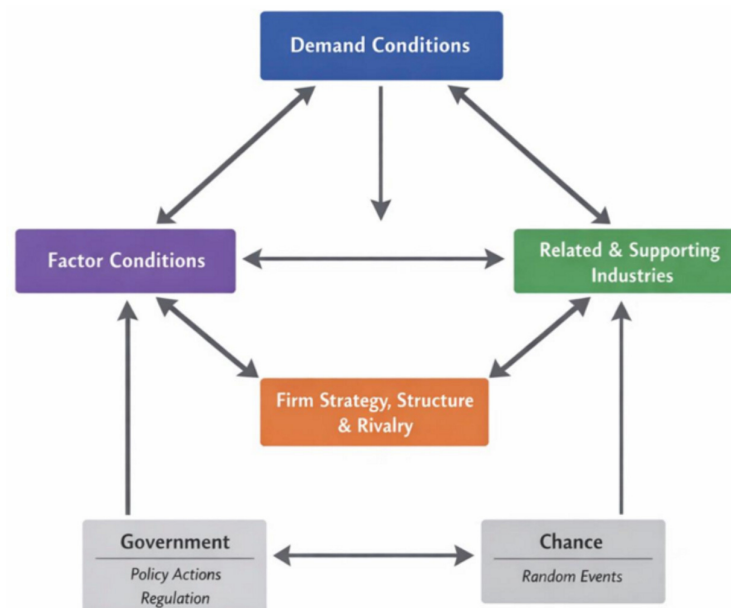


Figure 1. Porter's Diamond Model Applied to National Competitiveness. Note: Arrows represent interaction and feedback effects rather than one-directional causality. Colors are used to distinguish conceptual components and do not indicate hierarchy or relative importance.

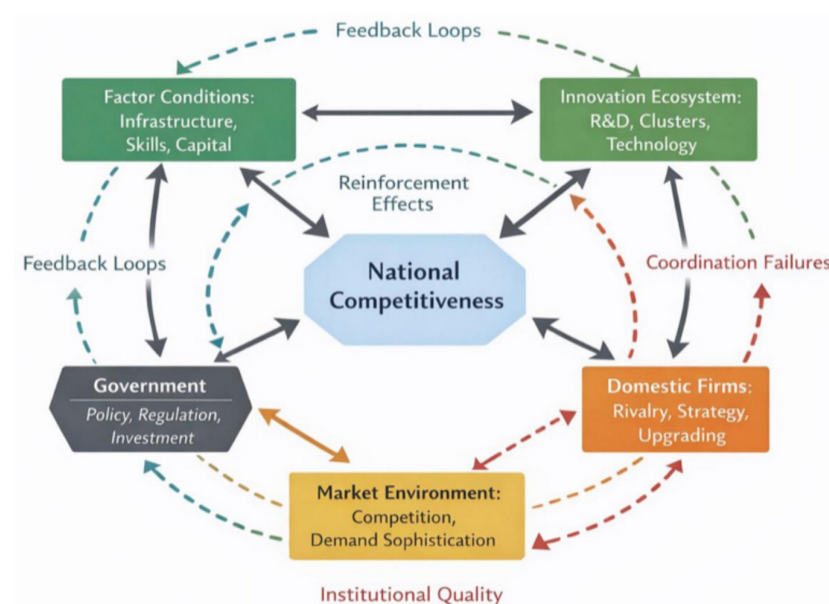


Figure 2. Systems-oriented framework of national competitiveness under Vision 2030. Note: Solid black double-headed arrows represent direct interaction and reinforcement effects between determinants. Dashed green arrows represent feedback loops through which upgrading in one determinant reinforces conditions in others. Dashed orange arrows represent coordination failures where weak linkages constrain the transmission of gains across determinants. The dashed line at the base represents institutional quality as a cross-cutting foundation. Colors of the boxes are used to distinguish conceptual components and do not indicate hierarchy or relative importance.

4. Methodology

4.1. Research Design and Analytical Approach

This study adopts a conceptual descriptive–analytical research design. The objective is not to test hypotheses or estimate causal relationships, but to develop a structured interpretation of Saudi Arabia’s national competitiveness during a period of systemic economic transformation. This design is appropriate for addressing questions related to interaction, coordination, and structural change at the national level, where empirical isolation of variables is neither feasible nor conceptually meaningful [1,3].

Porter’s Diamond Model is employed as the central analytical framework. In line with the systems-oriented interpretation defined in Section 3, the model is treated as an interconnected structure rather than a checklist of independent pillars. Accordingly, the analysis focuses on feedback loops, reinforcement effects, and coordination failures across determinants, consistent with systems thinking in social and economic analysis [31,32]. The analysis therefore focuses on how factor conditions, demand conditions, related and supporting industries, and firm strategy and rivalry interact under the influence of government-led reform, particularly Vision 2030.

4.2. Evidence Base and Data Sources

The analysis is grounded in secondary data drawn from authoritative and publicly available sources. These include official Saudi policy documents and strategies such as Vision 2030 and sectoral reform programs [5,28]; reports and statistical releases from Saudi government agencies including the General Authority for Statistics (GASTAT), Ministry of Finance, and Ministry of Investment [29,30,33]; and international competitiveness indicators produced by recognized institutions. Specifically, the study draws on the Global Innovation Index (GII) [21], Logistics Performance Index (LPI) [34], Worldwide Governance Indicators (WGI) [35], IMD World Competitiveness Rankings [7,36], World Development Indicators [37], Transparency International’s Corruption Perceptions Index (CPI) [38], and UNDP Human Development Reports [39]. To complement quantitative indicators, the study incorporates qualitative evidence from policy reports, institutional publications, and reputable international analyses addressing Saudi Arabia’s economic reform trajectory, including the OECD Economic Survey [12] and IMF Article IV Consultation [11]. These sources are used to contextualize numerical indicators and to capture structural and institutional dynamics that are not fully reflected in index values.

4.3. Source Selection and Inclusion Criteria

Sources were selected based on relevance, credibility, and consistency with the national scope of the study. Priority was given to primary policy documents, official statistics, and international datasets with transparent methodologies. Commercial or consultancy reports were used only when they provided descriptive insights that could be triangulated with official or independent sources.

The analysis focuses on materials published during the Vision 2030 period, with particular emphasis on developments from 2016 onward. Sources that were purely promotional, lacked methodological clarity, or focused narrowly on firm-level performance without national relevance were excluded.

4.4. Analytical Mapping Procedure

The analytical process followed a structured three-stage mapping procedure designed to ensure transparent linkage between evidence and interpretation:

Stage 1: Categorization. Evidence was first categorized according to the four core determinants of Porter’s Diamond: factor conditions, demand conditions, related and

supporting industries, and firm strategy, structure, and rivalry. Government was treated as a systemic influence shaping all four determinants rather than as a separate pillar. Each indicator and policy instrument was assigned to the determinant it most directly informs, as summarized in Table 1.

Table 1. Evidence-to-Diamond Mapping, Cross-Determinant Links, and Assessment Status.

Diamond Determinant	Indicators Used	Reform Instruments (Vision 2030)	Cross-Determinant Interaction Links	Triangulation Basis and Assessment
Factor Conditions	GII [21], WGI [35], LPI [34], IMD [7](infrastructure/skills), UN E-Gov Index, HDI [39]	Human Capital Development Program; National Investment Strategy; Digital Government Strategy; infrastructure megaprojects	Factor → Demand: digital infrastructure upgrades enable more demanding procurement. Factor → Supporting industries: better logistics/skills lower entry barriers. Factor → Rivalry: easier entry increases competitive pressure.	Factor → Demand: strongly supported; convergence across index data, policy documents, and independent assessments. Factor → Rivalry: moderately supported; improved entry conditions noted, but firm-level evidence of stronger competition is limited.
Demand Conditions	IMD [7] market size and demand sophistication; PIF assets/projects [30]; LCGPA local content metrics; sectoral demand reports	PIF mega-projects (NEOM, Red Sea, Qiddiya); LCGPA procurement policies; tourism/infrastructure initiatives	Demand → Rivalry: performance-based procurement pressures firms to upgrade. Demand → Supporting industries: mega-projects spur domestic service providers. Demand → Factors: advanced project requirements signal needs for upgrading skills and technology.	Demand → Supporting industries: moderately supported; clusters forming but causal links inferred. Demand → Rivalry: analytically grounded; mechanism plausible but firm-level evidence scarce.
Related and Supporting Industries	IMD [7] business-efficiency sub-indices; cluster-development evidence; logistics/financial indicators; SME share of GDP	NIDLP; SME support programs (Monsha'at); cluster initiatives; fintech regulation (SAMA/CMA)	Supporting industries → Factors: deeper clusters create demand for specialised skills. Weak supporting industries: constrain transmission of demand/factor gains (constraining loop).	Reinforcing link: analytically grounded; SMEs growing but feedback mechanism inferred. Constraining effect: moderately supported; import dependence documented; link to productivity transmission consistent with data.

Table 1. *Cont.*

Diamond Determinant	Indicators Used	Reform Instruments (Vision 2030)	Cross-Determinant Interaction Links	Triangulation Basis and Assessment
Firm Strategy, Structure, and Rivalry	IMD [7] competitiveness and business-dynamism sub-indices; entrepreneurship/entry data (Monsha'at); FDI inflows (MISA) [30]; GASTAT commercial registrations [29]	New Investment Law (2024) [33]; Competition Law amendments (2019, 2023) [12]; privatisation (e.g., Aramco IPO); FDI attraction strategy	Rivalry: competitive pressure converts factor and demand improvements into productivity gains (reinforcing loop). Weak rivalry: blocks this transmission (constraining loop). Rivalry → Factors: competitive firms invest in capability development.	Constraining loop: strongly supported; multiple sources show weak rivalry despite strong infrastructure and demand improvements.
Government (Systemic Influence)	WGI [35] government-effectiveness and regulatory-quality percentiles; Transparency International CPI [38]	Vision 2030 governance reforms; regulatory simplification; coordination mechanisms; PIF as cross-determinant actor	Government: shapes all determinants. Coordination tension: PIF's dual role as demand driver and competition regulator can conflict with rivalry enforcement.	Coordination tension: analytically grounded; PIF's role and governance indicators support the interpretation, but specific cases of conflict remain undocumented.

Note: Assessment categories reflect the type and convergence of supporting evidence, not causal verification. Strongly supported = corroborated by convergence across different types of evidence (e.g., international index + policy document + independent institutional assessment) with a clearly articulable mechanism. Moderately supported = corroborated by two types of evidence or strong analytical reasoning, but one link in the chain lacks independent corroboration. Analytically grounded = logically follows from the systems framework and is consistent with available evidence, but the interaction mechanism has not been independently documented; represents a priority for future empirical testing. See Section 4.4 for detailed triangulation methodology.

Stage 2: Within-determinant synthesis. Within each determinant, qualitative and quantitative evidence was synthesized to identify dominant patterns, constraints, and reform-driven shifts. Quantitative indicators (e.g., GII rankings, LPI scores, IMD sub-indices) were interpreted not as standalone rankings but in conjunction with qualitative policy narratives that explain the mechanisms driving observed changes. For example, an improvement in Saudi Arabia's LPI score was interpreted alongside specific logistics reform initiatives under NIDLP to understand whether the improvement reflects genuine capability upgrading or measurement artifacts. Where conflicting signals emerged across sources—such as positive index-based improvements alongside critical assessments in OECD or IMF reports—preference was given to the interpretation supported by the most transparent methodological basis, and the discrepancy was noted in the analysis.

Stage 3: Cross-determinant linkage analysis. Particular attention was paid to linkages across determinants, such as how public demand influences firm behavior (demand → rivalry linkage), how factor upgrading affects cluster development (factor conditions → supporting industries linkage), or how government procurement standards simultaneously shape demand quality and firm strategy. This linkage-based reading reflects the systems orientation of the study and avoids interpreting each pillar in isolation. Feedback loops were identified where evidence suggested that progress in one determinant created conditions that reinforced or constrained dynamics in another. The identification of linkages followed a triangulation logic in which convergence across in-

dependent source types was treated as the basis for interpreting a cross-determinant connection. To illustrate the process concretely: the identification of a reinforcing linkage between factor upgrading and demand sophistication drew on three converging sources. First, the GII 2024 data showed Saudi Arabia's improvement in ICT infrastructure indicators, and the UN E-Government Development Index placed the Kingdom among the top 30 globally—establishing that factor-level digital capacity had measurably improved. Second, LCGPA policy documents showed the progressive tightening of digital compliance requirements in government procurement contracts during 2019–2023, including mandatory e-procurement registration and digital capability assessments for suppliers—establishing that demand-side specifications had become more technically demanding. Third, the OECD Economic Survey [12] independently noted that government procurement was becoming more complex and performance-oriented. The convergence of these three independent sources—an international index measuring infrastructure capacity, a domestic policy instrument imposing new requirements, and an independent institutional assessment confirming the trend—supported the interpretation that factor-level digital upgrading was translating into demand-side sophistication through procurement mechanisms, rather than these being coincidental parallel developments. Where such convergence was absent, for example, where index improvements were not corroborated by qualitative policy evidence, the linkage was noted as analytically grounded rather than strongly supported and was flagged as a priority for future empirical investigation. A similar triangulation approach was applied to identify constraining dynamics. The interpretation that weak rivalry constrains system-wide upgrading despite strong factor and demand improvements drew on: (a) IMD World Competitiveness Yearbook 2024 [7] sub-indices showing Saudi Arabia's relatively weak business dynamism scores alongside strong infrastructure and government efficiency scores; (b) the OECD [12] assessment that competition enforcement remains in an early stage with incumbents retaining relational advantages in procurement; and (c) GASTAT data showing that while new commercial registrations have increased, market concentration in key sectors remains high. The convergence of an international ranking, an independent institutional critique, and domestic statistical evidence supported the systemic interpretation that the rivalry mechanism was not effectively transmitting factor and demand gains into productivity improvement.

Table 1 summarizes how evidence sources and policy instruments are mapped to the Diamond determinants, identifies the specific cross-determinant interaction links examined, and indicates the triangulation basis and assessment status for each link. The “Cross-Determinant Interaction Links” column identifies the specific connections tested through the triangulation process described above. Each link is assessed based on the type and convergence of supporting evidence: strongly supported (the connection is corroborated by convergence across different types of evidence—such as an international index, a policy document, and an independent institutional assessment—and the logical mechanism linking them is clearly articulable); moderately supported (the connection is corroborated by two types of evidence or by strong analytical reasoning consistent with available data, but one link in the causal chain lacks independent corroboration); or analytically grounded (the connection follows logically from the systems framework and is consistent with available evidence, but the interaction mechanism itself has not been independently documented, making it a priority candidate for future empirical testing).

4.5. Credibility and Analytical Rigor

To enhance analytical credibility, the study relies on triangulation across multiple source types. Quantitative indicators are interpreted alongside policy narratives and institutional reforms to avoid overreliance on rankings or perception-based measures.

Where discrepancies across sources emerged, preference was given to official data or indicators with transparent construction methodologies.

The study does not attempt to assign numerical weights to Diamond determinants or construct composite indices. Instead, rigor is ensured through consistency of analytical logic, transparent use of sources, and explicit alignment between evidence and interpretation. Each claim in the analysis sections is traceable to specific indicators or policy evidence identified in the methodology.

4.6. Scope, Boundaries, and Limitations

The scope of the study is limited to national-level competitiveness dynamics in Saudi Arabia. While international benchmarks are referenced for contextual comparison—particularly positioning Saudi Arabia relative to other transformation economies such as the UAE, Malaysia, and Chile—no formal cross-country ranking exercise is conducted. Sector-specific performance, firm-level outcomes, and short-term macroeconomic fluctuations fall outside the scope of the analysis. As a conceptual analysis based on secondary sources, the study does not establish causal relationships and should be interpreted as a structured framework-based interpretation rather than empirical verification. A limitation is that index-based indicators reflect perceptions and aggregate conditions; therefore, they are used for contextual interpretation, while the underlying mechanisms remain conceptual. A further limitation concerns the cross-determinant interaction analysis: while the study traces interaction pathways by connecting documented reforms and indicators across determinants through analytical reasoning, the full causal chains linking nodes in these pathways (e.g., confirming that a specific factor upgrade led to a measurable change in firm behavior through a specific demand channel) cannot be verified within a conceptual study based on secondary data. The interaction mechanisms are therefore presented as analytically grounded propositions that generate testable hypotheses for future empirical research using firm-level data and process tracing methodologies. A related limitation is that the study's reliance on secondary data means that the transmission mechanisms connecting interaction pathway nodes—such as how a specific procurement digitalization initiative translates through demand-side requirements into measurable changes in firm-level capability investment—cannot be directly observed or traced at the micro level. Verifying these mechanisms would require primary data collection, including firm-level interviews, procurement contract analysis, and longitudinal tracking of capability outcomes following specific policy interventions. Similarly, the assessment categories used in Table 1 (strongly supported, moderately supported, and analytically grounded) reflect the convergence of available secondary evidence rather than direct empirical validation of causal pathways. Future studies seeking to upgrade these assessments would need to employ process-tracing methodologies capable of documenting each link in the proposed interaction chains with primary evidence. Despite these limitations, the methodological approach is suitable for the study's objective of explaining systemic interactions, making cross-determinant mechanisms explicit, and generating a coherent analytical narrative—including testable research propositions—that provides the analytical architecture future empirical work requires.

5. Analysis and Discussion: Saudi Arabia Through the Diamond Lens

From a systems perspective, competitiveness upgrading follows reinforcing loops (capability upgrading → higher standards → firm learning → productivity gains) but is constrained by balancing forces such as coordination failures, regulatory uncertainty, and limited rivalry. The analysis below identifies where reinforcing dynamics appear strongest and where bottlenecks weaken system-wide upgrading, drawing on the specific indicators and evidence identified in the methodology.

5.1. Factor Conditions

Saudi Arabia's factor conditions are undergoing deliberate upgrading. Historically, oil revenues constituted the dominant basic factor supporting public investment and consumption. Under Vision 2030, these rents are increasingly redirected toward developing advanced factors such as human capital, logistics infrastructure, digital capacity, and innovation ecosystems. Concrete evidence of this shift is visible across multiple indicators. Saudi Arabia's Logistics Performance Index score improved from 2.69 in 2016 to 3.16 in 2023, reflecting investments in port modernization (notably the King Abdullah Port expansion), customs digitalization, and the National Transport and Logistics Strategy [34]. The GII 2024 ranks Saudi Arabia 69th globally, with notable strengths in institutional environment and market sophistication, though knowledge creation and research output remain comparatively weak—R&D expenditure stands at approximately 0.5% of GDP, below the OECD average of 2.7% [21]. The Human Capital Development Program under Vision 2030 has expanded tertiary enrollment and launched specialized training initiatives, contributing to an improvement in the Kingdom's HDI score from 0.847 in 2016 to 0.875 in 2023 [39]. Digital infrastructure has advanced substantially, with internet penetration exceeding 99% and the Digital Government Authority driving e-government transformation that has placed Saudi Arabia among the top 30 countries in the UN E-Government Development Index [28].

Despite these gains, gaps remain in specialized skills, research intensity, and private-sector-driven innovation. The OECD [12] notes that while public-sector employment of Saudi nationals has declined, the quality and market-relevance of educational output requires continued upgrading to meet the demands of a diversifying economy.

From a systems perspective, upgrading factor conditions does not operate in isolation. Improvements in skills, infrastructure, and digital capacity directly reinforce demand sophistication by enabling public and private clients to specify more complex requirements. For example, the digitalization of government procurement systems (a factor condition improvement) has enabled more technically demanding tender specifications (upgrading demand conditions), which, in turn, pressure firms to invest in capability development (intensifying rivalry). These enhanced factor conditions lower entry barriers for new firms and intensify competitive rivalry, creating feedback loops that support continuous upgrading rather than static advantage.

5.2. Demand Conditions

Domestic demand in Saudi Arabia is both large and increasingly sophisticated. Population growth (the Kingdom's population reached approximately 32.2 million in 2023), rising incomes, and rapid urbanization create scale effects, while Vision 2030 projects generate complex and demanding public sector procurement. The Public Investment Fund (PIF), with assets exceeding USD 930 billion, drives mega-projects including NEOM (estimated investment of USD 500 billion), the Red Sea tourism development, and Qiddiya, each imposing high-performance requirements on firms and suppliers [30].

Critically, the demand generated by these projects is not merely quantitative but qualitatively sophisticated. PIF-driven procurement increasingly requires compliance with international standards, technology transfer commitments, and local content thresholds set by the Local Content and Government Procurement Authority (LCGPA). The LCGPA mandates that government procurement contracts meet minimum local content requirements, which have been progressively tightened—pushing domestic firms to develop capabilities rather than simply serving as intermediaries for imported services [27].

This evolving demand structure pressures firms to meet international standards and adopt advanced solutions. Unlike consumption driven demand, state led transforma-

tion demand emphasizes execution quality, integration, and long term value, which can accelerate learning and upgrading if domestic firms are effectively engaged.

Demand conditions also function as a systemic driver. Sophisticated public and private demand reinforces factor upgrading by signaling skill and technology requirements, while simultaneously encouraging the formation of supporting industries capable of delivering complementary services. For instance, NEOM's requirements for renewable energy integration and smart city technologies have stimulated demand for specialized engineering, AI, and environmental consulting services—creating conditions for new supporting industries to emerge. Where demand remains outcome-oriented and performance based, it sustains pressure for innovation and prevents complacency among incumbent firms.

5.3. Related and Supporting Industries

The development of related and supporting industries remains uneven but improving. Logistics, digital services, finance, construction, and professional services have expanded rapidly alongside public investment. Emerging clusters around tourism (the Red Sea coast and AlUla), renewable energy (the NEOM Green Hydrogen project and National Renewable Energy Program), and technology (Riyadh's positioning as a regional tech hub with the establishment of over 200 tech startups since 2020) signal increasing ecosystem depth.

The National Industrial Development and Logistics Program (NIDLP) targets the development of four priority sectors—mining, manufacturing, energy, and logistics—with the explicit objective of building domestic supplier networks and reducing import dependence in strategic inputs. SME support programs, including Monsha'at's initiatives, have contributed to an increase in SME contributions to GDP from approximately 20% in 2016 to over 28% in 2023, reflecting a gradual deepening of the domestic enterprise base [30]. The financial services sector has also modernized, with the Saudi Central Bank (SAMA) advancing fintech regulation and the Capital Market Authority (CMA) expanding market access, supporting the ecosystem infrastructure needed for business dynamism.

However, cluster integration is still developing. The IMD World Competitiveness Yearbook 2024 [7] assessment indicates that while Saudi Arabia performs well in infrastructure and government efficiency, business efficiency sub-indicators—including cluster development and inter-firm collaboration—remain below those of leading transformation economies such as the UAE and Malaysia [36]. Many advanced inputs and services remain imported, limiting domestic spillovers. Strengthening local supplier networks and encouraging collaboration between firms, universities, and service providers is essential for transforming scale driven growth into productivity-based competitiveness.

From a systems viewpoint, weak linkages among supporting industries constrain the transmission of benefits from strong demand and upgraded factors. For example, even where PIF mega-projects generate substantial demand for advanced engineering services, the absence of deep local supplier ecosystems means that much of the value is captured by international contractors rather than building domestic firm capabilities. Conversely, deeper cluster integration amplifies knowledge spillovers, reduces coordination costs, and strengthens firm level learning, thereby reinforcing rivalry and long-term competitiveness.

5.4. Firm Strategy, Structure, and Rivalry

Firm level dynamics represent one of the most critical challenges. Historically, limited domestic rivalry, high state dependence, and dominance of large incumbents constrained innovation incentives. The Saudi economy has been characterized by a concentrated market structure in key sectors, with state-owned enterprises and large family conglomerates accounting for a disproportionate share of economic activity [9,12]. Vision 2030 reforms aim to reshape this environment through several concrete mechanisms. The new Investment

Law (2024) establishes equal treatment for domestic and foreign investors, streamlines licensing procedures, and strengthens investor protections—addressing longstanding barriers to market entry [33]. The 2019 Competition Law amendments, with further revisions in 2023, strengthen the General Authority for Competition’s enforcement capacity and introduce merger control provisions designed to prevent anti-competitive concentration. Privatization initiatives, including the partial IPO of Saudi Aramco which raised USD 29.4 billion in 2019, and planned privatizations in healthcare, education, and water services, introduce market discipline into previously state-managed sectors. FDI inflows have increased from USD 1.4 billion in 2016 to approximately USD 8.9 billion in 2023, introducing new competitive players and management practices [30].

Increased entry of new firms and exposure to global competition are gradually intensifying rivalry. The number of new commercial registrations has risen substantially, with [40] Monsha’at reporting a 44% increase in active SMEs between 2018 and 2023. However, sustaining this momentum requires consistent competition policy enforcement, transparent regulation, and reduced reliance on state driven demand allocation. The OECD [12] notes that while regulatory reforms are progressing, the practical effectiveness of competition enforcement remains in an early stage, and large incumbents continue to benefit from informational and relational advantages in public procurement.

Rivalry acts as a central transmission mechanism within the Diamond system. Where competition is credible and rules based, firms respond to sophisticated demand and upgraded factors by innovating and improving productivity. Where rivalry is muted—whether through implicit protection of incumbents, discretionary contract allocation, or regulatory uncertainty—system wide upgrading stalls, regardless of public investment scale. This represents the most critical bottleneck in Saudi Arabia’s competitiveness system: substantial investments in factor conditions and demand sophistication may yield limited productivity gains if the rivalry mechanism fails to transmit competitive pressure effectively.

5.5. *The Role of Government as System Shaper*

Government is the central system shaper in Saudi Arabia’s Diamond. Vision 2030 functions as a coordinated intervention targeting multiple determinants simultaneously. Its effectiveness depends not on the scale of spending alone, but on whether policies reinforce linkages between factors, demand, firms, and supporting industries. Several concrete examples illustrate the government’s systemic role in both strengthening and potentially constraining cross-determinant linkages:

PIF as a cross-determinant actor: The Public Investment Fund simultaneously shapes demand conditions (through mega-project procurement), firm strategy (through co-investment and joint venture requirements that impose performance standards on partners), factor conditions (through investments in education and technology infrastructure via portfolio companies), and supporting industries (by catalyzing domestic supply chains around its project requirements). To illustrate concretely: PIF’s majority investment in Lucid Motors included a requirement to establish an advanced manufacturing facility at King Abdullah Economic City, directly linking a demand-side investment decision to factor condition development through localized production capacity and technology transfer. Similarly, PIF’s establishment of ROSHN as a national real estate developer created procurement demand for domestic construction materials, engineering services, and smart-home technology suppliers—simultaneously shaping demand conditions, stimulating supporting industries, and pressuring firms to meet international quality standards. This multi-determinant influence makes PIF a uniquely powerful system-shaping instrument—but also concen-

trates systemic risk, as the withdrawal or redirection of PIF demand could simultaneously weaken multiple determinants.

Localization policies as inter-determinant connectors: Localization requirements—including LCGPA content mandates, sector-specific Saudization targets, and the recent decision to localize consultancy professions [27]—directly link demand conditions to firm strategy and supporting industries. By requiring that procurement contracts meet local content thresholds, these policies translate public demand into pressure for domestic capability building. For example, LCGPA mandates in defense procurement have incentivized international contractors such as Lockheed Martin and Boeing to establish joint ventures and technology transfer agreements with Saudi firms, creating new domestic capabilities in military industries and advanced manufacturing. However, their effectiveness depends on implementation quality: overly rigid localization targets risk creating compliance-oriented rather than capability-oriented responses. The OECD [12] notes that in some sectors, local content requirements have led firms to meet minimum thresholds through nominal partnerships or workforce reclassification rather than genuine capability transfer—potentially constraining the very competition these policies aim to stimulate.

Regulatory reform and competition enforcement: The Investment Law reform, Competition Law amendments, and establishment of sector-specific regulators (e.g., the Communications, Space, and Technology Commission) reshape the rivalry determinant by altering market entry conditions and competitive dynamics. The Worldwide Governance Indicators show Saudi Arabia's government effectiveness score at the 66th percentile and regulatory quality at the 63rd percentile in 2023 [35]—above the regional average but indicating room for improvement compared to leading transformation economies. The Corruption Perceptions Index score of 52 (ranked 55th globally in 2024) similarly indicates meaningful governance progress alongside continuing challenges [38].

From a systems perspective, government intervention is most effective when it activates reinforcing feedback loops across the Diamond rather than addressing individual constraints in isolation. Where government acts as an enabler by setting standards, investing in capabilities, and ensuring fair competition, competitiveness is strengthened. Where it substitutes for markets or shields incumbents, long-term productivity gains may be constrained. Policy coherence and sequencing therefore become as important as policy intensity. The systemic implications of government's dual role—as both the primary driver of sophisticated demand and the architect of the competitive environment—are examined in greater detail in Section 5.6, where the coordination tension arising from this duality is analyzed as a distinct interaction pathway.

5.6. Cross-Determinant Interactions and Systemic Dynamics

The preceding determinant-level analysis identifies the condition of each Diamond component separately. The main systems-oriented contribution of this study, however, lies in explaining how these determinants interact to produce reinforcing or constraining dynamics across the competitiveness system. This section therefore moves beyond pillar-by-pillar assessment to identify four key interaction mechanisms that emerge from the evidence presented in Sections 5.1–5.5. The aim is not to claim firm-level causality, which would require primary empirical testing, but to make the logic of cross-determinant interactions explicit and to show how the Saudi Diamond appears to operate as an interconnected system. In this sense, the section provides the analytical bridge between the determinant-level assessment and the research propositions developed in Section 5.7.

Reinforcing Loop 1: Factor Upgrading → Demand Sophistication → Rivalry Intensification. The clearest reinforcing mechanism identified in the Saudi case links improvements in factor conditions to more sophisticated demand and, through demand, to stronger competitive pressure on firms. Saudi Arabia's digital upgrading, supported by national

digital transformation efforts and reflected in strong performance in digital government and ICT-related indicators, has improved the state's capacity to design and manage more demanding procurement systems [5,28,41]. This matters because the LCGPA's progressively tighter local content requirements rely on digital monitoring, supplier evaluation, and performance tracking to be implemented effectively [42]. As procurement becomes more technically demanding, firms face greater pressure to upgrade their capabilities through technology adoption, workforce development, and process improvement. These responses, in turn, increase demand for specialized digital and engineering skills, feeding back into factor upgrading through training expansion and educational adaptation [41]. A concrete illustration of this mechanism is the Etimad government procurement platform, which digitalized the procurement process by requiring all government suppliers to register electronically, submit digital compliance documentation, and meet standardized technical qualification criteria. This factor-level digital infrastructure improvement directly raised demand-side sophistication by enabling contracting agencies to specify more granular performance requirements and monitor supplier compliance in real time. In turn, suppliers seeking to participate in government contracts were compelled to invest in digital systems, staff training, and process standardization—creating competitive pressure that illustrates the factor → demand → rivalry transmission pathway in a traceable, institution-specific manner. The systemic implication is that factor upgrading does not improve competitiveness automatically; it does so most effectively when it raises the sophistication of demand and transmits pressure through rivalry.

Reinforcing Loop 2: Demand → Supporting Industries → Factor Conditions.

A second reinforcing pathway runs from sophisticated demand to supporting industries and then back to factor conditions. PIF-led mega-projects have created new forms of demand that are beginning to stimulate domestic service providers and supplier development [5,17]. NEOM's requirements in renewable energy, smart-city systems, and sustainable construction have generated demand for engineering, AI-related services, and environmental assessment capabilities that previously had limited scale in the Saudi market [5,41]. The NEOM Green Hydrogen project illustrates this particularly clearly, as it has attracted international participation while also encouraging domestic capability formation and specialized training [43]. Similarly, the Red Sea development has expanded demand for hospitality management, eco-tourism planning, and marine-related services within the broader diversification agenda of Vision 2030 [5]. These developments can strengthen factor conditions over time by creating new demand for skills, training, and applied knowledge transfer. NIDLP's cluster-oriented strategy is explicitly designed to support this type of transmission by linking demand, suppliers, and training systems [5]. At the same time, the evidence suggests that this loop remains incomplete, since many advanced inputs are still imported and domestic absorption capacity is uneven [7,12]. The broader implication is that demand-led transformation becomes more systemically effective when supporting industries are deep enough to internalize and diffuse learning.

Constraining Loop: The Rivalry Bottleneck.

The strongest constraining mechanism identified in the analysis arises from the co-existence of substantial upgrading in factor conditions and demand sophistication with persistently weak domestic rivalry. Saudi Arabia has made visible progress in infrastructure, with the Logistics Performance Index improving from 2.69 to 3.16 [34]. It has also achieved very high digital connectivity, with internet penetration exceeding 99% [41], while human development indicators improved from 0.847 to 0.875 [39]. Yet these gains coexist with weaker business dynamism indicators in international competitiveness assessments and limited competitive intensity in several sectors [7,8]. From a systems perspective, this is a critical bottleneck. If rivalry is weak, factor upgrading and sophisticated demand do

not transmit effectively into firm-level productivity, innovation, and capability renewal. Instead, improved inputs create productive potential that may remain underused, while incumbent firms can continue serving advanced demand without facing sufficient pressure to innovate. This is why rivalry should not be seen as an isolated pillar weakness, but as a transmission failure within the broader competitiveness system. The constraining effect of weak rivalry manifests differently across sectors, further illustrating its systemic character. In the telecommunications sector, where the entry of STC, Mobily, and Zain has created a more contestable market structure, firms have responded to factor and demand improvements by investing in 5G deployment, digital service innovation, and competitive pricing—demonstrating that where rivalry is present, the reinforcing loop operates more effectively. By contrast, in the construction sector, where market concentration remains higher and procurement allocation retains significant discretionary elements, similar factor and demand improvements have produced slower firm-level upgrading and greater reliance on international subcontracting. This sectoral contrast illustrates that the rivalry bottleneck is not uniform across the economy but varies with market structure and competitive enforcement, reinforcing the argument that rivalry functions as a transmission mechanism rather than merely a standalone determinant. The OECD's observation that competition enforcement remains at an early stage, and that large incumbents continue to benefit from informational and relational advantages, supports this interpretation [12]. The key implication is that factor and demand upgrading alone are unlikely to generate sustained competitiveness unless rivalry is credible and consistently enforced.

Coordination Tension: Government as Simultaneous Demand Driver and Competition Regulator.

A further systemic tension arises from the distinctive role of government in Saudi Arabia's Diamond. Through PIF and related entities, the state acts not only as the main driver of sophisticated demand but also as the architect of the competitive environment itself [17,44]. This dual position can generate coordination benefits, but it can also create tensions between capability building and market contestability. When PIF channels demand through co-investments, joint ventures, or large contract allocations, it may accelerate upgrading in strategic sectors. At the same time, preferential access to state-backed demand may reduce competitive pressure on beneficiary firms, even where regulatory reforms formally aim to promote competition. Localization policies illustrate this tension clearly. On one hand, local content thresholds can push firms to build domestic capabilities and strengthen supplier ecosystems. On the other hand, if these requirements operate in markets with few qualified firms and high discretionary allocation, they may unintentionally create protected positions that weaken rivalry [42]. This does not mean state coordination is inherently problematic. In early-stage transformation, coordinated intervention may be necessary. However, its long-run effectiveness depends on whether policymakers can use state-led demand to build capabilities without undermining the contestability needed for sustained productivity gains.

Taken together, these four mechanisms suggest that Saudi Arabia's competitiveness system is shaped by both reinforcing and constraining dynamics. Reinforcing effects are strongest in the factor–demand–capability nexus, while the most significant vulnerability lies in the weak transmission of these gains through rivalry and in the coordination tension created by government's dual role. This systems-oriented diagnosis differs from a simple determinant-by-determinant reading of the Diamond. A pillar-based summary might conclude that Saudi Arabia has strong factor conditions, improving demand, developing supporting industries, and weaker rivalry. The analysis here suggests a more precise conclusion: the central problem is not merely weak rivalry in isolation, but the inability of the rivalry mechanism to convert factor upgrading and demand sophistication into broader

firm-level productivity improvement. This reframing provides the analytical basis for the research propositions and policy implications that follow.

It is important to acknowledge the boundaries of this analysis. The interaction mechanisms identified here are derived from analytical reasoning that connects determinant-level evidence through the logic of Porter's Diamond. Demonstrating the full causal chain for each pathway would require firm-level datasets, sectoral case studies, and process-tracing approaches that fall outside the scope of this conceptual study. The contribution of the present section is therefore not to prove causality directly, but to identify where reinforcing and constraining dynamics are most likely to operate and to clarify how these dynamics may shape national competitiveness outcomes.

A final methodological clarification is also necessary. The evidence base at each node of the interaction pathways, including factor upgrading, demand sophistication, supplier development, and rivalry conditions, is grounded in the indicators and sources presented in Sections 5.1–5.5. However, the full transmission mechanisms linking those nodes cannot be empirically verified here. For that reason, the pathways should be interpreted as analytically grounded propositions about how the Saudi Diamond likely operates, rather than as empirically demonstrated causal chains. Their value lies in making the systemic architecture explicit and in providing a coherent foundation for the testable propositions advanced in Section 5.7.

5.7. Research Propositions for Future Empirical Testing

The systems-oriented analysis developed in this study generates a set of research propositions that translate the interaction mechanisms identified in Section 5.6 into testable directions for future empirical inquiry. Rather than treating Porter's Diamond as a set of static and independent determinants, these propositions reflect the argument that competitiveness outcomes depend on the strength, direction, and transmission quality of the linkages across determinants. Each proposition is derived from the analytical patterns identified in the Saudi case and is accompanied by suggested empirical approaches that future research can use to evaluate the proposed relationships.

P1—Factor upgrading strengthens national competitiveness only when domestic rivalry is credible and sustained.

Analytical motivation: Saudi Arabia has invested heavily in factor upgrading, including digital infrastructure and human capital development, with more than \$24.8 billion invested in digital infrastructure, internet penetration exceeding 99%, and widespread 5G coverage, alongside expanding training and skills development initiatives [41,43]. However, the analysis suggests that factor upgrading alone does not guarantee proportionate competitiveness gains. Where rivalry remains weak, these improved inputs may increase productive capacity without creating sufficient pressure for innovation, efficiency, and firm-level upgrading. This proposition therefore captures the argument that rivalry is not simply one determinant among others, but a critical transmission mechanism through which factor improvements are converted into competitiveness outcomes.

Suggested empirical approaches: Comparative case studies across sectors with differing levels of rivalry, such as telecommunications and construction, could assess whether similar improvements in factor conditions produce different productivity outcomes depending on competitive intensity. Firm-level surveys measuring perceived competitive pressure, innovation effort, and factor utilization could provide complementary quantitative evidence.

P2—Sophisticated public demand produces sustained productivity gains only when local supplier ecosystems have sufficient depth to absorb and transmit learning effects.

Analytical motivation: The analysis suggests that public demand becomes systemically effective only when it is matched by domestic supplier capacity. Mega-projects can generate advanced demand, but where local ecosystems remain shallow, value is likely to be captured by international suppliers rather than translated into domestic capability building. ROSHN illustrates both the promise and the limitation of this mechanism: it has awarded over 70% of its contracts to Saudi firms and created more than 200,000 jobs, yet many specialized inputs continue to be sourced externally [45]. This proposition captures the argument that sophisticated demand alone is not enough; its competitiveness effect depends on whether supporting industries are deep enough to internalize and diffuse learning.

Suggested empirical approaches: Firm-level surveys measuring supplier participation in mega-project supply chains, combined with indicators of capability upgrading and productivity performance, could be used to test this proposition. Comparative sectoral analysis between industries with deeper domestic supplier ecosystems and those with weaker local absorption capacity could provide further evidence.

P3—Government coordination improves competitiveness outcomes when it strengthens cross determinant linkages rather than substituting for market-based mechanisms.

Analytical motivation: Government occupies a central but potentially contradictory role in the Saudi competitiveness system. PIF's investment in Lucid Motors, including a manufacturing facility designed to produce up to 155,000 electric vehicles annually, demonstrates how state-backed demand can be linked to factor upgrading and supplier development [44]. At the same time, when government-directed demand is allocated through discretionary channels, it may reduce contestability, protect incumbents, and weaken rivalry. This proposition therefore captures the coordination tension identified in Section 5.6: state intervention may strengthen competitiveness when it connects demand, factors, and supporting industries, but it may weaken long-run competitiveness when it substitutes for market-based discipline.

Suggested empirical approaches: Comparative institutional analysis across Gulf economies could examine whether different forms of state coordination produce different competitiveness outcomes. Process tracing of specific interventions, such as localization mandates or joint venture structures, could help determine whether these mechanisms reinforced market upgrading or instead generated compliance-oriented behavior with limited competitive spillovers.

P4—Factor upgrading enables more demanding procurement and consumption.

Analytical motivation: The analysis indicates that improved factor conditions can raise the sophistication of demand. Enhanced digital infrastructure and stronger human capital enable government agencies, including the Local Content and Government Procurement Authority, to specify more demanding technical standards, monitor compliance more effectively, and enforce performance-based requirements. The Lucid Motors facility provides a concrete example of how upgraded factor conditions can support more advanced industrial and procurement expectations, including local content requirements tied to high-value manufacturing [44]. This proposition reflects the argument that factor upgrading can shape not only supply capacity but also the quality and sophistication of domestic demand.

Suggested empirical approaches: Future studies could compare procurement contracts across sectors with stronger and weaker factor conditions to assess whether better infrastructure and skills are associated with more stringent technical requirements, more demanding performance metrics, and higher local content thresholds.

P5—Large-scale demand with high technological requirements accelerates factor upgrading.

Analytical motivation: The analysis also suggests a reverse mechanism: sophisticated demand can itself stimulate the upgrading of factor conditions. The NEOM Green Hydrogen Company's partnership with the Energy and Water Academy provides a clear

illustration, as it has generated specialized training pathways designed to prepare Saudi nationals for advanced technical roles in green hydrogen production [43]. This indicates that mega-project demand can accelerate human capital development, curriculum adaptation, and specialized training in sectors where technological requirements are especially high. The proposition therefore captures the idea that demand does not merely absorb existing factors but can actively reshape them.

Suggested empirical approaches: Future research could compare the number, type, and speed of new training programs, vocational pathways, and university curricula across sectors with and without major project-driven demand. This would allow researchers to test whether technologically advanced demand environments are associated with faster factor upgrading.

P6—Improved factor conditions encourage the formation and expansion of supporting industries. Analytical motivation: The analysis suggests that stronger physical and human capital conditions can lower entry barriers and support the emergence of new domestic suppliers. The PIF–Lucid Motors collaboration is expected to stimulate local supply chain development in electric vehicle production and related manufacturing activities [44]. ROSHN’s long-term procurement roadmaps and extensive engagement with Saudi firms provide further evidence that improved capabilities, when combined with localization incentives, can help expand domestic supporting industries [45]. This proposition captures the argument that factor upgrading contributes to competitiveness not only directly, but also indirectly by enabling supplier formation and ecosystem development.

Suggested empirical approaches: Regional or sectoral studies could compare supplier-network growth across areas with different levels of logistics quality, skills availability, and digital readiness. This would help test whether stronger factor conditions are associated with broader and more capable supporting industries.

P7—Deeper supporting industries intensify rivalry by widening the pool of capable firms.

Analytical motivation: The systems-oriented analysis indicates that the development of supporting industries may strengthen rivalry by reducing entry barriers and increasing the number of qualified firms able to compete. ROSHN’s supplier partnerships in construction and related sectors suggest that local ecosystem development can broaden the pool of capable vendors and reduce dependence on a narrow group of incumbents [45]. This proposition therefore reflects the argument that supporting industries are not only complementary to competitiveness but may also strengthen rivalry by making markets more contestable and dynamic.

Suggested empirical approaches: Empirical testing could compare business dynamism, firm entry, and supplier diversity across sectors with stronger and weaker local supporting industries, while controlling for sector-specific demand conditions and factor endowments. This would allow future research to assess whether deeper ecosystems are associated with more competitive market structures.

Taken together, these propositions translate the conceptual insights of the present study into directions for future research. They are not intended as claims of empirical verification, but as analytically grounded propositions that can be examined more rigorously through firm-level, sectoral, and comparative research.

6. Policy Implications

The analysis indicates that national competitiveness cannot be achieved through isolated or sector-specific reforms. The cross-determinant analysis in Section 5.6 reveals that the most critical systemic bottlenecks are the rivalry transmission failure (the constraining loop, strongly supported in Table 1) and the incomplete demand-to-supporting-industries pathway (Reinforcing Loop 2, moderately supported). Additionally, the coordination

tension arising from government's simultaneous role as demand driver and competition regulator (analytically grounded) creates structural challenges for policy design. The following recommendations are structured as short-term coordinative measures and long-term institutional shifts, each targeting specific interaction pathways identified in the systems-oriented analysis.

Short-term coordinative measures:

Strengthen performance-based procurement standards: Reinforcing Loop 1 (Section 5.6) demonstrates that demand sophistication is a key systemic driver, but its effectiveness in transmitting competitive pressure to firms depends on how procurement standards are designed and enforced. Policymakers should ensure that LCGPA local content requirements are coupled with explicit performance metrics—measuring capability development outcomes rather than merely compliance percentages—so that public demand translates into genuine firm upgrading rather than nominal localization. This directly addresses the demand → rivalry link currently classified as analytically grounded in Table 1.

Establish coordination mechanisms between mega-project demand and supplier development programs: Reinforcing Loop 2 (Section 5.6) identifies the demand → supporting industries transmission as emerging but incomplete, classified as moderately supported in Table 1. The disconnect between PIF-driven demand and the capacity of local supplier ecosystems represents a critical systemic gap. Creating formal coordination platforms that align mega-project procurement timelines with Monsha'at's SME development programs and NIDLP sector strategies would help ensure that demand creates pull effects for domestic capability building, strengthening this currently weak reinforcing pathway.

Enhance transparency in competition enforcement: The constraining loop (Section 5.6)—the most robustly supported finding of the cross-determinant analysis (strongly supported in Table 1)—identifies weak rivalry as the central bottleneck preventing factor and demand gains from translating into productivity improvement. This bottleneck is partly attributable to enforcement uncertainty. Prioritizing the publication of competition enforcement decisions, standardizing procurement evaluation criteria, and establishing independent review mechanisms for major contract allocations would begin to strengthen the rivalry transmission mechanism in the short term.

Long-term institutional shifts:

Develop independent competition authorities with credible enforcement capacity: The constraining loop requires sustained institutional reform, not just short-term transparency measures. The General Authority for Competition should be progressively strengthened with greater autonomy, technical capacity, and enforcement resources to ensure that competition policy remains credible as the economy diversifies and incumbent interests become more entrenched. This directly targets the rivalry transmission mechanism that the cross-determinant analysis identifies as the most critical systemic vulnerability.

Build deep innovation ecosystems through sustained R&D investment and university-industry collaboration: Reinforcing Loop 1 depends on continuous factor upgrading to sustain the factor → demand → rivalry cycle. The factor conditions analysis (Section 5.1) reveals that while basic infrastructure has improved substantially, knowledge creation and research intensity remain weak (R&D at 0.5% of GDP versus the OECD average of 2.7%). Sustained increases in R&D expenditure toward at least 1.5% of GDP, coupled with structured university-industry collaboration programs (building on models such as KAUST's innovation ecosystem), would address this advanced factor gap and sustain the reinforcing dynamics that drive long-term competitiveness upgrading.

Transition from state-driven demand allocation toward market-based competitive procurement: The coordination tension identified in Section 5.6 (analytically grounded in Table 1) highlights the structural challenge of government simultaneously driving

demand and regulating competition. While government-led demand has been essential for triggering transformation, long-term competitiveness requires that firms face sustained competitive pressure from market-based sources rather than depending on discretionary state allocation. Gradually introducing competitive procurement mechanisms—where multiple qualified domestic firms compete for contracts on quality and price rather than relational criteria—would manage this tension by progressively strengthening the rivalry mechanism while maintaining the demand sophistication that drives upgrading.

Effective coordination across these dimensions is essential. The short-term measures primarily target the demand → rivalry and demand → supporting industries links where immediate policy action can strengthen transmission mechanisms, while the long-term shifts address the deeper institutional conditions needed to sustain the constraining loop's resolution and manage the coordination tension over time. The cross-determinant analysis demonstrates that fragmented interventions targeting individual determinants weaken reinforcing dynamics and limit long-term competitiveness gains, while coordinated reforms that consciously address the interaction pathways identified in Section 5.6 generate the systemic upgrading necessary for sustained transformation.

7. Conclusions

This study applies Porter's Diamond Model as a systems-oriented analytical framework to examine Saudi Arabia's economic transformation under Vision 2030. The central research question—how the interaction of national competitiveness determinants explains Saudi Arabia's economic transformation—is addressed through a structured analysis that maps evidence onto each Diamond determinant and examines their cross-determinant interactions.

The findings reveal a competitiveness system characterized by significant asymmetries. Factor conditions have been substantially upgraded, with measurable improvements in logistics performance (LPI rising from 2.69 to 3.16), institutional effectiveness (WGI government effectiveness at the 66th percentile), and human development (HDI improving from 0.847 to 0.875). Demand conditions have evolved markedly, driven by PIF-led mega-project procurement that imposes increasingly sophisticated requirements on domestic and international firms. However, the rivalry mechanism—which, in Porter's framework, serves as the central transmission channel through which factor improvements and demand sophistication are converted into productivity gains—remains the most critical bottleneck. Limited domestic competition, incumbent advantages, and evolving competition enforcement constrain the system's ability to translate substantial public investment into sustained firm-level productivity upgrading. Similarly, supporting industry ecosystems, while expanding, have not yet achieved the depth needed to capture and amplify the knowledge spillovers generated by the transformation.

The study's core thesis—that sustainable national competitiveness depends on coordinated upgrading across the integrated Diamond system rather than isolated reforms—is supported by the analysis across all determinants. Saudi Arabia's transformation illustrates both the power and the vulnerability of state-led competitiveness strategies: substantial investment and reform energy can rapidly upgrade individual determinants, but systemic competitiveness emerges only when reinforcing interactions across determinants are activated and sustained.

The theoretical contribution of this paper lies in its systems-oriented interpretation of the Diamond model. While existing applications in the Gulf context and emerging economies tend to evaluate determinants independently, this study demonstrates the analytical value of focusing on cross-determinant interactions as the primary unit of analysis. The cross-determinant analysis in Section 5.6 identifies specific reinforcing loops

(factor–demand–rivalry and demand–supporting industries–factor pathways), a critical constraining loop (the rivalry bottleneck that prevents factor and demand gains from translating into productivity improvement), and a structural coordination tension (government’s dual role as demand driver and competition regulator). This systemic diagnosis differs from what determinant-level evaluation would yield and provides a more actionable foundation for both policy design and future empirical testing. The seven research propositions developed in Section 5.7 provide a direct research agenda for future empirical investigation, including comparative case studies, firm-level surveys, and institutional analyses.

To guide future empirical work more concretely, three methodological directions merit particular attention. First, firm-level case studies using the Etimad procurement platform as a traceable institutional pathway could document whether and how digitalized procurement requirements translate into measurable capability investments by supplier firms, thereby providing direct evidence on Reinforcing Loop 1. Second, comparative sectoral analysis between industries with different levels of competitive intensity—such as telecommunications, where three-firm rivalry is established, and construction, where incumbent concentration remains stronger—could test whether similar improvements in factor conditions and demand generate different productivity outcomes depending on the strength of the rivalry mechanism, directly addressing Proposition P1. Third, cross-Gulf institutional comparisons examining competitiveness outcomes under different forms of sovereign wealth fund coordination, such as PIF in Saudi Arabia, Mubadala in the UAE, and QIA in Qatar, could help assess Proposition P3 regarding the conditions under which state coordination strengthens or weakens cross-determinant linkages. Together, these directions would provide the kind of primary, micro-level evidence that lies beyond the scope of the present conceptual study and would allow future research to examine these interaction mechanisms more directly.

From a systems perspective, the overarching finding is that fragmented reforms weaken competitiveness outcomes, whereas coordinated upgrading across determinants generates reinforcing dynamics essential for long-term transformation. For Saudi Arabia, the transition from resource-based prosperity to productivity-driven competitiveness requires continued emphasis on capability building, market discipline, and institutional coherence—pursued not as separate objectives but as interdependent elements of an integrated national competitiveness system.

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