

Linkages of Real Estate Regulations and Intermediaries with Transparencies in Blockchain Application

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Abstract

This study measures the relationship of real estate regulations and role of intermediaries with transparencies in Blockchain application for better real estate transactions. Blockchain application is essential to enhance the transparencies in the real estate transaction. The study is divided into two objectives: the first is to examine the strength and direction of the variable's relationship. The second is to assess impact of the Real Estate Regulations and the Role of Intermediaries on Transparency and determine the extent to which these factors explain variations in Transparency. Thus, the research conducted a survey with data collected from 105 respondents with purposive sampling through a developed literature study. This data was analyzed using the Correlation Analysis by Spearman's Rho and, and Regression analysis to achieve the study's objectives. The study found that all relationships are positive and statistically significant and impact of Real Estate regulations is stronger on Transparency than Role of Intermediaries.

Keywords: Real Estate, Transparency, Blockchain Technology, Fraud

Introduction

In recent years, there has been a surge of interest in blockchain adoption in the real estate business, with prospective benefits such as increased security, efficiency, and transparency. While blockchain implementations are still in their early stages, numerous organizations have shown considerable improvements in transaction times, prices, and data accuracy (Yang, 2024). The system has potential for land administration, property transactions, tokenization, and real estate management (Saari et al., 2022). However, empirical evidence indicates that blockchain adoption is mostly taking place in smaller-scale, hybrid contexts rather than as a disruptive force (Saari et al., 2022). Psychological factors outweigh technological ones in determining blockchain acceptability among real estate purchasers and sellers (Yeoh et al.,

2024). Despite its potential, widespread adoption faces challenges such as technical limitations, regulatory issues, and data privacy concerns (Yang, 2024). Successful implementation requires political will, regulatory frameworks, reliable digital data, and public-private partnerships (Saari et al., 2022).

By improving security, efficiency, and transparency, blockchain technology has the potential to completely transform real estate transactions. According to studies, blockchain-based platforms can lower transaction times by 32.4% and expenses by 27.8% (Yang, 2024). The technology's decentralization, immutability, and smart contract capabilities address long-standing difficulties in property management, including as fraud and lack of transparency (Kaur, 2024). Blockchain-based regulatory technology (RegTech) has the potential to improve the efficiency, accuracy, and cost-effectiveness of real estate transactions, particularly mortgage applications (Chao et al., 2022). Blockchain implementation in real estate can boost record management efficiency by 45.6% while increasing data accuracy to 98.9% (Yang, 2024). However, widespread adoption confronts obstacles such as technical constraints, regulatory issues, and data privacy concerns (Yang, 2024).

This study aims to measure the relationship of real estate regulations and role of intermediaries in transparency of blockchain adoption. By examining which variables have significant impact on transparencies could help decision makers to layout the best strategy in the blockchain utilisation in real estate industry in the future. This insight may inform policymaking, stakeholders, and the real estate market, ensuring that blockchain technology meets customer expectations.

Real Estate Regulations

Real estate regulations and openness are critical components in property transactions. Digitalization facilitates transparency, which increases the communication of sustainability information and stakeholder connections (Ionaşcu & Anghel, 2020). Despite improved access to listing information, realtor experience is still useful in attaining attractive sale prices through higher quality listings (Gay & Zhang, 2014). Market transparency has greatly increased in European real estate markets, making it a critical component in investment and occupancy decisions (Newell 2015).

Blockchain technology offers significant potential for improving real estate transactions and processes. Studies indicate that blockchain can enhance transparency, security, and cost-efficiency in property transactions (Hoxha and Sadiku, 2019; Saari et al., 2022). The technology's adoption in real estate is still in its early stages, with land administration and property transactions being the primary focus areas (Saari et al., 2022). Psychological factors, rather than technological ones, play a crucial role in blockchain acceptance among real estate buyers and sellers (Yeoh et al., 2023). The implementation of blockchain in real estate can lead to increased trust between parties, reduced intermediary involvement, and improved transaction tracking (Veuger, 2017; Hoxha and Sadiku, 2019). However, the relationship between blockchain and real estate has yet to be fully proven in practice, and further research is needed to explore its potential impacts on various real estate subsectors (Veuger, 2017; Saari et al., 2022).

Legal frameworks play a crucial role in facilitating blockchain adoption across industries. In one example of freight logistic, the Government policies and support are among the top factors influencing blockchain implementation (Orji et al., 2020). A comprehensive legal framework can help govern blockchain innovation, with technical code potentially having similar effects as legal code (Pu & Lam, 2021). However, the adoption of blockchain technology raises significant legal and regulatory challenges, including issues of enforceability, jurisdiction, data privacy, and security (Szabo et al., 2024). To address these challenges, organizations need to consider a broad range of factors beyond just technical aspects, including institutional and market factors (Janssen et al., 2020). Developing a robust legal framework that supports responsible blockchain use is essential for its successful adoption across industries (Szabo et al., 2024). This multifaceted approach to legal considerations can help organizations and governments navigate the complexities of blockchain implementation and seize emerging opportunities.

Role of Intermediaries

Intermediaries play a significant role in enhancing transparency and efficiency in real estate transactions. They reduce transaction costs, facilitate information flow, and decrease search time for buyers and sellers (Dilek, 2014). In emerging markets like Warsaw, international real estate consultants act as crucial intermediaries, transferring global knowledge and implementing transparent structures (Bitterer & Heeg, 2012). Internet-based real estate platforms have shown advantages in information symmetry and transparency, leading to reduced price increases and transaction fluctuations compared to traditional intermediaries (Zhang et al., 2019). However, intermediaries in China's REIT market face challenges in professionalism, information disclosure, due diligence, and cash flow collection, highlighting the need for improved regulation and risk prevention (Xu et al., 2021). Overall, intermediaries are essential in bridging information gaps and facilitating transactions in real estate markets, though their effectiveness may vary across different contexts and platforms.

In several sectors, the role of intermediaries is changing as a result of blockchain technology. While some claim that blockchain will replace intermediaries by lowering transaction costs and increasing trust (Gomez et al., 2019; Schenk et al., 2020), others believe that intermediaries will adapt and change with blockchain adoption (Tseng & Shang, 2021; Chiu & Shang, 2019). Blockchain may handle complicated difficulties in global value chains, possibly increasing operational efficiency and redefining intermediate duties. However, intermediaries may still be required in some ecosystems, maybe moving into new roles or developing unique business models (Chiu & Shang, 2019). The technology itself may serve as a new form of middleman, moving trust from humans to computer code (Gomez et al., 2019). In the context of open innovation, blockchain could significantly reduce opportunistic behavior and associated transaction costs, but may not entirely replace the matchmaking and resource-provision roles of intermediaries (Schenk et al., 2020).

Transparencies

Over the last several decades, the real estate industry's transparency has improved significantly, notably in European markets (Schulte et al., 2005; Newell, 2015). Transparency is critical for market efficiency, since it facilitates decision-making and coordinates stakeholder actions (Ionaşcu, 2019). Sustainability reporting, connection with global sustainable development goals, and technology improvements are all factors that contribute

to improved openness. Research indicates substantial links between real estate market transparency and the institutional environment, macroeconomic issues, technology, innovation, and social environment (Ionaşcu et al., 2019). The most competitive and economically successful countries typically have the most transparent and mature real estate markets (Ionaşcu et al., 2019). Transparency in emerging and developing nations requires effective governance and an absence of corruption (Ionaşcu et al., 2019). Improved transparency is viewed as a key factor in strategic real estate investment and occupancy decision-making for institutional investors and occupiers (Newell, 2015).

Research indicates that transparency in real estate markets significantly impacts market dynamics and foreign investments. Lack of transparency can limit risk-sharing and increase house price volatility, as opaque markets enable insurance opportunities and reduce volatility (Pavlov et al., 2016). However, opaque competitive equilibrium is unstable, with lenders incentivized to switch to transparent lending after regional income shocks (Pavlov et al., 2016). Market transparency, characterized by easy access to credible data on supply, demand, prices, and transactions, influences investment decisions and risk levels (Czechowska, 2013). Increased transparency is associated with greater capital investment in information and communication technology (ICT) and ICT trade, particularly in emerging economies (Gholipour et al., 2023). Additionally, real estate market transparency is higher in countries with fewer restrictions on foreign real estate investment, stronger corruption controls, and common law traditions (Gholipour et al., 2023). These findings underscore the complex relationship between transparency and real estate market stability.

Research Methodologies

The goal of this study is to assess the linkages between real estate regulations and the role of intermediaries with transparency in Blockchain applications. This study employs a quantitative approach by providing a questionnaire survey to 105 respondents. Purposive sampling is employed, with a focus on real estate stakeholders such as real estate valuers, real estate agents, mortgage bankers, and conveyancing attorneys. The data collected has been screened and is available for analysis. The analysis that must be performed in order to accomplish categorization is divided into two phases: correlation analysis on the variables and investigation of the influence of Real Estate Regulations and the role of intermediaries in transparency and regression analysis. For the first step; the correlation analysis will be use and the step need to be follow as shown in Figure 1.



Figure 1. Process of assessing the Correlation analysis using Spearman's ρ

The impetus of using Correlation analysis follows because of this statistical analysis is easy and yet provide rich information (Senthilnathan, 2019). After the done creating the result using the Correlation analysis, next step will used Regression analysis developed. Before testing the Regression analysis, it is important to check multicollinearity issues using Variance Inflation Factor (VIF) (Midi et al, 2020). The step to produce a Regression analysis is in Figure 2. Regression analysis is a strong statistical approach used in clinical research and social

sciences to model variable interactions (Rosenthal, 2017). It is useful for both prediction and explanation, allowing researchers to analyze the impact of one or more independent factors on a dependent variable (Mishra et al, 2019; Rosenthal, 2017). The advantage of Regression analysis is to study the impact of the variables towards the transparencies.

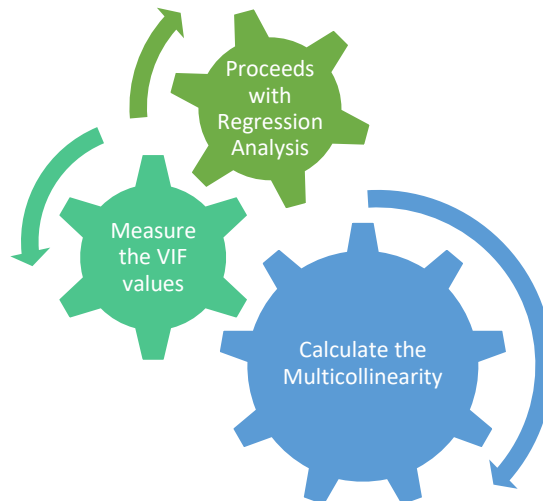


Figure 2. Process of Regression analysis

Discussion

After a thorough step of calculation, the study discussed the findings gain from both data analysis. In this paper, 105 respondents have been collected and the analysis divided into two phases. First, this paper employed Correlation analysis to view the direction and relationship between the variables. The questionnaire using Likert’s scale and the best methodology to measure the relationship is using Correlation analysis by Spearman’s Rho. The correlation analysis was conducted in Excel where manual calculation is needed to gain the results. The key point to access the calculation is via Rank Average (RANK.AVG) function in the excel. The results of the correlation shown in Table 1.

Table 1

The results from Correlation analysis- Spearman’s Rho

Variables	RER x ROI
Coefficient (r_s)	0.7174
N	105
T-statistics	10.4507
p-value	0.000
Variables	ROI x TRANS
Coefficient (r_s)	0.6551
N	105
T-statistics	8.7998
p-value	0.000
Variables	RER x TRANS
Coefficient (r_s)	0.7053
N	105
T-statistics	10.0999
p-value	0.000

The value above showing the relationship between RER x ROI have a strong positive correlation ($r = 0.717$) between Real Estate Regulations and Role of Intermediaries. The p -value < 0.05 which suggest the correlation is statistically significant. The relationship between ROI x TRANS showing a moderate strong positive correlation ($r = 0.655$) between Role of Intermediaries and Transparency. The p -value < 0.05 showcase the relationship is statistically significant. The strong positive correlation ($r = 0.705$) presents between Real estate regulations and Transparency. The p -value < 0.05 suggest that the correlation is statistically significant.

The numbers shows that all relationship is positive and statistically significant ($p < 0.05$), while the strongest correlation exist between RER x ROI ($r = 0.717$). Both RER and ROI contribute to Transparency but the analysis suggest that RER has a slightly stronger direct link than ROI.

Then, Multicollinearity test is recommended before starting with the Regression analysis. Multicollinearity occurs when independent variables in a regression model are highly correlated, making it difficult to determine their individual effects. The common test to check for multicollinearity is using Variance Inflation factor (VIF). The formula for VIF is below:

$$VIF = 1/(1 - r^2)$$

The interpretation of VIF results as follows:

Table 2

VIF Value	Interpretation
VIF < 5	No multicollinearity problem
VIF > 5	Moderate multicollinearity (consider checking further)
VIF > 10	High multicollinearity (serious issue and need to revise model)

The results gain for multicollinearity test is in Table 3.

Table 3

VIF values

	VIF Value
RER	2.736
ROI	1.922
TRANS	2.377

Next, since the all VIF values are below 5, multicollinearity is not the concern in the regression model. This means that Real Estate Regulations and Role of Intermediaries are independently contributing to Transparency without excessive correlation affecting their estimate. Next, the study runs the regression analysis to gain the model fit as per Table 4. Based on the model fit, the model explains a significant proportion (57.9%) of the variability in Transparency.

Table 4

Model fit

Metric	Value	Interpretation
Multiple R	0.761	Strong positive correlation between predictors and Transparency
R-square	0.579	57.9% of the variation in Transparency is explained by the independent variables
Adjusted R-square	0.571	Adjusted for the number of predictors; still strong
Standard error	0.458	Average error in predicted Transparency scores

Next, the study interprets the ANOVA (Model Significance Test) as per Table 5. The F-statistics (70.25, $p < 0.0001$) shows that the model is highly significant and the significance F ($6.59E-20$) < 0.05 suggest that at least one predictor significantly explains Transparency.

Table 5

ANOVA (Model Significance Test)

Source	df	SS	MS	F	Significance F
Regression	2	29.53	14.76	70.25	6.59×10^{-20}
Residual	102	21.44	0.210		
Total	104	50.97			

Then, we calculate the coefficients where predictors influence on Transparency. Refer to Table 6, the intercept showing the score of 0.959 where when X1 and X2 are zero, the Transparency is predicted to be 0.959. The RER shows (0.601, $p < 0.0001$) which A 1-point increase in X1 increases Transparency by 0.601 points which contributes to highly significant. The ROI (0.154, $p = 0.0277$) show that A 1-point increase in X2 increases Transparency by 0.154 points which is still significant but weaker in effect. The model is highly reliable where ($p < 0.0001$) and findings can guide policy or business strategy. The equation for the regression analysis was stated as below:

$$Y = 0.959 + (0.601 \times X1) + (0.154 \times X2)$$

Table 6

Coefficients

Variable	Coefficient	Std. error	t-statistics	P-value	95% Confidence Interval
Intercept	0.959	0.274	3.50	0.0007	(0.415, 1.502)
Real Estate regulations	0.601	0.085	7.09	1.77E-10	(0.433, 0769)
Role of Intermediaries	0.154	0.069	2.23	0.0277	(0.017,0.291)

Conclusion

The application of findings in this study would be useful to stakeholders in real estate industry especially policy makers and authority which this study provides empirical evidence of the relationship and impacts on the Transparency in Blockchain application. The objective of this research has been achieved by measuring the direction and the impact of the predictor towards the dependent variable. From the findings, the study suggests that when Real estate

regulations factors improve, the Role of Intermediaries also tends to improve. Then, if the responsibility of Role of Intermediaries were higher will also resulted greater Transparency. The study also suggest that a better real estate regulations environment is strongly associated with higher Transparency levels. Both of the analysis shows Real estate regulations has a stronger impact on Transparency than the Role of Intermediaries. However, the intermediaries do hold significant impact on transparency but the role is smaller. In the real time scenarios, this study suggests that, improvement on Real estate guideline, rules and regulations do play greater impact on the transparency on blockchain application. The blockchain application able to increase transparency in real estate transaction but need the help from better real estate guidelines and rules which provide better environment on the real estate market. This priority needs to take measure and followed by the role of intermediaries to execute the upbringing.

This study makes a significant theoretical contribution by integrating real estate regulations, intermediary roles, and blockchain transparency into cohesive analytical framework. It enhances existing literature by empirical validation of blockchain in real estate transparency. While previous studies highlight blockchain's potential in reducing fraud and inefficiencies (Yang, 2024; Kaur, 2024). This study provides statistical validation of blockchain's impact on transparency through real estate regulations and intermediaries, reinforcing the theoretical foundations of blockchain's role in governance and trust enhancement. By demonstrating that real estate regulations have a stronger impact on transparency than intermediaries, the study supports Regulatory and Institutional Theories (Newell, 2015; Szabo et al., 2024). This study validates the argument that regulatory frameworks are essential for blockchain implementation and adoption in structured industries. Furthermore, this study empirically confirms that intermediaries still play a significant, though lesser, role in transparency. This aligns with Innovation Diffusion Theory, suggesting that rather than displacement, intermediaries are adapting to blockchain-enabled markets (Tseng and Shang, 2021). Prior studies link market transparency with institutional quality (Pavlov et al., 2016; Gholipour et al., 2023). This research contributes by quantifying transparency improvements through blockchain, offering a theoretical bridge between Transparency Theories and Technological Adoption Models in real estate.

For contextual contribution, the study provides evidence-based insights for policymakers, suggesting that strengthening real estate regulations is the most effective pathway to achieving blockchain transparency. This directly informs Malaysia's real estate governance and digital transformation strategies. Real estate professionals, including valuers, agents and mortgage bankers, benefit from an understanding of blockchain's impact on transparency. The study identifies intermediaries' evolving roles, guiding their adaptation in an increasingly digital market. Most blockchain studies focus on developed markets (e.g. European real estate; Newell, 2015). This study extends blockchain research into an emerging market, Malaysia, offering contextual insights on regulatory dynamics and market transparency in such economies. The findings guide strategic blockchain implementation by showing that regulatory improvements have a more profound impact on transparency than intermediary involvement. This supports a top-down approach, where governments and regulatory bodies play a primary role in blockchain success in real estate. The study advances theoretical frameworks on blockchain transparency, regulation and intermediary adaptation while providing contextual insights relevant to policymakers and industry stakeholders. By

empirically demonstrating the link between regulations, intermediaries and blockchain transparency, it serves as a foundation for future research on blockchain's role in real estate digitalization.

References

- Chao, R. R., Liu, J. K., & Su, K. (2022). Blockchain-based regulatory technology deployment for real estate transactions. *International Conference on Network and System Security*.
- Chiu, S., & Shang, S. S. (2019). Can blockchain really remove all intermediaries? A multiple-case study in different industries. *Integrated Spatial Databases*.
- Czechowska, K. (2013). Level of foreign direct investments and transparency of Polish and global real estate market. *Real Estate Management and Valuation*, 21(2), 22–28.
- Gholipour, H. F., Arjomandi, A., Andargoli, A. E., & Bennett, R. M. (2023). On real estate market transparency: The relationship with ICT trade and investment. *Land Use Policy*.
- Gomez, M., Bustamante, P., Weiss, M. B., Murtazashvili, I., Madison, M. J., Law, W., ... & Krishnamurthy, P. (2019, July). Is blockchain the next step in the evolution chain of [market] intermediaries? In *TPRC47: The 47th Research Conference on Communication, Information and Internet Policy*.
- Hoxha, V., & Sadiku, S. (2019). Study of factors influencing the decision to adopt blockchain technology in real estate transactions in Kosovo. *Property Management*.
- Ionaşcu, E. (2019). Towards more transparency in the real estate sector through sustainability reporting. *26th Annual European Real Estate Society Conference*.
- Ionaşcu, E., & Anghel, I. (2020). Improvement of real estate transparency through digitalisation. *Proceedings of the International Conference on Business Excellence*, 14, 371–384. <https://doi.org/10.2478/picbe-2020-0036>
- Janssen, M., Weerakkody, V., Ismagilova, E., Sivarajah, U., & Irani, Z. (2020). A framework for analysing blockchain technology adoption: Integrating institutional, market and technical factors. *International Journal of Information Management*, 50, 302–309.
- Kaur, R. (2024). A new era of property management: The blockchain revolution in real estate transactions enhancing transparency, efficiency, and security in real estate. *International Journal of Innovative Science and Research Technology*, 901–904. <https://doi.org/10.38124/ijisrt/IJSRT24JUL1234>
- Midi, H., Sarkar, S. K., & Rana, S. (2010). Collinearity diagnostics of binary logistic regression model. *Journal of Interdisciplinary Mathematics*, 13(3), 253–267. <https://doi.org/10.1080/09720502.2010.10700699>
- Mishra, I., Bandyopadhyay, R., Ghosh, S., & Swetapadma, A. (2019). Analysis of cutting-edge regression algorithms used for data analysis. *Advances in Data Mining and Database Management*.
- Newell, G. (2015). The changing real estate market transparency in the European real estate markets. *Journal of Property Investment & Finance*, 34, 407–420.
- Orji, I. J., Kusi-Sarpong, S., Huang, S., & Vazquez-Brust, D. A. (2020). Evaluating the factors that influence blockchain adoption in the freight logistics industry. *Transportation Research Part E: Logistics and Transportation Review*.
- Pavlov, A., Wachter, S., & Zevelev, A. A. (2016). Transparency in the mortgage market. *Journal of Financial Services Research*, 49, 265–280.
- Pu, S., & Lam, J. S. L. (2021). Blockchain adoptions in the maritime industry: A conceptual framework. *Maritime Policy & Management*, 48(6), 777–794.
- Rosenthal, S. (2017). Regression analysis, linear.

- Saari, A., Vimpari, J., & Junnila, S. (2022). Blockchain in real estate: Recent developments and empirical applications. *Land Use Policy*, 121.
- Schenk, E., Schaeffer, V., Pénin, J., Mention, A., & Torkkeli, M. (2020). Blockchain and the future of open innovation intermediaries: The case of crowdsourcing platforms.
- Schulte, K., Rottke, N. B., & Pitschke, C. (2005). Transparency in the German real estate market. *Journal of Property Investment & Finance*, 23, 90–108.
- Senthilnathan, S. (2019). Usefulness of correlation analysis. *Political Methods: Quantitative Methods eJournal*.
- Szabo, J., Bernard, C., & Philip, L. (2024). Legal implications and challenges of blockchain technology and smart contracts. *Computer*, 12(2), 2024.
- Tseng, C., & Shang, S. S. (2021). Exploring the sustainability of the intermediary role in blockchain. *Sustainability*, 13, 1936.
- Veuger, J. (2017). Trust in a viable real estate economy with disruption and blockchain. *Facilities*, 36, 103–120.
- Yang, J. (2024). Application of blockchain technology in real estate transactions enhancing security and efficiency. *International Journal of Global Economics and Management*, 3(3), 113–122. <https://doi.org/10.62051/ijgem.v3n3.14>
- Yeoh, W., Lee, A. S. H., Ng, C., Popovic, A., & Han, Y. (2024). Examining the acceptance of blockchain by real estate buyers and sellers. *Information Systems Frontiers*, 26(3), 1121–1137.