JOURNAL OF TECHNOLOGY MANAGEMENT AND TECHNOPRENEURSHIP

Enhancing Productivity in Property Transfers through Big Data Analytics: A UAE Perspective

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Abstract

This study establishes the core principles that underpin the real estate sector and explores how Big Data Analytics (BDA) can enhance productivity and transparency in property transfer processes within the United Arab Emirates (UAE). The study adopts a qualitative conceptual approach, synthesizing secondary data from academic research, industry reports, and government publications. It highlights the evolving role of BDA in streamlining real estate transactions, reducing information asymmetry, and improving decision-making among investors, developers, and regulators. The paper concludes that BDA-driven insights can transform property transfer productivity through automation, predictive analytics, and enhanced transparency. Implications for policymakers, investors, and regulators are also discussed.

Keywords: Big Data Analytics, Data-Driven Decision Making, Digital Transformation, Property Management, Property Transfers.

1. Introduction

The real estate sector forms a vital part of national economies, shaping both urban development and employment. In the United Arab Emirates (UAE), robust economic growth has emerged from a deliberate move away from oil dependency toward a diversified economy—particularly in real estate and tourism. Rapid expansion in these areas has underscored the need for more efficient and transparent property transfer procedures. In Abu Dhabi, buyers have historically faced obstacles such as high brokerage fees and limited access to reliable pricing data. Additionally, between 2015 and 2020, Abu Dhabi sometimes lagged behind rival markets in the transparency of real estate transactions. These challenges demonstrate the urgent necessity for technological innovations that boost efficiency and openness in property dealings.

2. The Role of Big Data Analytics in Real Estate

Big Data Analytics (BDA) has emerged as a transformative force across various industries, including the global real estate market (Yang 2024). BDA, often combined with other advanced information technologies like the Internet of Things (IoT) and Artificial Intelligence (AI), offers significant potential to improve market forecasting accuracy and optimize investment decisions by increasing transparency (Yang 2024). The real estate industry is increasingly recognizing the importance of leveraging big data through new strategies for data preparation, analysis, and visualization to gain competitive advantages (Rave, Correa, and Echavarría 2019) (Kalambe et al. 2025). This analytical power allows for more precise estimations of future housing values, the identification of novel investment avenues, and a comprehensive understanding of how external factors, such as economic regulations or environmental shifts, influence real estate market dynamics. Moreover, BDA contributes to greater transparency by making data-driven insights accessible to all stakeholders, thereby fostering accountability and reducing information asymmetry in real estate transactions (Kalambe et al. 2025).

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3. Applications of Big Data Analytics in Property Transfers

BDA empowers various stakeholders in the real estate sector, including investors, developers, government officials, and city planners, to uncover trends, foresee market developments, evaluate property worth, and support strategic decision-making (Kalambe et al., 2025).

Key applications relevant to property transfers include:

3.1 Market Forecasting and Pricing

Big Data Analytics significantly enhances the accuracy of real estate price predictions (Kalambe et al., 2025). Traditionally, real estate prices in Abu Dhabi were largely influenced by demand and supply, with brokers often dominating price determination, which created a pricing gap and highlighted the urgent need for accurate forecasting (Marzooqi and Redouane, 2024). Machine learning models are important tools that predict real estate prices by analyzing various property characteristics and economic parameters that affect property price developments. For instance, machine learning concepts are specifically used to predict real estate prices in the Abu Dhabi region (Marzooqi and Redouane, 2024). In dynamic markets like Dubai, machine learning algorithms have emerged as powerful tools for precise predictions and informed decisions regarding property prices (Balila and Shabri, 2024). BDA leverages diverse, high-velocity data sources, including historical property transactions, demographic patterns, satellite imagery, social media sentiment, and economic indicators, to enable more precise forecasting of property values and market behavior (Kalambe et al., 2025). Traditional forecasting methods frequently struggle to cope with the scale, speed, and intricacy of today's evolving market landscape, making BDA an innovative alternative (Kalambe et al., 2025).

3.2 Competitive Intelligence

BDA is crucial for competitive intelligence processes within the real estate sector (AlBahsh and Hosseinian-Far, 2021). Evaluating the performance of competitive intelligence processes, particularly among local real estate developers in the UAE, involves utilizing big data sources and analytics to identify market dynamics and competitive landscapes (AlBahsh and Hosseinian-Far, 2021). This helps to address challenges such as information asymmetry and the lack of reliable data for price comparisons (AlBahsh and Hosseinian-Far, 2021; Kalambe et al., 2025). BDA offers descriptive analytics to understand market dynamics and competitor activities, alongside predictive insights for planning seasonal offers that better suit customer needs (AlBahsh and Hosseinian-Far, 2021). Utilizing big data also contributes to building enterprise early warning models for real estate, enabling accurate decisions based on rapidly changing market information and improving early warning mechanisms (樊, 2023).

3.3 Strategic Decision-Making

By providing comprehensive insights into market trends and property valuations, BDA empowers key participants, including investors, developers, government officials, and city planners—to make more informed strategic decisions in property transfers (Kalambe et al., 2025). BDA is transforming business operations by integrating data-driven insights into core decision-making strategies to maintain competitiveness (Cheryshenko and Pomernyuk, 2021). Through predictive algorithms, stakeholders can estimate future housing values, identify new investment possibilities, and analyze how external influences, such as economic regulations or environmental changes, affect real estate market behavior (Kalambe et al., 2025). This enhances investment strategies, reduces market uncertainties, and supports more informed urban planning strategies (Kalambe et al., 2025). Furthermore, a data analytics methodology integrating statistical and analytical methods can support real estate investment decisions (Abdulsalam et al., 2024). Predictive analytics, utilizing machine learning, is particularly effective in forecasting market trends, property valuations, and investment risks with a higher degree of accuracy than traditional methods (Mally, 2023).

3.4 Addressing Market Challenges

BDA can help mitigate the impact of market fluctuations by providing early warnings about market changes, enabling proactive responses (Nachiappan, 2024). Big data saves time and resources by offering real-time information on property prices, rents, and customer needs (Naeem et al., 2023). The technologies from the Fourth Industrial Revolution, including machine learning simulations, have the potential to minimize real estate investment risks (Osunsanmi et al., 2023). BDA fosters greater transparency in the real estate sector by making

data-driven insights accessible to all stakeholders, thereby fostering accountability (Kalambe et al., 2025). This enhanced transparency is particularly beneficial in preventing or mitigating market volatility (Kalambe et al., 2025). Furthermore, companies can strategically adapt to environmental challenges and market jolts by altering investment portfolios, effectively mitigating the impact of economic downturns and leveraging market improvements (Bodolica et al., 2017).

4. Enhancing Productivity in Property Transfers

Productivity in property transfers can be enhanced through BDA by:

- Streamlining Information Flow: Centralized and analyzed big data can provide all stakeholders with reliable, up-to-date information, reducing the time and effort spent on due diligence and price discovery (Marzooqi and Redouane 2024). This improved access to data directly contributes to the reduction of information asymmetry, fostering a more equitable and efficient market for all participants (Kalambe et al. 2025).
- Automating Valuation and Risk Assessment: Predictive models built on big data can automate property valuation and risk assessment, speeding up the approval and transfer processes. This automation not only accelerates transactions but also improves accuracy and consistency across diverse property portfolios (Janowski and Renigier-Biłozor 2024). Furthermore, the integration of artificial intelligence alongside big data enables automated property valuations and optimized pricing strategies, thereby uncovering new investment opportunities and streamlining realty management (Wu 2024).
- Improving Transparency: By making market data more accessible and understandable, BDA can improve transaction transparency, which has been a noted area for improvement in Abu Dhabi's real estate market (Marzooqi and Redouane 2024). This enhanced transparency fosters greater trust among market participants, which is crucial for a healthy and dynamic real estate sector, particularly in emerging markets where data access has historically been limited (Kalambe et al. 2025).
- Optimizing Resource Allocation: Government entities and developers can use BDA to understand demand patterns and allocate resources more efficiently for infrastructure and developmental projects, further supporting the growth of the real estate sector (Marzooqi and Redouane 2024). The adoption of smart city technologies, which integrate big data, GIS, BIM, and AI, further amplifies these benefits by creating digital twins and enabling automated building permits, thereby streamlining the entire development lifecycle (Al-Rimawi and Nadler 2025). This comprehensive integration across various technological platforms enhances decision-making and operational efficiency throughout the property transfer ecosystem.

5. Findings and Analysis

The application of Big Data Analytics in the real estate sector, particularly within the dynamic context of the United Arab Emirates, yields significant findings concerning enhanced productivity in property transfers. These enhancements manifest across various operational facets, from improved market understanding and valuation accuracy to streamlined processes and more informed decision-making for all stakeholders.

5.1. Enhanced Market Understanding and Predictive Power

One of the most significant impacts of Big Data Analytics is its capacity to offer a more comprehensive and precise understanding of the real estate market (Kalambe et al., 2025). Traditional forecasting methods, which often rely on historical data and a limited number of variables, frequently struggle to keep pace with the rapidly evolving dynamics of the market (Kalambe et al., 2025). This challenge is particularly evident in regions like the UAE, which have experienced substantial growth and fluctuations (Kalambe et al., 2025; Marzooqi and Redouane, 2024). Such conventional techniques, like regression analysis, often prove inadequate for forecasting real estate trends in modern conditions, especially in markets characterized by high uncertainty (Iftikhar, 2025; Nachiappan, 2024; Walacik and Chmielewska, 2024). They may also fail to capture the complex, non-linear relationships and temporal dependencies inherent in real estate data (Nachiappan, 2024).

BDA overcomes these limitations by integrating massive, diverse, and high-velocity data sources (Kalambe et al., 2025; Munawar et al., 2020). These include traditional structured data like property listings, transaction records, sales history, rental prices, ownership changes, and mortgage information (Baldominos et al., 2018; Kalambe et al., 2025; Yang, 2024). Additionally, BDA incorporates unstructured and multi-modal data such as demographic patterns, satellite imagery, social media sentiment, news articles, blogs, and economic indicators (Azizi and Rudnytskyi, 2022; Iftikhar, 2025; Kalambe et al., 2025; Naeem et al., 2023; Sáiz and Miranda, 2023a,

2023b; Taşçılar and Arslanlı, 2022). This rich integration of data sources allows for more precise forecasting of property values, market behavior, and potential investment opportunities (Kalambe et al., 2025).

Studies consistently demonstrate that machine learning algorithms, a core component of BDA, significantly enhance the accuracy of property valuation and market prediction (Al-Qawasmi, 2022; Choy and Ho, 2023; Jha et al., 2025; Mally, 2023). In contexts like Abu Dhabi, where unreliable information and a lack of authentic databases historically presented obstacles to accurate price comparisons and fair valuations, ML concepts have been successfully applied to analyze and forecast real estate transaction prices, thereby introducing greater market stability (Marzooqi and Redouane, 2024). Automated valuation models powered by ML can provide more accurate and reliable property assessments compared to traditional methods, which often struggle with the dynamic nature of real estate markets (Janowski and Renigier-Biłozor, 2024; Kok et al., 2017).

Models such as Random Forest have shown superior performance in predicting real estate prices compared to traditional statistical methods like support vector machines, decision trees, or linear regression (Chen and Si, 2024; Fourkiotis and Tsadiras, 2023; Gala et al., 2024; García et al., 2022; Ho et al., 2020; Jha et al., 2025; Kim and Hong, 2024; Mouna et al., 2023; Rampini and Cecconi, 2021; Rave et al., 2019). These advanced algorithms are adept at uncovering complex non-linear relationships and patterns within datasets that might be missed by conventional approaches (Iftikhar, 2025; Nachiappan, 2024; Walacik and Chmielewska, 2024). For instance, RF has proven more accurate in real estate valuation due to its ability to process complex variables and reduce overfitting (Jafary et al., 2022; Jha et al., 2025). This enhanced predictive power, whether through RF, gradient boosting machines, or neural networks, minimizes uncertainty for investors, developers, and policymakers, facilitating more strategic and timely decision-making (Balila and Shabri, 2024; Deppner et al., 2023; Kalambe et al., 2025; Mally, 2023; Wu, 2024; Yang, 2024). By providing these stakeholders with accurate insights into future housing values, investment possibilities, and the impact of external influences, BDA helps optimize investment strategies and supports informed urban planning initiatives (Kalambe et al., 2025; Wu, 2024).

5.2. Streamlined Property Transfer Processes and Operational Efficiency

BDA contributes directly to streamlining property transfer processes by automating data-intensive tasks and providing actionable insights that reduce manual effort and potential errors. By leveraging diverse data sources and sophisticated analytical techniques, the entire property transfer lifecycle, from initial listing to final registration, can become more efficient.

- Reduced Processing Time: The application of BDA can significantly shorten the time required for various stages of property transfer. Automated valuation models, for example, can provide rapid and accurate property assessments, circumventing the delays associated with manual appraisals (Saull et al., 2020). Digital technologies, including BDA, have the potential to make transactions faster and cheaper by optimizing steps and reducing friction points in the process (Saull et al., 2020).

- Optimized Resource Allocation: Data-driven insights allow real estate firms to optimize property pricing based on demand forecasts, ensuring competitive pricing and maximizing profitability (Nachiappan, 2024). This enables more targeted marketing efforts and helps align property offerings with specific customer needs, leading to increased sales likelihood (Nachiappan, 2024). Predictive analytics also provides early warnings about market changes, enabling proactive responses and more efficient resource deployment (Nachiappan, 2024).

- Improved Transparency and Reduced Information Asymmetry: BDA fosters greater transparency in the real estate sector by making data-driven insights more accessible to all stakeholders, including homebuyers, local governments, and developers (Kalambe et al., 2025). This democratization of data reduces information asymmetry, promotes accountability, and supports more equitable and efficient real estate markets (Gholipour et al., 2020; Ionascu, 2019; Kalambe et al., 2025). The shift towards a more transparent market, especially critical in regions historically characterized by less regulated practices (Marzooqi and Redouane, 2024), benefits all participants by reducing ambiguities and building trust.

5.3. Enhanced Decision-Making and Strategic Insights

Big Data Analytics empowers all participants in the real estate ecosystem—investors, developers, government officials, and city planners—to make more informed, data-driven decisions by uncovering trends, foreseeing market developments, and evaluating property worth (Kalambe et al., 2025). This ability to extract actionable insights from massive and diverse data sources, using advanced analytical techniques like machine learning, improves decision-making processes across the industry (Cheryshenko and Pomernyuk, 2021; Delisle et al., 2020; Kalambe et al., 2025; Wu, 2024). This capability extends beyond merely pricing and market forecasting

to encompass strategic planning and competitive intelligence (Kalambe et al., 2025; Sáiz and Miranda, 2023a, 2023b).

- Investment Decision-Making: By leveraging predictive algorithms, BDA estimates future housing values, spots new investment possibilities, and helps identify optimal investment opportunities (Guo, 2023; Kalambe et al., 2025; Yang, 2024). It further enables stakeholders to analyze how external influences, such as economic regulations or environmental changes, affect real estate market behavior, thereby reducing market uncertainties and enhancing investment strategies (Kalambe et al., 2025). Predictive analytics, powered by machine learning, is particularly effective in forecasting market trends, property valuations, and investment risks with a higher degree of accuracy than traditional methods (Mally, 2023).
- Urban Planning and Sustainable Development: BDA plays a crucial role in promoting long-term, sustainable urban development by supporting informed urban planning strategies (Kalambe et al., 2025; Neves et al., 2024). It helps identify patterns related to energy usage, environmental impact, and the long-term viability of real estate projects (Kalambe et al., 2025). Integrating environmental data with economic and demographic indicators allows decision-makers to prioritize green development, assess climate risks, and design smart infrastructure aligned with sustainable urban growth principles, fostering smarter, more sustainable, and adaptable real estate ecosystems (Bibri et al., 2023; Bibri and Krogstie, 2020; Kalambe et al., 2025). City management is encouraged to invest in big data and geodata for smart infrastructure development (Al-Rimawi and Nadler, 2025), and geospatial analytics offers valuable insights into market trends and property values for urban planners (Gupta, 2024).
- Competitive Intelligence: In the UAE, BDA has significantly influenced competitive intelligence for real estate developers (AlBahsh and Hosseinian-Far, 2021). It improves forecasting, dynamically detects competitors' activities, and supports accurate decision-making (AlBahsh and Hosseinian-Far, 2021). BDA provides descriptive analytics to understand market dynamics and competitors' activities, as well as predictive insights for planning seasonal offers that best suit customers (AlBahsh and Hosseinian-Far, 2021). This leads to a shorter, more efficient competitive intelligence process, allowing for quicker adaptation to market changes and positioning companies to be more proactive and future-promising (AlBahsh and Hosseinian-Far, 2021; Lv, 2022). Real estate developers can also use BDA for market analysis to significantly impact acquisition and conception phases (Al-Rimawi and Nadler, 2025).

6. Implications

The findings presented highlight several crucial implications for key stakeholders within the UAE real estate sector, underscoring how Big Data Analytics can significantly enhance productivity and transparency in property transfers.

- For Policymakers and Real Estate Regulators: The transformative potential of BDA necessitates a proactive regulatory approach to ensure trust and fair practices. Policymakers should consider developing clear legal and ethical guidelines for data collection, usage, and privacy in real estate transactions to mitigate risks and foster confidence (Chang, 2021; Gorian and Osman, 2024; Kalambe et al., 2025; Ogungbemi, 2024). Investment in national data infrastructure and open data initiatives can accelerate BDA adoption, thereby enhancing market transparency and efficiency, an area identified for improvement in Abu Dhabi's real estate market (Ekundayo and Isaac, 2023; Kalambe et al., 2025; Neves et al., 2024; Salem, 2016). Regulations should also encourage the **standardization of data formats** across various entities to facilitate seamless integration and analysis, fostering a more equitable and efficient real estate ecosystem through the reduction of information asymmetry and promotion of accountability. This is crucial for integrating diverse regulatory data into structured formats, overcoming fragmented information and siloed tools (Grišiūtė et al., 2025; Smith, 2005). The ability to effectively manage and share geospatial and other property data, often enabled by Spatial Data Infrastructures, supports effective governance (Smith, 2005). Such standardization, alongside quality data, contributes to a transparent market operating within a consistent legal and regulatory framework, leading to improved policies and efficient building processes (Gholipour et al., 2023, 2020; Kalambe et al., 2025; Walacik and Chmielewska, 2024). BDA empowers government officials and city planners to make more informed, data-driven decisions and to optimize resource allocation for infrastructure and developmental projects (Al-Rimawi and Nadler, 2025; Kalambe et al., 2025). This also includes supporting informed urban planning strategies and prioritizing green development initiatives by integrating environmental data with economic and demographic indicators (Kalambe et al., 2025).
- For Investors: BDA offers significantly enhanced predictive capabilities and competitive intelligence, providing a strategic advantage (Abdulsalam et al., 2024; Kalambe et al., 2025; Naeem et al., 2023). Investors

should prioritize integrating BDA tools into their due diligence and decision-making processes to identify optimal investment opportunities, accurately assess property valuations, and mitigate risks associated with market fluctuations (Balila and Shabri, 2024; Kalambe et al., 2025; Yang, 2024). Leveraging BDA allows for a deeper understanding of market trends and external influencing factors, enabling more strategic and timely portfolio adjustments and the identification of novel investment avenues (Abdulsalam et al., 2024; Kalambe et al., 2025). Machine learning algorithms, a core component of BDA, can provide more precise estimations of future housing values and more accurate property valuation, reducing uncertainty for investors (Al-Qawasmi, 2022; Balila and Shabri, 2024; Marzooqi and Redouane, 2024).

- For Developers: BDA offers crucial tools to optimize resource allocation, refine market forecasting, and enhance project viability (Al-Rimawi and Nadler, 2025; Kalambe et al., 2025). Developers can utilize BDA to gain insights into demand patterns, tailor projects to investor preferences, and streamline internal processes from planning to sales (Al-Rimawi and Nadler, 2025; Kalambe et al., 2025). By embracing automated valuation and risk assessment through predictive models, developers can accelerate transactions, ensure competitive pricing, and optimize property pricing based on demand forecasts, ultimately reducing information asymmetry and fostering greater accountability in the market (Kalambe et al., 2025; Walacik and Chmielewska, 2024; Yang, 2024). BDA also improves competitive intelligence by providing descriptive analytics to understand market dynamics and predictive insights for strategic planning, leading to quicker adaptation to market changes (Al-Rimawi and Nadler, 2025; Yang, 2024).

7. Conclusion

The application of Big Data Analytics holds immense promises for revolutionizing property transfers in the UAE, particularly within the dynamic real estate market of Abu Dhabi. By leveraging BDA for enhanced market forecasting, competitive intelligence, and strategic decision-making, stakeholders can overcome existing challenges related to transparency and information asymmetry. This technological integration is essential for fostering a more productive, efficient, and transparent property transfer ecosystem, aligning with the UAE's vision of becoming a non-oil economic powerhouse.

In summary, the findings underscore that BDA is not merely a technological enhancement but a transformative force within the real estate sector, driving significant productivity gains across valuation, operational efficiency, market transparency, and strategic decision-making, particularly benefiting the evolving real estate landscape of the UAE.

8. Limitations and Future Research Directions

This paper has explored the transformative potential of Big Data Analytics in enhancing productivity and transparency within real estate transfer processes, particularly within the context of the UAE. While providing a comprehensive synthesis of existing knowledge and potential applications, it is essential to acknowledge certain limitations of this conceptual approach and identify promising avenues for future research.

Limitations

A primary limitation of this study stems from its **conceptual nature and reliance on secondary data**. As a synthesis of existing research and theoretical frameworks, this paper does not present new empirical data or case studies. This approach, while providing a broad overview, inherently restricts the ability to validate the practical implementation challenges and specific impacts of BDA solutions in real-world property transfer scenarios (Selman et al., 2021a, 2021b). The absence of databases compiled during real estate market analysis also raises questions about the integrity and validity of evaluation appraisals in some contexts (Osennyaya et al., 2021).

Furthermore, research in this domain often encounters significant challenges related to **data availability and quality**. Acquiring, managing, cleaning, and preparing large datasets can be arduous, particularly due to the often unstandardized and insufficiently labeled nature of real estate data (Krause and Lipscomb, 2016). Accessing proprietary data sources, which are crucial for robust analysis, frequently poses a hindrance to research replicability and study robustness (Mathotaarachchi et al., 2024). Moreover, existing models sometimes struggle to fully capture dynamic external factors such as economic shifts, government policies, and societal changes, thereby limiting their predictive accuracy (Nachiappan, 2024). Studies also tend to focus on national or regional market trends rather than granular, individual asset-level insights, which can diminish predictive accuracy for specific properties (Iftikhar, 2025).

Another important limitation is the **generalizability of findings**. Many studies are conducted within specific geographic contexts, and their results may not be directly transferable or applicable to diverse real estate markets without further investigation (Chen and Biljecki, 2022; Mathotaarachchi et al., 2024). The "black-box" nature of

some advanced machine learning models, such as neural networks, presents an additional challenge. While these models can yield highly accurate predictions, interpreting the specific factors driving those predictions can be difficult, making it challenging for real estate professionals to fully understand and act on the insights generated (Mathotaarachchi et al., 2024; Nachiappan, 2024).

Future Research Directions

Addressing the identified limitations opens several critical avenues for future research that can advance the understanding and application of BDA in the real estate sector. Future studies should prioritize empirical and case-based investigations that examine actual adoption rates, implementation challenges, and measurable outcomes of BDA within real estate organizations and government agencies, providing practical validation and real-world insights. In parallel, quantitative analyses are needed to assess the tangible impact of BDA on mitigating market challenges such as information asymmetry, pricing opaqueness, and transaction costs, particularly in markets such as Abu Dhabi. Researchers should also work toward establishing robust regulatory structures tailored to data collection, usage, and privacy, drawing on international best practices and proposing mechanisms to standardize data formats across diverse entities to address fragmented information (Mathotaarachchi et al., 2024). Further opportunities lie in integrating advanced technologies and diverse data sources—such as sensor networks, satellite imagery, and social media sentiment—with sophisticated machine learning algorithms, including deep learning, reinforcement learning, Recurrent Neural Networks, and Long Short-Term Memory networks, alongside hybrid approaches that combine ML with traditional econometric models to enhance predictive accuracy (Gala et al., 2024; Kalambe et al., 2025; Nachiappan, 2024; Mathotaarachchi et al., 2024). Enhancing the interpretability and explainability of complex ML models is also essential to increase trust and facilitate professional adoption (Mathotaarachchi et al., 2024; Nachiappan, 2024). Moreover, investigating the synergistic effects between BDA and complementary technologies—such as IoT, AI, GIS, and BIM—could lead to more advanced predictive systems, automation capabilities, and smart city infrastructure solutions. Comparative and cross-market analyses would further improve generalizability by evaluating how BDA applications perform across emerging and developed real estate markets. Finally, additional research is needed to address big data management challenges by identifying effective tools and methods for handling data complexities and developing user-friendly analytical solutions that support broader adoption of advanced predictive modeling techniques (Munawar et al., 2020; Mathotaarachchi et al., 2024).

By systematically addressing these limitations and pursuing the suggested research directions, the academic community can significantly enrich the understanding of BDA's multifaceted role in the real estate sector, fostering more robust, transparent, and efficient property markets worldwide.

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