



Building Costs and Sustainability Considerations in Real Estate Development: A Focus on Saudi Arabia

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ABSTRACT

Real estate development, the transformative process of breathing life into bare land, is a potent engine of urban growth and economic dynamism. However, this transformative power comes at a substantial price, woven from a complex tapestry of interconnected cost factors. While existing research has analyzed individual threads like land acquisition, construction, and financing, a critical gap remains in understanding their intricate interplay and the dynamic forces shaping the overall cost equation. This paper delves into this intricate landscape, unveiling the hidden connections and offering actionable insights for optimizing project budgets. Through a multi-pronged methodological approach, this research dissects the cost structure of real estate development projects across diverse scales and locations. In-depth case studies provide granular insights into actual cost breakdowns and decision-making processes, while comparative analysis reveals the impact of regional variations and emerging trends. Expert consultations further enrich the understanding of cost drivers and potential policy interventions. Beyond simply quantifying costs, this research focuses on cost management strategies. It explores the effectiveness of established methods like value engineering and phased development, alongside the potential of innovative approaches like BIM and data analytics. By illuminating these strategies and their impact on various project types, the research empowers developers to optimize their budgets and navigate the ever-evolving cost landscape. Ultimately, this paper transcends the price tag to reveal the true financial anatomy of real estate development. It provides a nuanced understanding of the complex interplay between land acquisition, construction, financing, and project management. By bridging the gap between individual threads and the tapestry they create, this research empowers stakeholders to navigate the financial challenges of development, foster sustainable growth, and ultimately contribute to a more efficient and inclusive built environment.

Key words: Real Estate, development, building, policy, BIM, project management

INTRODUCTION

Real estate development, the transformative process of breathing life into bare land, is a potent engine of urban growth and economic dynamism. Yet, this transformative power comes at a price – a complex and often substantial one. From land acquisition, the initial and often largest hurdle, which can consume up to 50% of the budget (Al-Sakkaf et al. 2021; Smith & Lang, 2023), to construction, a meticulous dance of materials and manpower accounting for roughly 35% of total costs (Al-Sakkaf et al. 2020; RICS, 2022), the cost elements of real estate development weave an intricate tapestry.

Understanding this tapestry is crucial. Developers navigate a financial tightrope, balancing ambition with the ever-present reality of budgets. Investors seek to quantify risk and potential returns, factoring in an average development IRR of 12-15% (McKinsey Global Institute, 2020). And policymakers grapple with the delicate balance between fostering development and ensuring affordability, with studies showing a direct correlation between land acquisition costs and housing affordability (Eweda et al. 2021; Al-Sakkaf, 2020; Urban Land Institute, 2021).

This research delves into the heart of this cost equation. We dissect the major cost categories, from land acquisition and permitting to construction and marketing, illuminating their individual weight and their interplay. We explore the financing landscape, examining the diverse funding sources that fuel these ventures, from traditional debt and equity to innovative crowdfunding models. And we delve into the crucial art of cost management, showcasing strategies like value engineering and phased development that can tip the scales towards success, potentially saving developers up to 10% on construction costs (Al-Sakkaf & Ahmed 2021; RICS, 2022; Elshaboury et al. a,b-2022).

Through this exploration, we aim not only to illuminate the costs of real estate development, but also to empower stakeholders. Developers can utilize these insights to optimize their projects, investors can make informed decisions, and policymakers can craft regulations that foster sustainable growth, balancing the needs of developers with the aspirations of communities. Ultimately, this understanding is key to ensuring that the transformative power of real estate development benefits not just developers, but the communities they shape (Al-Sakkaf et al. 2020).

LITERATURE REVIEW

The intricate tapestry of real estate development costs has captivated researchers for decades. While individual threads like land acquisition, construction, and financing have received ample attention, a gap remains in understanding their interconnectedness and the dynamic interplay that shapes the overall financial landscape of a project. This review delves into the existing body of knowledge, identifying key contributions and illuminating avenues for further exploration.

Land Acquisition: The Groundbreaking Cost:

Land, the foundation of any development, often claims the largest portion of the budget. Smith & Lang (2023) found land acquisition costs averaging 45-50% across global cities, highlighting its significant impact. However, variations exist, as Urban Land Institute (2021) demonstrated by linking rising land prices to reduced housing affordability. Understanding these local and global dynamics, as well as the impact of factors like zoning regulations and infrastructure availability, is crucial for informed land acquisition strategies.

Constructing the Dream: Balancing Efficiency and Cost:

Construction costs, typically accounting for 35% of the project budget (RICS, 2022), represent the intricate dance between materials, manpower, and meticulous planning. RICS (2022) further dissected this dance, revealing materials (40-50%), labor (30-35%), and equipment (15-20%) as the major cost drivers. Research by McKinsey Global Institute (2020) adds another layer, suggesting that a 20% increase in construction productivity could lead to a 10-15% reduction in overall project costs. Exploring the potential of innovative construction methods, prefabrication, and technology-driven optimization presents an exciting avenue for future research.

Financing the Vision: A Balancing Act:

The financial lifeblood of development, funding sources and their interplay with costs remain an evolving narrative. Traditional debt and equity continue to dominate, with JLL (2021) highlighting an average IRR of 12-15% for development projects compared to stabilized assets. However, PwC (2022) sheds light on the rise of alternative financing models like crowdfunding and venture capital, particularly for smaller and more innovative projects. Understanding how these diverse financing options influence cost structures and risk profiles is essential for developers seeking the optimal funding mix.

Beyond the Numbers: The Art of Cost Management:

Simply understanding cost components is insufficient. RICS (2022) emphasizes the art of cost management, highlighting strategies like value engineering, phased development, and early contractor involvement, which can potentially save developers up to 10% on construction costs. Turner & Townsend (2021) further explores the role of technology, suggesting that BIM and data analytics hold immense potential for improving cost forecasting, resource allocation, and project transparency. Examining the effectiveness of these strategies

across diverse project types and contexts will provide valuable insights for developers seeking to optimize their budgets.

Emerging Trends: Redefining the Cost Equation:

The real estate landscape is not static. Sustainability, smart technologies, and changing demographics are just a few of the emerging trends reshaping development costs. Understanding how these trends influence material choices, construction processes, and marketing strategies requires further investigation. Additionally, exploring the cost implications of innovative concepts like co-living spaces or modular construction can pave the way for more sustainable and inclusive development models.

Policy and the Cost Landscape: A Complex Interplay:

Government policies on zoning, land use, and infrastructure significantly impact development costs. While existing research has explored these connections, a deeper understanding of how specific policy frameworks influence cost structures in different regions and for different project types is needed. Furthermore, examining the potential of policy interventions to promote both affordability and sustainable development can provide valuable insights for policymakers navigating this intricate balance.

PREVIOUS STUDIES

Land Acquisition:

Smith & Lang (2023): This study analyzed real estate development projects across various global cities and found that land acquisition costs accounted for an average of 45-50% of the total project budget.

Urban Land Institute (2021): Explored the connection between land acquisition costs and housing affordability, highlighting how rising land prices disproportionately impact first-time buyers and lower-income households.

Construction Costs:

RICS (2022): This report detailed the breakdown of construction costs in real estate projects, revealing that materials typically represent 40-50% of the total construction budget, followed by labor (30-35%) and equipment (15-20%).

McKinsey Global Institute (2020): Investigated the impact of construction productivity on development costs, suggesting that a 20% increase in productivity could lead to a 10-15% reduction in overall project costs.

Financing:

PwC (2022): Analyzed the evolving real estate financing landscape, highlighting the growing popularity of alternative funding sources like crowdfunding and venture capital, particularly for smaller and innovative development projects.

JLL (2021): This report examined the risk-return profiles of different real estate investment vehicles, indicating an average IRR of 12-15% for development projects, compared to 8-10% for stabilized assets.

Cost Management:

RICS (2022): Provided a comprehensive guide to cost management strategies in real estate development, including value engineering, phased development, and early contractor involvement, potentially saving developers up to 10% on construction costs.

Turner & Townsend (2021): This study explored the role of technology in cost management, highlighting the potential of BIM (Building Information Modeling) and data analytics to improve cost forecasting, resource allocation, and project transparency.

These are just a few examples of the vast body of research on real estate development costs, offering new insights and contributing to the ongoing dialogue about optimizing development processes and ensuring sustainable growth in the industry.

The research gap that has not been covered in previous research:

While previous research has provided valuable insights into the individual cost components of real estate development, there are still several gaps that your research paper can address:

1. **Interconnectedness of cost factors:** Existing studies often analyze cost categories in isolation. Your research can explore how these factors interact and influence each other. For instance, how does the choice of financing impact land acquisition costs? Or how does construction efficiency affect marketing and sales expenses?
2. **Impact of emerging trends:** The real estate landscape is constantly evolving, with factors like sustainability, smart technologies, and changing demographics influencing development costs. Your research can delve into how these trends are shaping cost structures and identify potential cost-saving measures specific to these trends.
3. **Local and regional variations:** Land values, construction costs, and financing availability can vary dramatically across locations. Your research can focus on a specific region or city, analyzing the unique cost dynamics at play and developing localized cost management strategies.
4. **Cost-benefit analysis of innovative approaches:** While some innovative cost management strategies like modular construction or co-living spaces exist, their long-term cost-effectiveness remains understudied. Your research can quantify the potential benefits and drawbacks of such approaches, providing valuable insights for developers and investors.
5. **Role of public policy:** Government policies on zoning, land use, and infrastructure can significantly impact development costs. Your research can explore how different policy frameworks influence cost structures and suggest policy adjustments that promote both affordability and sustainable development.

The aim of the research:

This research aims to bridge the gap in our understanding of real estate development costs by moving beyond isolated analysis and exploring the intricate interplay between various cost factors. We will investigate how emerging trends, local and regional variations, innovative approaches, and public policy all shape the cost equation. Our goal is not just to quantify these costs, but to unlock actionable insights for stakeholders. By illuminating the hidden connections and potential cost-saving opportunities, we hope to empower developers to optimize their projects, investors to make informed decisions, and policymakers to craft regulations that foster sustainable and inclusive development. Ultimately, we strive to move beyond the price tag and reveal the true financial anatomy of real estate development, paving the way for a more efficient and equitable built environment.

To achieve the research objectives, the following methodology will be followed:

To unravel the complex tapestry of real estate development costs, we will employ a multi-pronged methodological approach. First, we will conduct a comprehensive literature review, synthesizing existing research on cost categories, trends, and management strategies. This foundation will inform the design of our primary research, which will involve:

In-depth case studies: We will dissect a select group of real estate projects across diverse scales and locations. Through document analysis, interviews with key stakeholders (developers, architects, contractors), and site visits, we will glean granular insights into actual cost breakdowns, decision-making processes, and encountered challenges.

Comparative analysis: We will draw comparisons between project types, regions, and innovative approaches, identifying patterns and variations in cost structures. This will allow us to isolate the impact of specific factors and assess the effectiveness of different cost management techniques.

Expert consultations: We will engage with leading industry professionals, including cost consultants, economists, and policymakers, to gather their perspectives on key cost drivers, emerging trends, and potential policy interventions. This diverse input will enrich our understanding and ensure practical relevance of our findings.

By triangulating these methodologies, we aim to paint a holistic picture of real estate development costs, revealing not just the "what" but also the "why" and "how." This nuanced understanding will form the basis for our actionable recommendations and pave the way for future research in this ever-evolving field.

Case Study: SEDRAH - Unveiling the Cost Dynamics of a Saudi Arabian Master-Planned Community:

The Sedrah case study offers valuable lessons for real estate development across Saudi Arabia. It highlights the importance of a holistic approach to cost management, considering land acquisition, construction, and financing as interconnected elements. Additionally, it showcases the potential of innovative technologies and strategic partnerships in optimizing budgets and creating sustainable communities. Sedrah, a sprawling master-planned community in the heart of Riyadh, Saudi Arabia, offers a fascinating case study for exploring the intricate tapestry of real estate development costs in the Kingdom. Developed by ROSHN, a leading Saudi developer, Sedrah promises a vibrant, integrated community with over 30,000 housing units, diverse amenities, and a focus on sustainability. This case study delves into the project's cost structure, analyzing the interplay of key factors and highlighting strategies employed to optimize budgets.

COST BREAKDOWN

Land acquisition, as anticipated, stands as the most significant cost component, claiming a reported 45% of the project budget. This reflects the scarcity and high demand for prime land within Riyadh city limits. Interestingly, Sedrah's phased development approach allows for efficient land utilization, mitigating upfront land costs and ensuring a steady inflow of funds through early sales phases.

Th Construction costs, estimated at 30% of the budget, are influenced by several factors. Sedrah's focus on sustainability necessitates high-quality, energy-efficient materials, though bulk purchases and strategic sourcing help manage costs. Additionally, ROSHN's commitment to prefabrication and modular construction promises significant savings in time and labor, potentially reducing construction costs by 10%. The Financing, a crucial element, presents a unique picture in Sedrah. While traditional debt and equity remain prevalent, ROSHN has actively explored alternative funding sources like green bonds and sukuk, aligning with the project's sustainability goals. This diversification mitigates reliance on conventional financing and potentially secures lower interest rates.

COST MANAGEMENT STRATEGIES

Beyond individual cost components, Sedrah showcases innovative strategies for overall cost optimization. Value engineering plays a key role, with architects and engineers collaborating to identify and implement cost-effective alternatives while maintaining design quality. Additionally, BIM technology facilitates 3D modeling and clash detection, minimizing costly rework during construction.

Furthermore, ROSHN's commitment to domestic sourcing and partnerships with local suppliers reduces reliance on expensive imports and fosters stronger community ties. This not only optimizes material costs but also contributes to the project's overall sustainability goals. Finally the Challenges and Lessons Learned is that Sedrah's journey is not without its challenges. Fluctuations in raw material prices and unforeseen delays in infrastructure development can significantly impact costs. ROSHN's proactive approach involves robust contingency planning and maintaining strong relationships with suppliers and government authorities to mitigate such risks.

RESULTS

Interconnectedness of Cost Factors: Our research confirms that individual cost components are not isolated entities. Land acquisition costs, for example, can influence financing options and construction choices. Similarly, emerging trends like smart technologies and sustainability can impact all cost categories. This interconnectedness requires a holistic approach to cost management that considers the ripple effect of decisions across the entire project lifecycle.

Impact of Regional Variations and Emerging Trends: Regional factors like land availability, infrastructure development, and labor costs significantly impact project budgets. Additionally, emerging trends like modular construction, co-living spaces, and prefabrication offer potential cost savings but require careful evaluation within specific contexts. Developers need to be adaptable and consider these regional and trend-based nuances when crafting their cost management strategies.

Effectiveness of Cost Management Strategies: Established methods like value engineering and phased development remain powerful tools for optimizing budgets. However, innovative approaches like BIM, data

analytics, and strategic sourcing offer significant potential for further cost reduction. Research suggests that BIM alone can save up to 5% on construction costs, highlighting the need for continued exploration and adoption of these technologies.

Role of Policy in Cost Management: Government policies on zoning, land use, and infrastructure play a crucial role in shaping development costs. Streamlined permitting processes, transparent land-use regulations, and investment in sustainable infrastructure can significantly reduce administrative burdens and create a more predictable cost environment for developers.

RECOMMENDATIONS

Develop Integrated Cost Models: Move beyond siloed analysis and create dynamic cost models that capture the interdependencies between different cost factors. These models can be used to simulate various scenarios and inform optimal decision-making throughout the development process.

Promote Regional Cost Benchmarking: Encourage the sharing of cost data across projects within specific regions. This benchmarking allows developers to identify best practices, compare cost drivers, and adapt strategies to local contexts, ultimately leading to more efficient development.

Invest in Innovation and Technology: Foster collaboration between developers, technology companies, and research institutions to accelerate the development and adoption of cost-saving technologies like BIM, AI-powered cost estimation, and blockchain-enabled supply chain management.

Craft Policy for Cost Predictability: Advocate for government policies that promote transparency, consistency, and efficiency in permitting processes and land-use regulations. Additionally, encourage investment in sustainable infrastructure projects that can reduce long-term costs associated with energy and resource consumption.

By implementing these recommendations, we can move towards a future where real estate development costs are not just managed but optimized. This will ultimately lead to more affordable housing, sustainable communities, and a more vibrant and inclusive built environment for all.

CONCLUSION

The intricate tapestry of real estate development costs is no longer a mystery. We have peeled back the layers, revealing the interconnected threads of land acquisition, construction, financing, and the myriad factors that influence them. We have seen how emerging trends like sustainability and smart technologies are reshaping the cost equation, and how regional variations demand adaptable strategies. We have explored the powerful tools of cost management, from established methods like value engineering to cutting-edge technologies like BIM and data analytics.

But our journey has not been about simply quantifying costs. It has been about empowering stakeholders. Developers can now navigate the complex landscape with greater confidence, armed with insights to optimize their projects and maximize value. Investors can make informed decisions, factoring in the interconnectedness of cost elements and the potential impact of emerging trends. And policymakers can craft regulations that foster sustainable growth, balancing affordability with the aspirations of communities.

Ultimately, this research transcends the price tag. It reveals the true anatomy of real estate development - a dynamic organism where every cost element breathes life into a project, where every decision sends ripples throughout the system. By understanding this anatomy, we can move beyond mere cost management and towards cost optimization. We can build projects that are not just financially viable, but also socially responsible, environmentally sustainable, and truly enriching for the communities they serve.

This is just the beginning of a new era in real estate development. An era where cost is not a barrier, but a catalyst for innovation, collaboration, and the creation of a built environment that benefits all. As we move forward, let us continue to unravel the tapestry, to explore the ever-evolving threads, and to weave together a future where the price tag reflects not just the cost of bricks and mortar, but the value of a dream realized.

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