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Key determinants of rental rates for A-grade office space in the Colombo-Central Business District: A tenants' perspective

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Abstract

Property investors and tenants face complicated decision-making due to rent variations among purpose-built office buildings in the same market. While rental discrepancies are accepted as normative across economies, recent trends show the Asian office market experiencing notable growth and instability. This trend is also observed in Colombo's Central Business District (CBD), and thus far, a comprehensive analysis of the drivers behind the fluctuations is lacking. This study aims to fill this gap by examining the determinants of rental rates for A-grade office spaces in Colombo from tenants' perspectives through market research. Factors such as building age, occupancy restrictions, maintenance costs, unit size, and additional and green features emerge as significant influencers while building brand and additional and green features play a moderating role. The study's findings contribute to the growing body of knowledge that can be used to develop and sustain a healthier office market industry.

Keywords:
Commercial property;
Office buildings;
Rental rate;
Colombo's Central Business District;
Tenants.

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1. Introduction

The commercial real estate sector significantly contributes to the global economy (Manyika et al., 2018). As economies expand, driven by growth in industrial and service sectors, there is an increasing demand for commercial space, creating a direct link between local economic growth and the expansion of the real estate sector (Feng & Wu, 2022). Moreover, multinational corporations are increasingly entering local markets, increasing demand for office space. Nevertheless, the strong correlation between Gross Domestic Product (GDP) growth and real estate price appreciation underscores the attractiveness of investing in rapidly growing urban areas to participate in economic expansion. Despite the dwindling attractiveness of rental properties, it is important to note that tenants wield the most direct influence on commercial real estate prices.

Due to economic downturns, many office building owners offer significant concessions to secure occupancy and complete leasing transactions (Younglai, 2023), resulting in a loss of competitive positioning for buildings. This loss leads to slower leasing velocity and rent growth, creating a detrimental cycle. Higher-quality buildings are typically leased first, while lower-quality ones face prolonged vacancies. Consequently, investors are focusing on A-grade, functionally relevant

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buildings, expecting them to maintain competitiveness in the current market. An A-grade office is a premium commercial building offering superior-quality finishes, advanced systems, exceptional accessibility, and a strong market presence, typically commanding above-average rental rates (Building Owners and Managers Association International, 2018). Nevertheless, there are variations in rental rates even among A-grade office buildings, warranting an investigation into the underlying causes of these differences. Thus, this research aims to comprehend the various factors influencing the rental rates of the office space market in Colombo, a developing economy, and ascertain the magnitude of each factor's effect on determining rental values.

Investment in office building construction in Colombo, an emerging economy, is ongoing without proper demand assessment. Although organisations such as such as Klynveld Peat Marwick Goerdeler (KPMG), Jones Lang LaSalle Incorporated (JLL), and the Institute for Research & Development, have conducted market research in Colombo to gauge office space demand over time, these research are inadequate (Jones Lang LaSalle, 2017). There is a pressing need for continuous research conducted by institutions, universities, and individuals, as yesterday's findings may no longer hold due to changing socio-economic conditions. Moreover, recent research by Morawski (2022) further confirms that the economy's underlying strength is a key driver of office demand and market performance.

The office space market encounters significant challenges and issues in emerging economies such as Colombo. Firstly, there are notable variations in occupancy levels and rental rates throughout a building's lifespan, mirroring economic fluctuations (Gholipour et al., 2022). This inconsistency negatively impacts the office market sector and the broader economy, perpetuating a vicious cycle. Existing studies that examined the impact of economic factors on rental rates are dated, for example Akinsomi, et al. (2018), Chin (2003), Ke and White (2009), McCartney (2010), McCartney (2012), Ng and Higgins (2007), Simon et al. (2015), Udoekanem and Nuhu (2014). Clearly there is a lack of recent studies conducted in developing markets such as Colombo in the literature.

Secondly, there is an issue with the unresponsiveness of supply to the demand for office space buildings. Despite expectations of supply aligning with demand in an idealised economy, there are periods of short supply and oversupply due to investor reactions to market opportunities and the substantial time required for construction. This imbalance between supply and demand has been studied extensively, by scholars such as Tedja et al. (2021), Madushika and Gunawardhana (2019, October 8), and Gambero (2015) exploring the reasons behind it. The overconstruction of both apartments and office buildings can have a negative impact on prices and rents (Schnure & Thompson, 2020). Additionally, the reduced demand for office space resulting from the COVID-19 pandemic contributes to supply-side imbalances that the market needs to absorb (Naor et al., 2022).

The third challenge stems from disparities in occupancy and rental rates among office buildings with similar appearances and proximity. This inconsistency is attributed to changing dynamics influenced by the knowledge economy, knowledge workers, and shifts to the digital workplace (Harris, 2021). More than mere possession of a building is required to attract occupants, emphasising the necessity for additional features, as identified by Nurzukhrufa et al. (2018). Scholars worldwide, including Nase et al. (2019), Adnan et al. (2012), Celka (2011), Sanderson and Edwards (2014), and Ozus (2009), have conducted studies to comprehend tenant expectations beyond office space. A recent study by Delventhal et al. (2022) reveals that anticipated increases in vacancy rates will not uniformly impact all office buildings, leading to winners and losers in the evolving reality. Researchers argue that the pandemic may propel the industry to become a valued supplier for tenants, supporting talent acquisition and retention. The requirement for additional features varies among economies and countries.

The fourth issue involves variations in operational costs among similar office buildings, and this discrepancy in operational costs is linked to rent and occupancy rates. A study conducted in the Shanghai office market affirmed that tenants are more willing to pay for office buildings featuring water and energy-saving attributes (Zhang & Yin, 2022). Furthermore, office buildings with lower operational costs were identified as green-certified (Jeong et al., 2016). Research in a selected London neighbourhood revealed that green buildings positively impact rents and prices (Chegut et al., 2014). In South Korea, the certification of green buildings was found to increase tenants' willingness to rent (Jang et al., 2018). Certain regions worldwide promote the development of green-certified buildings, at least regarding operational energy costs, by offering a reduced tax rate (Olubunmi et al., 2016). Long (2015) also highlighted that one of the most widely recognised green building certifications is the Leadership in Energy and Environmental Design (LEED) certification provided by the Green Building Council of the United States.

The final significant challenge pertains to fluctuations in rental income within the same period and market, impacting similar office buildings with similar additional facilities and operational costs located in proximity. This discrepancy may be attributed to differentiation, as described by Porter and Advantage (1985), where above-average performance can be achieved through market strategies like differentiation, also known as market positioning. In a study conducted in Kuala Lumpur, Malaysia, Cheah et al. (2021) revealed that occupants of A-Grade office buildings are willing to pay a premium rent for brand names, services, and top-of-the-range amenities. Similar insights were provided by Jain and Robinson (2018), who found that large-scale owners generate significant market rental premiums, indicating a potential brand effect. This phenomenon can be identified as brand positioning, which centres on consumers' perceptions of a firm's brand, as Fuchs and Diamantopoulos (2010) noted.

Hence, this research aims to identify the factors contributing to the increase in rental rates for A-grade office space in the Central Business District (CBD) of Colombo, a developing economy. This investigation is intended to facilitate informed decision-making for developers and policymakers. Various factors, including economic, demographic, project-specific, energy consumption, and marketing-related aspects, were examined, leveraging insights from existing literature. The investigation focused on information gathered from tenants with tenancies from 2016 to 2022, encompassing both years.

2. Literature review and identification of variables

The literature highlighted that real estate markets are highly vulnerable to shocks when property prices are inflated and yields are low (Amron, 2018). As a result, risk spillovers into the global banking sector imply risk in global office property markets. On the other hand, another scholar pointed out that since the global financial crisis of 2008, two key factors have been driving significant change in the office market industry: change in the traditional extended lease model and the growth of the contingent workforce (Weinbrenn, 2016). According to Weinbrenn, the office space market has evolved into a broader, client-oriented delivery platform in serviced space and co-working environments. GlobeNewswire (2022, June 17) reported that the annual compound growth rate of the flexible office market (private offices, co-working spaces, virtual offices, and others) is expected to be 18.16% by 2030. In other words, it is an increase in market share from USD 37.54 Billion to USD 199.13 Billion by 2030.

The variation in office rent exemplifies that the determinants of rental rates vary from market to market and over time. Chin (2003) tabulated various determinants used in the literature in a study conducted from 1988 to 2003 in five Southeast Asian cities, Singapore, Hong Kong, Taipei, Kuala Lumpur, and Bangkok, to investigate macroeconomic factors and rental rate movements.

Tonelli et al. (2004) compiled a list of office rent determinants used by various scholars worldwide from 1984 to 2003. Table 1 shows a comparison of the determinants identified by the two scholars.

Table 1: Determinants of the rental rate of the office space market used in the literature by Chin (2003), Tonelli et al. (2004)

Determinants of the rental rate	
Chin (2003)	**Tonelli et al. (2004)**
GDP GNP Income	Economic Activity
Economic Uncertainty	Economic Uncertainty
Employment or Unemployment rate (Total/Service)	Employment rate Unemployment rate
Interest rates (long-term or short-term)	Interest Rates
Inflation	Inflation
-	Location
-	Building Characteristics
Population	-
Office-floor Space (Total/New/ Changes)	Space Supply Occupied Space
Vacancy	Vacancy Rate Natural Vacancy Rate
Absorption	Space Absorption
Past Rental Value	Rent Equilibrium Rent
House Index	House Prices
Share Price	Stock Market
Bond and T-bill Yields	Market Conditions
Construction Cost	Construction Costs
Cost of Capital	
	Lease Aspects
Operating Expenses	Operating Costs
Yield/ Capital value	
Tax	Taxation

A recent systematic investigation by Salam et al. (2022) confirmed a similar set of factors that influence office building rentals and categorised the rental determinants into four (4) categories: locational, macroeconomics, physical, and financial. Table 2 depicts each category, including many significant aspects of office building rents.

Table 2 Determinants of rental rate (Salam et al., 2022)

Determinants of Rental Rates			
Locational	**Macroeconomics**	**Physical**	**Financial**
Locations-specific	Employment Rate	Green Labels	Depreciation
Nearest Public Transport	GDP	Multimedia Super Corridor status	Tenancy Duration
Access to Commercial Centres	Lending Rates	Building Age	Lease Details
Traffic Condition	Population	Amenities and Inhouse services	Operating Cost
Building Frontage	Vacancy Levels	Building Appearance and Design	Taxation
Neighbourhood Characteristic		Building Height and floor area	
		Building grade	

However, recent studies confirmed that the COVID-19 pandemic had a detrimental impact on real estate project development, existing real estate sales operations, cost estimates, values, and rates

of return in the current real estate sector in general (Tanrıvermiş, 2020). The Chinese office market sector was among the first affected by the pandemic. Wang et al. (2022) confirmed a more than 8% decrease in office building rental rates by analysing data from 2013 to 2022 in seven Chinese cities. Similarly, several studies confirmed the negative impact on office rent due to the pandemic. For example, Allan et al. (2021) showed that the Asia–Pacific region commercial property rent declined severely in regions exposed to the COVID-19 pandemic. Another study undertaken in Sydney, examining data from 2018 to 2021, also concluded that pre-COVID-19, both residential and commercial markets saw growth, with rising rents and decreasing vacancies; however, post-2020 lockdown, CBD commercial vacancies rose while rents declined, indicating reduced demand (Vigiola et al., 2022). Further to the above results, Rosenthal et al. (2022) found that commercial real estate rent is decreasing in city centres in a study conducted using data from 89 U.S. cities. According to another study on the U.S. office market, businesses and real estate demand in major U.S. metro regions are shifting away from central business districts and into lower-density suburbs and exurbs (Ramani & Bloom, 2021). Academics termed this phenomenon the "Donut Effect" to reflect the hollowing out of metropolitan cores and the expansion of surrounding suburban rings. However, a study conducted in India using secondary data revealed that government-implemented preventive measures affected the return on investments in the real estate sector, mainly commercial buildings (Yadav, A. & Yadav, D,, 2021).

Contrary to the aforementioned conclusions, several research findings have confirmed opposing viewpoints. A study conducted in European markets suggests that the impact of the COVID-19 pandemic on commercial property prices is minimal compared to other industries (Hoesli & Malle, 2022). Another research undertaken in the U.S. market found that COVID-19 slows down the rate of rent growth for commercial real estate, but the effect is only short-lived; in a shorter period, the office rental market bounces back to about 70% (Wen et al., 2022). At the same time, Cai and Xu (2022) observed that contrary to what they expected in the U.S. real estate industry, the net effects of the COVID-19 epidemic on office and residential REIT returns are not negative. Wang et al. (2022) argued that mainstream literature provided two competing hypotheses for explaining the impact of the COVID-19 epidemic. According to the fear sentiment hypothesis, COVID-19 should have a considerable negative impact. On the other hand, the various governments' stimulus plans have softened the destructive effects of the COVID-19 pandemic, resulting in positive outcomes. Hence, it is essential to revisit the determinants of rental rates in the office space market with the changed socio-economic situation.

Many studies have been conducted worldwide in various economies. However, recent studies have yet to identify the economic factors and additional features that could influence the demand for office space, especially in Colombo. For example, a study by Fernando and Perera (2022) investigated the importance of interior design and basic amenities for employee happiness. However, they did not explore how these additional features and interiors affect rent in the Colombo office market.

In addition, many studies conducted worldwide have investigated the impact of various scattered factors. Some researchers focused on supply-side factors, while others examined demand-side factors. For example, Yang et al. (2021) considered the “vacancy rate/office floor stock,” Aybar and Dokmeci (2022), and Costa et al. (2018) analysed factors such as the 'location of the building,' and Porumb et al. (2020) explored the impact of “green building certification”. Most importantly, there has been very little research into the product branding and positioning strategies or tactics used by developers in renting out office space, which may influence the demand for office space along with other factors (Jain & Robinson, 2018; Pfrang, 2010). Therefore, the current study aims to identify the factors affecting rental rates in the Colombo office space market, incorporating nearly all the factors discussed in the existing literature to bridge the identified research gap.

For the past 50 years, office space demand analysis has been a subject of study in the literature. Pittman and Thrall (1992) categorise empirical models of the real estate market into two types:

econometric and judgmental models. Figure 1 illustrates various models used in the office market literature, as evaluated by Stevenson and McGarth (2003).

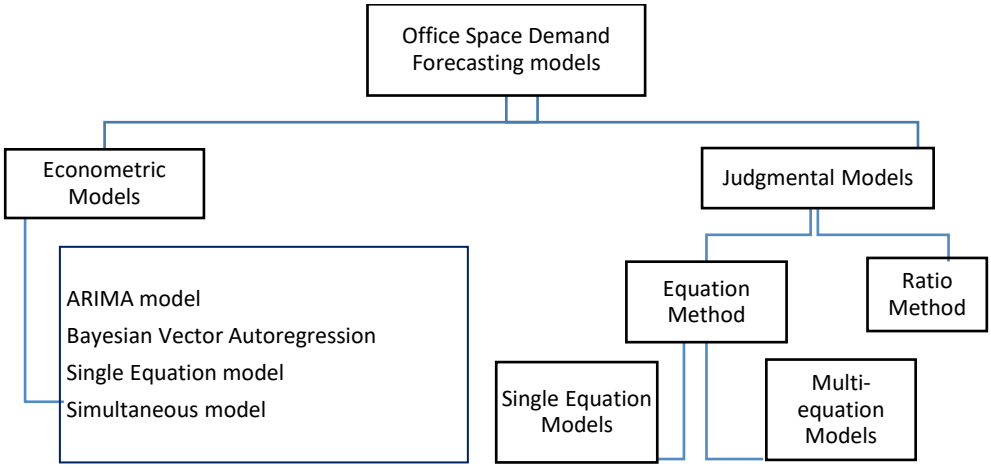

Figure 1: Classification of Forecasting Models (Prepared based on Stevenson & McGarth, 2003)

As cited by Rabianski & Gibler (2006), Guy and Harris (1997) emphasised that while econometric techniques have led to more sophisticated modelling methods, they often neglect a deeper understanding of market dynamics. They suggest that marketing research can help explain the cause of the change in demand by understanding (i) demand and supply factors, (ii) the relationship between supply and demand, and (iii) environmental conditions that affect the relationship. Therefore, the current study employed a market research approach to investigate tenants' perspectives on the factors influencing office space rental rates, revealing meaningful relationships between variables. The data analysis utilised statistical techniques that combine both econometric and judgmental approaches, thereby contributing new insights to the literature.

3. Methodology

Following the suggestion by Creswell (2008), the researchers chose a quantitative approach that aligns with the nature of the research problem and objectives. Several studies in the literature have also utilised a quantitative approach within the same research area. Notable examples include Govett et al. (2020), Jang et al. (2018), Roy et al. (2016, September), Simon et al. (2015), and Čeh et al. (2012). In addition to the aforementioned, this study embraced a postpositive philosophy, as Creswell (2008) outlined. Postpositivists highlight determinism, where causes primarily shape effects or outcomes. This philosophy aims to condense ideas into a concise set of hypotheses, research questions, or variables. The research utilises a quantitative approach to systematically investigate the cause-and-effect relationship between the rental rate of A-grade office space and its explanatory variables. The network of associations between independent and dependent variables was modelled. Figure 2 depicts a detailed framework of the link between independent and dependent variables.

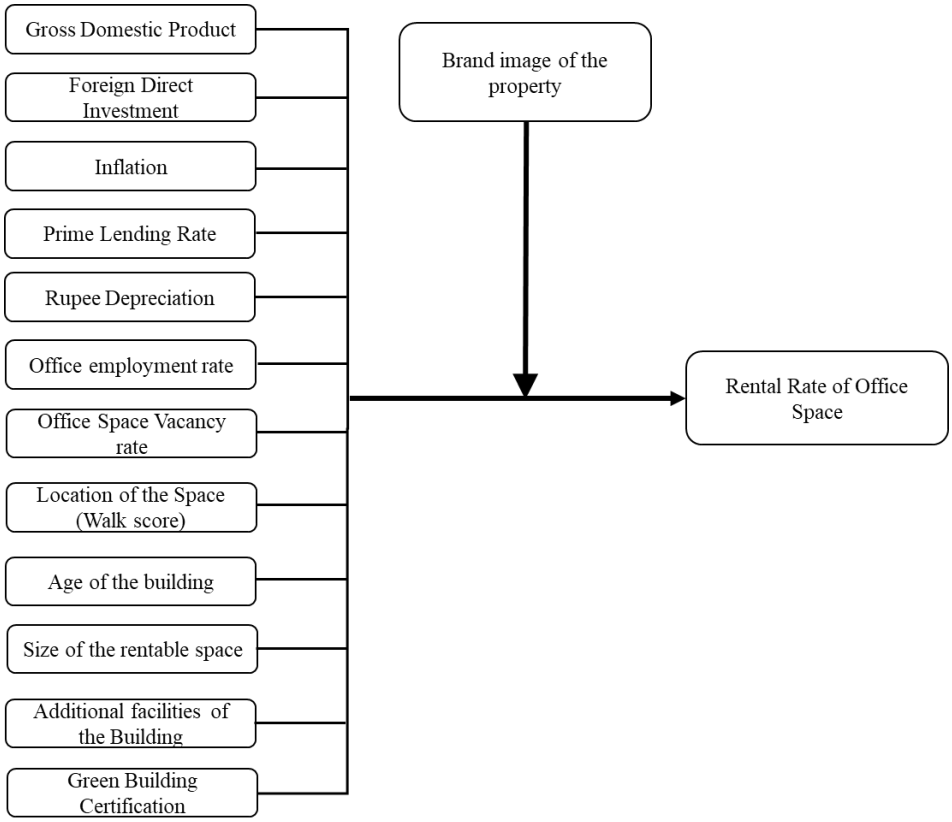

Figure 2: Detailed Framework

The researchers conducted a market survey to identify factors influencing office building rental rates. Primary data was collected from respondents. Using the Statistical Package for Social Science (SPSS) software, the data was processed and analysed to categorise the demographic composition of units and test hypotheses. The research aimed to investigate this relationship without altering the natural environment, following the approach suggested by Konyimbih (2018).

3.1 Unit of analysis

Individual property units representing individual office buildings were chosen as the units of analysis. This selection is based on the variations in features or factors from one building to another, coupled with the diverse requirements of tenants. Previous studies by Bialkowski et al. (2019), Bera and Uyar (2019), and Costa et al. (2018) also employed office units or office buildings as units of analysis. A similar approach was adopted in a study on Sub-Saharan African land rental markets conducted by Abay et al. (2021), where land plots were utilised as units of analysis. Subsequently, primary data was collected from the tenants of the office units. Sanderson and Edwards (2014) and Adnan et al. (2012) adopted a very similar approach by selecting tenants of major landlords representing A-grade office spaces.

The study encompassed the total count of individual units within A-grade, purpose-built office spaces in Colombo's CBD areas (Colombo 01, 02, 03, 04, 11) from 2016 to 2022 as the population. A similar methodology was utilised by Konyimbih (2018) in a study carried out in the CBD of Nairobi. Data were gathered from randomly selected office units in each office building through

a questionnaire administered to CEOs, CFOs, CMOs, or other personnel responsible for property management within the tenants' organisation.

3.2 Research instrument

The research was designed for quantitative analysis, so the questions were formulated in closed alternative or closed-ended formats. These included determinant choice, checklist-type multiple-choice, rating scale multiple-choice questions, and attitude rating scales using a 5-point bipolar Likert scale. The structure of the questionnaire was based on the design developed by Byrne et al. (2007). A pilot test was conducted with a sample size recommended by Cooper and Schindler (2014), involving 20 questionnaires randomly distributed to respondents. To evaluate response consistency, the same participants completed the questionnaire again without prior notice after a day or two.

3.3 Analysis

The researchers employed descriptive and inferential statistics to analyse the quantitative data. The model presented below was utilised for the multivariate regression analysis, a method commonly used by various researchers, including Konyimbih et al. (2017), Elfaki and Ahmed (2024), and Ahmed (2020).

$$Y=\alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \varepsilon$$

Where:

Y	=	Dependent variable, rental rate per square area
α	=	Constant (intercept)
βi	=	Slope (gradient)
Xi	=	Independent variables
Ɛ	=	Stochastic error term

The *t*-test at a 95% (α=0.05) confidence level was carried out to test the significance of each variable. Next, the explained sum of squares (R^2) of the model was tested.

3.4 Data

The A-grade office buildings classified according to their location and grade were compiled in Table 3 (JLL, May 2017).

Table 3 - Number of Purpose-Built Office Buildings (JLL, May 2017)

Segments of Colombo	A-Grade	B Grade
CBD	11	28
SBD	3	Not applicable

CBD – Central Business District
SBD – Suburb Business District

The 11 A-grade, purpose-built office buildings located in the CBD of Colombo, as outlined in Table 4, comprised approximately 700 to 800 individual office space units and were considered as the study population. This methodology is consistent with the approach employed by Adnan et al.

(2012) in their study conducted in Kuala Lumpur, Malaysia, where the population of tenants was determined using tenants' directories and building management offices.

The study's sample size was determined using the Krejcie and Morgan method, following Sundram et al. (2018). With a population (number of office units) of 700 for the study, the determined sample size was 248. To enhance the efficiency of the sampling design, the researchers employed the proportionate stratified sampling technique described by Parsons (2017). Consequently, the sample population, denoted as N (248), was divided into L (11) strata. The number of units in each stratum, labelled as N1, N2, N3, N4, ...N11, was determined based on the approximate preset number of units in each stratum, as presented in Table 5.

Table 4 - Number of Units by Default in Each Building

No.	Name of the building	Location	Grade of the building	Gross Floor area (ft2)	No of Units by default
1	World Trade Center	Colombo 01	A	976,538	312
2	Access Tower II	Colombo 02	A	320,000	60
3	Parkland	Colombo 02	A	326,000	48
4	Parkland One (Readyware)	Colombo 02	A	98,801	9
5	Iceland Business Centre	Colombo 02	A	65,000	16
6	Lee Hedges	Colombo 03	A	110,000	ND[a]
7	Aitken Spence Tower II	Colombo 02	A	216,000	ND[a] defined
8	One Galle Face Tower	Colombo 02	A	662,948	256
9	Astoria Tower	Colombo 03	A	104,100	36
10	AOD Innovation Tower	Colombo 03	A	108,124	ND[a]
11	M2M Tower	Colombo 02	A	120,000	24

a - ND - Not defined

Table 5 - Number of Samples in Each Stratum

Stratum Number	Number of Samples in the stratum	Stratum Number	Number of Samples in the stratum
N1	96	N7	3
N2	19	N8	79
N3	15	N9	11
N4	3	N10	6
N5	5	N11	7
N6	4		

As the population was approximately proportionate with the number of office floors, one office unit was chosen for each floor across all A-grade, purpose-built office buildings. This selection ensures that the sample adequately represents the entire population. The selection of office units on each floor was determined using a random number generator. Thus, a sample of 248 was chosen through proportionate stratified random sampling methods, following the approach utilised by Konyimbih et al. (2017) and Konyimbih (2018).

4. Analysis and results

The study reports a response rate of 16.5%, following the criteria defined by the American Association of Public Opinion Research (2016). Initially, the researchers sent out 1200 direct emails to elicit responses, resulting in 166 replies. Subsequently, the remaining portion of the

sample was obtained through face-to-face meetings. Figure 3 illustrates each method of data collection along with its corresponding response rate.

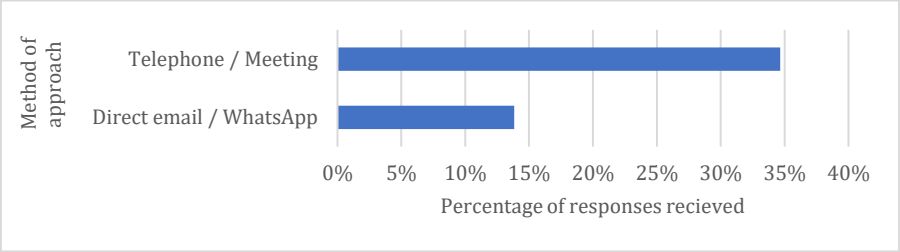

Figure 3: The Graph of Rate of Response for Each Method of Approach

The internal consistency reliability of each variable was assessed, and the corresponding Cronbach's alpha values are presented in Table 6 below. As Konyimbih et al. (2017) suggested, a Cronbach's alpha exceeding 0.7 signifies good internal consistency among variables. Except for additional facilities, all variables demonstrated Cronbach's alpha values greater than 0.7. Nevertheless, the Cronbach's alpha value for additional facilities closely approaches 0.7. Therefore, the researchers concluded that the variables are reliable.

Factor analysis, specifically Principal Component Analysis (PCA), was conducted to identify and group the underlying variables contributing to the observed patterns in the dataset. Numerous scholars contend that a Kaiser-Meyer-Olkin (KMO) measure of at least 0.80 is considered adequate for initiating factor analysis (Napitupulu et al., 2017; Silva et al., 2014). In the present study, the recorded KMO measure stands at 0.891, indicating significance. Since the KMO test yielded satisfactory results, Principal Component Analysis was conducted using SPSS. The factors derived from PCA were subsequently renamed and identified as independent variables, as depicted in Table 6.

Table 6: Factor analysis and the internal consistency

Factor	Items	Factor loading	Cronbach alpha	VIF	Skewness (z value)	Kurtosis (z value)
GDP & FDI	GDP	0.74	0.775	3.210	-3.943	-2.144
	FDI	0.66	0.845			
Maintenance cost	Inflation	0.79	0.673	1.794	-12.18	11.351
Inflation, Lending rate LKR Depreciation & employment rate	Inflation	0.65	0.673	3.843	-5.026	-2.135
	Prime Lending Rate	0.79	0.743			
	Rupee Depreciation	0.53	0.744			
	Office employment rate	0.47	0.737			
Vacancy Rate	Office space vacancy rate	0.80	0.773	1.913	-7.090	1.620
Limit to employees	Office employment rate	0.66	0.737	2.302	-3.800	-2.816
Location	Location of the Space	0.85	0.854	1.674	-6.974	10.537
Age of the Building	Age of the building	0.55	0.723	2.405	-4.374	0.693
Size of the Office Space	Size of the rentable space	-0.70	0.686	1.493	4.587	-1.607
Additional & Green features and branding	Additional facilities of the building	0.83	0.626	2.215	-11.65	29.271
	Green Building Certification	0.88	0.875			
	Brand image of the property	0.69	0.755			

The statistical tests on the aforementioned factors yielded significant results at a 95% confidence interval. However, the normality tests for each factor, or independent variables, produced results outside the range of -1.96 to +1.96, indicating that the factors are not normally distributed (Cramer & Howitt, 2004; Doane & Seward, 2011). Additionally, all variable inflation factor (VIF) values for the predictor variables were found to be below 5 (VIF values below 10 are generally considered acceptable). Consequently, the researchers concluded that there was no multicollinearity issue with the independent variables (Daoud, 2017). Given the non-normal distribution of predictor variables, a non-parametric analysis was conducted. Table 7 displays Spearman's correlation values between each independent variable and the dependent variable, rental rate, with only significant correlations presented.

Table 7: Spearman's Correlation Coefficients

Independent variable	Correlation Coefficient	Independent variable	Correlation Coefficient
GDP & FDI	0.515**	Location	0.318**
Maintenance Cost	0.427**	Age of the Building	0.511**
Inflation Lending	0.574**	Size of the office space	-0.410**
Vacancy Rate	0.518**	Additional, Green features & Branding	0.629**
Limit of people	0.389**	Rental Rate	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the Spearman's correlation values, it is determined that all variables are significantly associated with rental rate. While the "size of the office space" shows a negative correlation, all other independent variables exhibit positive associations with the rental rate.

4.1 Linear regression analysis

Multilinear regression or ordinary linear regression analysis was conducted for all the significant independent variables (IVs) to examine the relationships and the statistical measures of the model are presented in Table 8.

Table 8: Description of the Model & Summary

Variable	Unstandardised Coefficients		Standardised Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.211	0.249		4.862	0.000
GDP_and_FDI	-0.036	0.048	-0.054	-0.740	0.460
Maintenance_Cost	0.118	0.049	0.130	2.380	0.018
Inflation_Lending	0.052	0.056	0.074	0.928	0.354
Vacancy_Rate	0.068	0.052	0.073	1.292	0.198
Limit_of_people	-0.112	0.027	-0.257	-4.149	0.000
Location	-0.033	0.042	-0.042	-0.796	0.427
Age_of_the_Building	-0.222	0.049	-0.289	-4.549	0.000
Size_of_the_office_space	0.107	0.026	0.207	4.152	0.000
Additional, Green features & Branding	0.767	0.046	1.018	16.730	0.000
R	0.802[a]	Regression Sum of squares (ESS)			39.479
R Square	0.644	Residual sum of squares (RSS)			21.850
Adjusted *R* Square	0.629	Total Sum of Squares (TSS)			61.329
Std. Error of the Estimate	0.320				
F	42.762	Sig. = 0.000			

a. Predictors: (Constant),
Independent Variables: Additional_Green features & Branding, Maintenance Cost, Location, Size_of_the_office_space, Vacancy Rate, Limit_of_people, Age_of_the_Building, GDP_and_FDI, Inflation_Lending
Dependent Variable: Rental_Rate

As shown in Table 8 above, the "Explained variation/Total variation" ratio is 64.4%, indicating that the model clarifies 64.4% of the variation in the dependent variable (DV). Alternatively, 64.4% of the variance in the rental rate (DV) can be explained by the independent variables. Table 8 also displays the model's regression, residual, and total sum of squares. The total sum of squares (TSS), which amounts to 61.3, describes the total variation of actual Rental Rate (DV) values from their sample mean. A higher TSS indicates greater variability in the DV (Rental Rate), offering more potential for explanatory power by the independent variables in the model. The results show that the regression sum of squares, also known as the explained sum of squares (ESS), is 39.5. This explains the variation of the estimated values of the Rental Rate (DV) around their sample mean. The unexplained variation of Rental Rate values about the regression line is only 21.8, attributed to a stochastic error. This represents the variation of Rental Rate values that cannot be explained by the included independent variables (IVs) in the model. A higher ESS (approximately double the value of RSS) suggests that the researchers have selected a reasonable number of IVs to elucidate the variation of the DV, the rental rate.

Further to the above, Table 8 presents the model description and each variable's significance level. Accordingly, the Constant, Maintenance Cost, Limit of People, Age of the Building, Size of the Office Space, and Additional, Green Features & Branding of the Office are deemed significant, whereas other variables are not. The significant constant value (1.211) suggests that the rental rate holds value regardless of changes in independent variables (IVs). Furthermore, tenants perceive that as maintenance costs of the building increase, the rental rate also increases by 0.118. Additionally, they believe that when limits are placed on the number of occupants for a given space, the rental rate should decrease by 0.112, indicating that tenants anticipate developers will provide more office space as the number of employees grows, thereby lowering the rental rate. Moreover, tenants perceive that the rental rate should increase for smaller office areas by 0.107. They also strongly believe that when an office building incorporates additional and green features and is effectively branded in the market, the rental rate will increase by 0.767.

4.2 Test of moderating effect

The potential impact of "Additional, Green features and Branding of the building" was examined for its moderating influence using SPSS. GDP & FDI, Maintenance Cost, Inflation, Lending rate, LKR Depreciation & employment rate, Vacancy Rate, Limit to employees, Location, Age of the Building, and Size of the Office Space were considered as independent variables for the above investigation. The results of the model are shown in Tables 9 and 10.

Table 9: Summary of the Models

Statistics	Model 1	Model 2
R	0.802[a]	0.844[b]
R^2	0.644	0.712
Adjusted R^2	0.629	0.688
R^2 Change	0.644	0.068
Std. Error of the Estimate	0.609	0.558
F	42.762	29.781
F Change	42.762	6.051
Sig. F Change	0.000	0.000
Regression Sum of Squares (ESS)	142.735	157.827
Residual Sum of Squares (RSS)	78.998	63.906
Total Sum of Squares	221.733	221.733

a. Predictors: (Constant), Zscore(Additional_Green), Zscore(Maintenance_Cost), Zscore(Location), Zscore(Size_of_the_office_space), Zscore(Vacancy_Rate), Zscore(Limit_of_people), Zscore(Age_of_the_Building), Zscore(GDP_and_FDI), Zscore(Inflation_Lending)
b. Predictors: (Constant), Zscore(Additional_Green), Zscore(Maintenance_Cost), Zscore(Location), Zscore(Size_of_the_office_space), Zscore(Vacancy_Rate), Zscore(Limit_of_people), Zscore(Age_of_the_Building), Zscore(GDP_and_FDI), Zscore(Inflation_Lending), IV2MV, IV6MV, IV3MV, IV4MV, IV1MV, IV5MV, IV7MV, IV8MV
c. Dependent Variable: Zscore(Rental_Rate)

According to the results provided in Table 9, there is a change of 0.068 in the *R*-square value between Model 1 and Model 2. The result indicates that the inclusion of "Additional, Green features and Branding of the building" has a notable moderating effect on the independent variables within the model, which is statistically significant.

Further to the above, Table 9 demonstrates that the ESS of model 1 has increased from 142.7 to 157.8 in Model 2, confirming that "additional & green features and branding" has a moderating impact on selected IVs, which enhances the explanatory power of the model. At the same time, the model has improved by reducing RSS from 79 to 63.9 from Model 1 to Model 2.

The coefficients of each variable and their significance level are shown in Table 10 below. However, as per the results shown in Table 10, the moderating variable; "Additional_Green_features_&_Branding" moderates only selected independent variables: GDP & FDI, location of the building, and size of the office space. The moderating effects on all other IVs are not significant.

Table 10: Description of the Model

Model		Unstandardised Coefficients[a]		Standardised Coefficients[a]	t	Sig.
		B	Std. Error	Beta		
	(Constant)	0.109	0.067		1.625	0.106
	IV1MV	-0.336	0.100	-0.356	-3.344	0.001
	IV2MV	0.096	0.066	0.102	1.452	0.148
	IV3MV	0.081	0.127	0.066	0.636	0.526
2	IV4MV	-0.130	0.097	-0.118	-1.347	0.180
	IV5MV	0.117	0.134	0.088	0.868	0.387
	IV6MV	-0.366	0.094	-0.353	-3.899	0.000
	IV7MV	0.119	0.110	0.113	1.082	0.280
	IV8MV	-.0252	0.090	-0.341	-2.792	0.006

a. Dependent Variable: Zscore(Rental_Rate)

Where;

IV1MV – (ZGDP_and_FDI) x (ZAdditional_Green_features_&_Branding)
IV2MV – (ZMaintenance_Cost) x (ZAdditional_Green_features_&_Branding)
IV3MV–(ZInflation_Lending_LKR Depreciation_Employment rate) x (ZAdditional_Green_features_&_Branding)
IV4MV – (ZVacancy_Rate) x (ZAdditional_Green_features_&_Branding)
IV5MV – (ZLimit_of_people) x (ZAdditional_Green_features_&_Branding)
IV6MV – (ZLocation) x (ZAdditional_Green_features_&_Branding)
IV7MV – (ZAge_of_the_Building) x (ZAdditional_Green_features_&_Branding)
IV8MV – (ZSize_of_the_office_space) x (ZAdditional_Green_features_&_Branding)

The structured equation model, which illustrates the relationship between variables, was created using SPSS–AMOS. The resulting models are presented in Figure 4 and Figure 5.

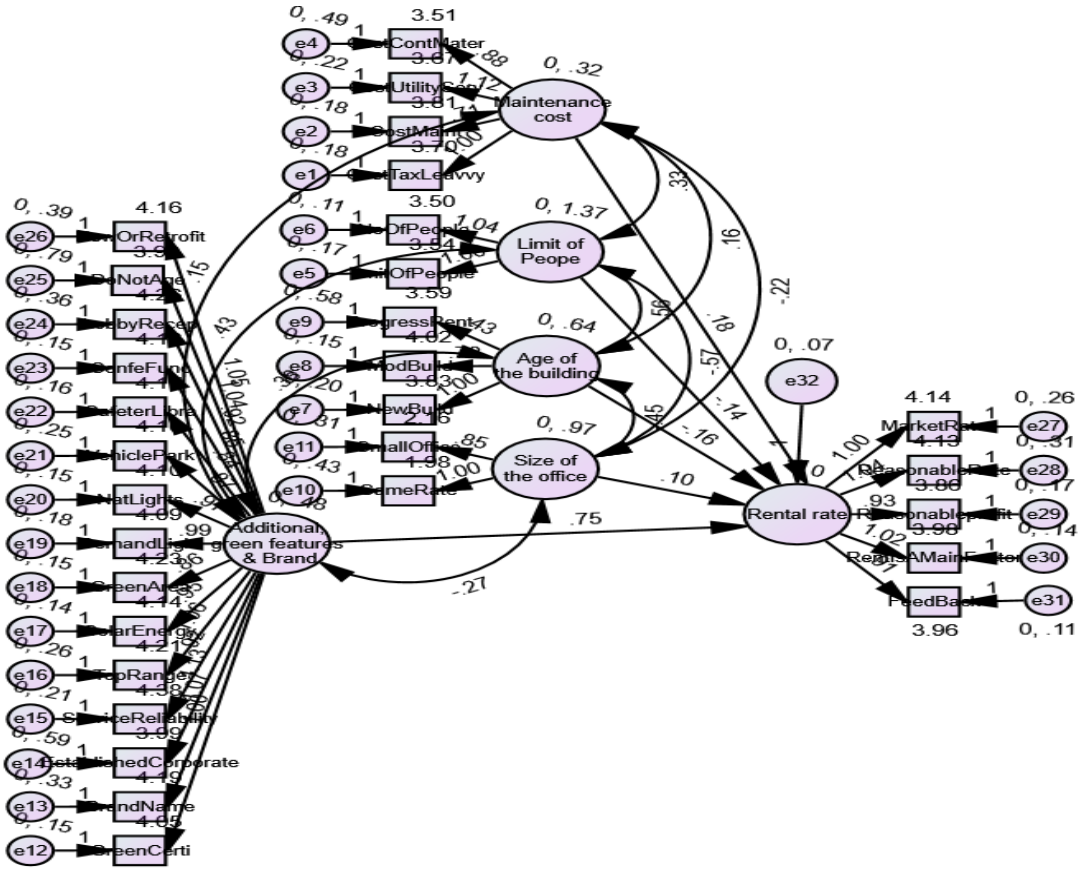

Figure 4: Measured and Structured Model

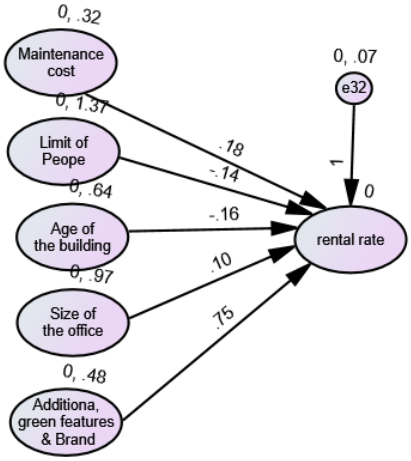

Figure 5: Structured Equation Model

5. Discussion

Based on the literature, twelve independent variables were expected to impact the rent in the Colombo office market. These independent variables span a broad spectrum, including economic aspects, property-specific characteristics, sustainability or green-related factors, and marketing elements. Nevertheless, based on the responses from the tenants, five factors were found significant, specifically maintenance cost, limit of people, age of the building, size of the office

space and additional & green features and branding. Results also show that all the economic-related factors such as GDP & FDI and "inflation, lending rate, LKR depreciation, employment rate" are not significant. Other variables that are found to be not significant are vacancy rate and location of the building,

5.1 GDP & FDI

Past studies that explore the relationship between rental rates and economic factors have yielded mixed results (e.g., Akinsomi, Mkhabela & Taderera, 2018; Simon et al., 2015; Udoekanem, Sanusi et al., 2015b; and Udoekanem et al., 2015a). In Colombo, tenants do not believe that changes in GDP and FDI should affect rental rates. They potentially anticipate that in the long run, when the economy grows (increase in GDP), more office buildings will be added to the market, which leads to reducing the rental rate or leaving the rental rate unchanged based on the level of change in demand for office spaces. On the other hand, in the short run, there is no chance to change the rental rate based on changes to GDP and FDI, as rates were predetermined and fixed by the lease agreement. Similar findings were reported by Ng and Higgins (2007) in their study on Singapore, and Chin (2003) confirmed comparable trends across several South Asian countries.

However, the impact of GDP changes on rental rates is weakened by the additional and green features available in the office building along with its market position (brand image). Additional features noted in the Colombo office market can be identified as the availability of a common lobby and reception, conference and function rooms, cafeterias, libraries, gymnasiums, restaurants, and clubs. Green features observed in the office market in Colombo are the use of daylights, automatic functioning of lights based on occupancy, availability of green areas in proportion to the rentable area, production of solar energy, and availability of green certification.

5.2 Inflation, lending rate, depreciation of LKR & employment rate change

Inflation, lending rate, depreciation of LKR and employment rate change are found to be not significant in determining rental rates, based on tenants' perspectives. Tenants of the office space market in Colombo do not anticipate rental rates to adjust in response to these factors. The theoretical rationale for the above can be elucidated as follows: Inflation, lending rates, depreciation of the LKR, and the employment rate are regarded as demand-side factors that influence the rental rate, as articulated by numerous scholars such as McCartney (2012) and Akinsomi et al. (2018). According to the theory of demand and supply, when demand increases, the demand curve shifts upward. Consequently, rents increase, mainly as new construction projects may take longer. However, due to the rational behaviour of stakeholders, tenants perceive the impact of all these demand-side variables in the Colombo office market to be minimal. Tenants may anticipate these factors affect not only the demand for rental space but also the supply, where developers and investors tend to strategically plan new construction projects in anticipation of potential increases in employment rates, bank lending rates, inflation, and other pertinent factors.

5.3 Vacancy rate

Almost all scholars reported a significant negative correlation between the rental rate and vacancy rate in various studies conducted in different parts of the world (e.g., Ng & Higgins, 2007; Udoekanem & Nuhu, 2014; Ke & White, 2009; McCartney, 2010, 2012; Udoekanem, Sanusi, et al., 2015b; Udoekanem et al., 2015; Frew & Jud, 1988; Glascock et al.,1990). Further, some researchers even reported the magnitude of the impact of change in the vacancy rate on the rental

market performance. One such research study by Wheaton and Torto (1988) explained that real office rents drop approximately 2% annually for every percentage point of "excess vacancy" in the market.

Nevertheless, in this study, the vacancy rate is not significant in determining rental rates based on the tenants' perspective. This negligible relationship can be attributed to two reasons: firstly, the vacancy rate results from the interplay between demand and supply, particularly the difference between available office floor stock and actual occupancy; secondly, long-term rental agreements also play a role.

5.4 Location of the building

Past studies that investigated the location premium on real estate prices and reported positive and significant results (e.g. Lucchesi et al., 2021). Nevertheless, tenants of the office market in the CBD in Colombo do not perceive location as an important factor in determining rental rates. Several reasons may contribute to this perception. For instance, businesses like BPOs may find the office location irrelevant to their operations. Alternatively, organisations may independently provide all necessary services for their employees, such as transportation, food, clothing, healthcare, and more, thereby diminishing the importance of external location-related factors. Additionally, the CBD typically features an adequate transportation network and operates around the clock, further reducing the perceived importance of location.

5.5 Factors influencing cost-effectiveness

This study examined six cost-effectiveness or value-for-money factors, specifically the number of occupants, size of the unit, age of the building, additional facilities, green features, and brand. According to the tenants, these variables are found significant in determining rental rates, indicating a strong influence of these factors on tenants' decisions.

The number of occupants allowed by the property owner is found to have a negative impact on rental rates. When an occupancy cap is applied, the property becomes less attractive to the tenants, and they expect lower rental rates for such property. This factor has not been previously studied in any published literature. The common practice in building design involves allocating a specific square footage per person based on the building's intended use (Ching & Winkel, 2022). Energy consumption, particularly in shared services such as elevators and mechanical ventilation and air conditioning (MVAC) systems, is closely tied to the number of occupants (Deng et al., 2021). Building owners could potentially reduce operational costs by introducing an occupancy cap. However, this concept has not been extensively tested in Colombo or other markets.

Tenants in the Colombo office market perceive rent to increase with the increase in the rentable area of the unit, which is unanticipated. Furthermore, tenants in the Colombo office market believe that rent rises in proportion to the unit's rentable space. A recent study conducted by Tsolacos et al. (2022) confirmed that rent and floor area show a negative relationship, in accordance with the findings of previous studies. For every 10,000 sq. ft. of additional net letting area, rents tend to be lower by 3%. The researchers cannot explain the cause of this behaviour and advise additional research to establish the logic properly.

The age of a building usually signifies its depreciation, which can influence rental rates. Older buildings may command lower rental rates due to potential maintenance issues, outdated facilities, or less efficient design. In contrast, newer buildings with modern amenities and technologies often justify higher rental rates. This factor is significant in portraying their success, especially among business owners. The literature also confirmed the above trend (e.g., Čeh et al.,

2012). In line with the above, tenants of office spaces in the Colombo market perceive that the age of the building is negatively correlated with the rent.

This study found that tenant appreciates additional and green features of the building and perceive that these features should affect rental rates. Additional facilities examined in this study include cafeterias, gymnasiums, banks, supermarkets, restaurants, clubs, and cinemas. The literature also confirmed a positive relation between the rent and these added facilities, for example, Tsolacos et al. (2022).

The green features examined in this study include the utilisation of daylights, demand base ventilation and lighting facilities, indoor air quality and green areas, the facility to create solar energy, rainwater irrigation, and flush water system, and green building certification. Many studies have been conducted to investigate the relationship between green features and rental rates in office buildings in the literature (Li et al., 2021; Turan et al., 2020; Mangialardo et al., 2019). The office market in Colombo, like the rest of the world, demonstrated a strong positive relationship between green features and rental rates.

The tenants of office units in Colombo perceive that the additional features, green features, and branding influence them to a greater extent in determining rental rates. Moreover, it is the highest of all the other factors. In addition, this factor (additional, green features and branding) moderates the relationship between other independent variables and rental rates. i.e., the moderator weakens the relationship between rent and the following variables: GDP & FDI, location, and size. The results of the study proved that any office building that comprises additional and green features earns a higher rental rate if properly branded, irrespective of the location of the building, size of the office unit, and economic growth.

6. Limitations and recommendations

This study acknowledges several limitations. Firstly, it solely relies on the perspectives of office tenants to estimate rental rates, neglecting input from building owners. Additionally, the surveyed individuals, such as CEOs and CFOs, may not always dictate rental decisions, potentially skewing the data. Furthermore, the study fails to explore factors specifically associated with decreasing rental rates. For instance, local market peculiarities like proximity to a cemetery affecting rent were overlooked. Moreover, the chosen variables for analysis were based on literature from other markets, possibly lacking relevance to the developing economy: Colombo's unique market dynamics. Thus, the findings might vary if Colombo-specific variables were included.

Hence, the study suggests collecting data from both tenants and building owners, as both play a role in determining rental rates. Also, to investigate factors affecting rent reductions, especially considering local culture, it is advised to start with expert interviews to determine relevant variables for developing economies. Moreover, understanding tenant perceptions is crucial for market development, necessitating empirical studies over an extended period and comparing results over different time frames. Additionally, due to shifting preferences, research should encompass both CBD and SBD areas.

Moreover, given the crucial role of accurately predicting how tenants assess the value of space in driving the development of the office market industry, this study examines tenants' perceptions in determining the rental rates of office units within purpose-built office buildings in Colombo's Central Business District (CBD). Thus, to validate the findings of this research, conducting empirical studies utilising secondary data over an extended timeframe is imperative.

Additionally, conducting market research across various timeframes would be beneficial in comparing the trends observed in the Colombo office space market.

Furthermore, the study's findings, like the positive correlation between green certification and rental premiums, suggest policy interventions. Government mandates for green certification and energy usage caps can align with Sustainable Development Goals. Additionally, decentralising infrastructure-rich zones beyond the CBD could benefit the public. The study also highlights the negative impact of building age on rental rates and recommends government policies to promote retrofitting and refurbishment after a certain period. This can enhance energy efficiency and overall township well-being, aligning with global trends favouring renovated office spaces.

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