

Optimizing Property Management Performance With Green Building in Indonesia

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Abstract

Indonesia has not widely implemented green buildings although such buildings offer many benefits to their occupants and property management firms. In this respect, this study seeks to test the effect of green buildings on business performance. This research expands GBCI's green building indicators with an indicator of continuous and design process to operationalize the green building variable. Meanwhile, the measurement of business performance refers to the balanced scorecard for sustainability (BSCS) concept that adds the environmental perspective into the conventional BSC. Surveying 126 manager respondents representing 89 green and non-green buildings, the study finds that green building implementation positively affects business performance. Thus, our hypothesis is empirically supported.

Keywords: green building, business performance, sustainability, balanced scored for sustainability

1. Introduction

The average increase in Indonesian electricity consumption is 6.9%, or about 8.5 GW annually (ESDM, 2019). Besides, access to clean water is equally crucial in Indonesia. Meanwhile, Indonesia also experiences a rapid population growth that negatively affects access to electricity and clean water. Hence, sustainable electricity provision and clean water as basic needs emerge as crucial issues in Indonesia (Alihar, 2018).

In this respect, green buildings arguably improve the efficiency of electricity and clean water usage. Green buildings do not only have to meet certain efficiency criteria in water and electricity criteria. They also need to have qualified sewage

management, use environmentally friendly local building materials, and have green building certificates that enable authorities to monitor the progress or achievement. Thus, green buildings do reduce not only energy consumption but also waste pollutants. Green buildings' inhabitants will then enjoy a better quality of life due to lower indoor pollution.

Consequently, green buildings contribute to their occupants (in this respect, firms) economically and non-economically. For example, green buildings enhance organizational and brand images that will likely increase firms' sales and performance. Besides, green buildings increase property values that will help governments increase their tax revenues (Raji et al., 2017).

However, although numerous regulations at central, provincial, and municipal levels have regulated green buildings, the implementation progress of green buildings in Indonesia remains slow. Indonesia has only 69 green buildings, while its neighbor, Singapore, has already had about 2,000 buildings.

¹⁹ This study seeks to investigate the effect of green building implementation on business performance, a relatively understudied research issue. Currently, studies on green buildings usually come from civil and architectural engineering, mechanical engineering, landscape engineering, or even philosophy fields (e.g., Upton, 1996; Lent & Walsh, 2009; Ghaffarianhoseini et al., 2013; Sinha, 2013; Syahriyah, 2017; Effendi & Khamdevi, 2017). Thus, this study contributes to the business (more specifically accounting) literature by highlighting the relationship between green buildings and business performance. In particular, this study asks whether green building affects business performance.

Our study differs from previous ones by adding one continuous improvement and design process (CIDP) category of Green Building Council Indonesia (GBCI) from six to seven categories. We also focus on sustainable green building, starting from building construction to certification and maintenance and renovation.

This research informs firms (as occupants or building management) and the public that improving green building implementation progress will improve business performance because such action pays off financially. Our results also advise the ²⁰ Green Building Council Indonesia (GBCI) in evaluating their rating tools to measure green building implementation. Lastly, this study contributes to academia by highlighting the financial returns of green building investments.

2. Literature Review

2.1 Green Buildings

Indonesia has only recently tried to implement green buildings. Although numerous regulations have been issued, the implementation progress has been limited, and legal sanctions have not been implemented. Hence, persuasive approaches to educate the public about green buildings' efficient resource use are crucial.

Green buildings refer to sustainable buildings that are environmentally friendly and emphasize efficient resource use, such as efficient use of electricity, clean water, building materials (Shams & Rahman, 2017). Green buildings are more cost-efficient and environmentally friendly than conventional ones because of their better construction and management. Hence, green buildings arguably deliver

higher profits for firms. Additionally, they also highlight the importance of natural resources (planet) and their occupants (people) (Fan et al., 2018).

Buildings have to meet several criteria to be considered green. Various bodies propose different green building criteria. For example, the Leadership in Energy and Environmental Design uses six criteria: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process (Azhar et al., 2011). There are numerous green building measures, including using resource efficiently; relying on renewable energy; reducing waste and pollution and reusing used materials; having rooms with good air circulation and environmental quality; using non-polluting and sustainable building materials; using environmentally friendly design, construction, and management; using design, construction, and management that enhance their occupants' quality of life; and having designs adjustable to environmental changes (World Green Building Council, 2015). This study uses six indicators to measure green buildings, namely appropriate site development; energy efficiency and conservation; water conservation; material resources and cycle; indoor health and comfort; building environment and management; and continuous improvement and design process (Green Building Council Indonesia, 2013)

Some indicators deserve further explanation. Appropriate site development (ASD) refers to the selection and development of buildings' sites that take the environmental aspects into, such as community accessibility, public transport, site landscaping, bicycle facilities, and stormwater management (Green Building Council Indonesia (GBCI), 2011). Material resources and cycle (MRC) indicates

the use of environmentally friendly building materials to support buildings' performance in facilitating their occupants (Green Building Council Indonesia (GBCI), 2011).

Green buildings also prioritize their occupants' health and comfort. Healthy occupants (employees) will arguably contribute to their firms' performance. Hence, conducive commercial or institutional buildings will improve firms' efficiency in their business activities (Green Building Council Indonesia (GBCI), 2011). Meanwhile, building environmental management (BEM) deals with reliable waste and pollution management, highly qualified building professionals, reliable building management, and occupant survey (Green Building Council Indonesia (GBCI), 2011).

This study adds another indicator – continuous improvement and design process (CIDP) - in the analysis. Green buildings develop sustainably and offer competitive advantages that enable firms to improve their performance and respond to technological development (Qian & Chan, 2010). Buildings generally change over time. Hence, their functions are also sustainably adaptive to changing environments (Manewa et al., 2016). Green buildings are the component of sustainability tools that facilitate sustainable development (Barnes, 2012). Rapid technological and lifestyle changes require green building standards to constantly change or sustainably develop (Manewa et al., 2016).

Lent & Walsh (2009) suggest that green building measurement criteria need regular evaluation in responding to climate and periodical changes. Existing buildings without green buildings need to undergo continuous improvement and

design process by implementing one or several green building rating tools according to building management's financial capacity (Green Building Council Indonesia (GBCI), 2011). Green buildings' criteria are evaluated when the buildings are completely built (new buildings) and existing buildings by performing retrofit during buildings' lifetime. Hence, green buildings need continuous improvement and design process.

2.2 Triple Bottom Line

Abu & Wira (2010) argue that green building indicators are the basis of sustainable construction development. Green buildings play a crucial role in sustainable development by protecting environments and improving human life quality. Businesses need to achieve sustainability within the capitalistic social paradigm (Elkington, 1998).

¹⁸ Triple Bottom Line (TBL or 3BL), namely People, Planet, and Profit (3p), measures firms' success in three criteria: economy, environment, and society. In this study, people refer to buildings' occupants or managers, employees, consumers, or the general public. They are the main factors that maintain humane business growth and continuity. Meanwhile, the planet represents green buildings' surrounding environments that need protection by constructing buildings in the intended area, granting building permits from the governments, preparing lands for gardens and green open spaces, and parking areas for bicycles (Huo, Yu, & Wu, 2018). Lastly, profits are the results of highly qualified management teams that benefit firms and surrounding communities. Thus, green buildings, occupants,

building managers, and their environments are interrelated and mutually beneficial that they develop sustainably together (Zhang, Wu, & Liu, 2018).

2.3 Business Performance

Business performance is firms' ability to achieve their business objectives based on certain standards. A commonly used standard to measure business performance is a balanced scorecard that has been used for more than twenty years (Kaplan & Norton, 1996).

The balanced scorecard consists of four perspectives, namely learning and growth, internal business, customer, and financial perspectives. The learning and growth perspective emphasizes atmospheres that support organizational changes, enhancement, and growth. In the green building context, this perspective is measured with innovation in building construction and management, buildings' design and planning models, or blueprints that adhere to green building criteria (Kellen, 2003).

The internal business perspective emphasizes the business process that delivers products to customers effectively and efficiently. In the green building context, this perspective is measured with environmentally friendly building construction planning and design, building construction, and building construction activities.

Next, the customer perspective creates values and differentiation towards customers' perceptions. In the green building context, this perspective is measured with building occupants' satisfaction and convenience, and better health. Lastly,

the financial perspective refers to strategies for growth measured with efficient resource use in green buildings.

A balanced scorecard has been developed further by taking the environmental and societal factors into account. The environmental and societal perspective (sustainable performance) has been added as the fifth perspective into the sustainable balanced scorecard (SBSC) (Butler et al., 2011). In this respect, green buildings as sustainable tools appreciate efficient resource use and environmental sustainability. Thus, green buildings also support the fifth perspective of the sustainable balanced scorecard.

3. Hypothesis Development

3.1 The Effect of Green Building on Business Performance

Green buildings are sustainable buildings that efficiently consume electricity, clean water, building materials, and other resources. Consequently, buildings' operational costs can be minimized to improve buildings' managing firms (Vyas & Jha, 2017).

However, many still argue that green buildings are more expensive than conventional ones. Some firms continue prioritizing profits through cost efficiency (Collins et al., 2018). Investments in green buildings are indeed higher than in conventional ones. Hence, green building implementation requires support both from firms' internal and external parties. Internally, sufficient managerial skills and commitment concerning green buildings from top management teams are crucial. Externally, governments need to facilitate by encouraging firms to implement green

buildings, providing appreciation and incentives for firms that have implemented green buildings, and sanctioning non-implementing ones (Wimala et al., 2017)

Green buildings' market-based economic values should correspond to their investments. However, many are still unsure about green buildings' economic or real values. Thus, it takes overall analysis to evaluate whether green buildings increase greater revenues than initial investments, although green buildings arguably consume less electricity than conventional ones (Shimizu, 2013).

Green buildings are environmentally friendly and can be considered healthy buildings because they can positively affect occupant's or employees' health, improving firms' productivity. Further, firms can reduce employee health-related costs that will improve overall cost efficiency. In sum, consumers can choose buildings with lower costs and quality or more expensive ones but more healthy and with better quality that will improve their productivity and profits (Miller, Pogue, Gough, & Davis, 2009)

Countries exhibit different signs of progress in green building implementation because they have different interests and obstacles. For example, developing countries tend to face more obstacles in implementing green buildings because they still prioritize basic needs fulfillment. However, it is insufficient to solely rely on firms or buildings management to enhance green building implementation. Hence, governments need to offer supports in various aspects, namely providing reward and punishment systems embodied in green building regulations (legal aspect), offering incentives to firms that operationalize buildings with green building certificate (financial aspect), and disseminating knowledge of

green buildings to building management and the general public (educational aspect) (Azeem et al., 2017)

Green buildings' cost efficiency contribution is greater for high-rise buildings. They also support environmental protection by reducing carbon (CO₂) emissions. These factors increase property investors' willingness to pay and investments in green buildings and create demand shifts from conventional buildings to green ones, especially for middle-up market segments (Fuerst et al., 2011). In sum, green building implementation helps firms use electricity, clean water, and building materials more efficiently. Furthermore, green buildings enable firms to enhance business performance as measured with a sustainable balanced scorecard (SBSC).

Based on the above arguments, the following is our research hypothesis:

H1: Green buildings positively affects ¹⁴business performance

4. Research Methods

4.1 Population and Sample

¹⁴This research investigates the causal relationship between the variables to test the research hypothesis (Sekaran, 2015). The primary data is generated through an interview-based questionnaire (Creswell, 2013). Our population is property management firms that operationalize buildings.

31 buildings in Indonesia receive green building certificates from various organizations ⁹ such as Green Building Council Indonesia (GBCI) (Green Building Council Indonesia (GBCI), 2011), Green Mark (Singapore), Green Building Index

(Malaysia), ²⁸ Leadership in Energy and Environmental Design (Canada), and others. However, we can only contact 17 property management firms or 55% of these buildings. Meanwhile, we manage to contact operators of 68 non-green buildings of comparable size with green buildings to facilitate better comparisons. These buildings represent various building types, including malls, office buildings, hospitals, schools, campuses, hotels, modern markets, and governmental offices.

We select the respondents using purposive sampling technique based on certain criteria (Tongco, 2007). Our respondents are those who have sufficient knowledge of property management and property management firms' decision-makers, including property managers, finance managers, building managers, engineering managers, and facility managers. Because different buildings have different terms for these positions, we have to identify personnels' functions in these buildings carefully. These managers must have at least five years of experience and hold a bachelor's degree to qualify as our respondents. We contact these respondents through the Indonesian Mall Management Association (*APPBI*), Building Owners and Managers Association (*BOMA*), and personal contact with building management firms.

We develop the questionnaire by consulting with several certified green building consultants, property managers with greenship professional certification, a member of a green building certification institution, and a sustainable development manager and director of an Indonesian property firm. This questionnaire also takes respondents' character, understanding, and behavior into account (Taylor & Powell, 1998).

The study then interviews the respondents based on the questionnaire. The questionnaire initially asks respondents' profiles such as age, education level, and positions.

4.2 Variable Operationalization

Our dependent variable is business performance representing firms' achievement or performance by optimizing resources in their operating activities (Atkinson et al., 1997). More specifically, this study relies on a balanced scorecard for sustainability (BSCS) that consists of financial, customer, internal business process, learning and growth, social, and environmental perspectives. (Betianu et al., 2014). The measures of balanced scorecard for sustainability are energy efficiency of products (more efficient electricity use with similar service quality and comfort), disposal costs (reduced internal failure-related costs by recycling scraps), use of environmentally friendly raw materials, and use of green vendors (Butler et al., 2011). All indicators are measured with the interval scale.

The independent variable is green building that is defined as an environmentally friendly building with its design, construction, and management that can reduce or mitigate its negative effects and create positive effects on climate and natural environments (Jarad et al., 2010). This variable is measured with six indicators, namely appropriate site development, energy efficiency and conservation, water conservation, material resources and cycle, indoor health and comfort, and building environment and management (GBCI, 2011). Additionally, we also propose another indicator (continuous improvement and design process) as this study's novelty.

4.3 Data Analysis

We test the research variable with Structural Equation Modeling (SEM) because our research variables consist of sub-variables. Before testing the hypothesis, the validity and reliability tests are run with the confirmatory factor analysis, composite reliability, and cross-loadings, respectively (Ghozali, 2016). This research tests the hypothesis with the partial least square's inner weight outputs with the Smarpls software. A sample number of more than 100 is sufficient to recommend that PLS provides valid results (Hair et al., 2010). After data analysis, we conduct interviews with selected respondents to gain further insights into our results.

5. Results and Discussion

5.1 Respondents' Characteristics

This study focuses on buildings that are legally required to implement green buildings based on ¹Ministry of Civil Works and Public Housing Regulation No. 02/PRT/M/2015 concerning Green Buildings article 5 verse 3. The regulation classifies high or medium-rise ¹buildings with a minimum area of 5,000 meter square and height of two floors consume considerable energy, clean water, and other resources ¹(Ministry of Civil Works and Public Housing, 2015).

From 150 questionnaires distributed to the respondents through email and by hand, 126 questionnaires (84% of total questionnaires) return and are usable for analysis. The number of usable responses exceeds the minimum required sample number that must be five times the number of indicators (22) or 110 (Hair et al., 2010). Of 126 respondents, 35 (27% of total respondents) are officers of 14 firms

that manage buildings with green building certifications (40% of total buildings represented in the analysis). A high response rate (84%), comparable respondents (in terms of their building capacity, professional positions, the equal credibility of their firms), and our confirmation to the respondents arguably indicate that the responses are free from survival bias that threaten the quality of our data (Li & Xu, 2002; Sekaran & Bougie, 2016). These 126 respondents represent 89 buildings.

Table 1 displays the descriptive statistics of the respondents. Most respondents (67%) are between 41-55 years old. This finding is understandable because we focus on respondents with upper/ middle managerial positions as the respondents and those at this age range are more likely to hold these positions. Most respondents (61%) also hold a bachelor's degree and the rest obtain higher degrees. In terms of positions, 58% of the respondents answer that they are at functional manager levels, followed by general manager respondents (24 respondents or 19% of the total respondents). Next, 91 respondents, or 72.3% of total respondents, work at firms that manage buildings without green building certificate. Besides, respondents from office buildings dominate with 45 respondents or 36% of total respondents. Respondents also work in firms that operationalize relatively old buildings, with 81 respondents or 64% of total respondents who work at firms that manage buildings built between 1980 and 2010. Lastly, from 89 buildings selected, 30 buildings (34% of total buildings) are office buildings, followed by malls (21 buildings) and campuses (14 buildings).

Table 1
Respondents' Profiles (n=126)

No.	Respondents' Profile	Category	Frequency
1	Age	¹⁷ < 36 years 36-40 years 41-55 years 56-65 years	10 (7.9%) 19 (15%) 85 (67%) 12 (9.5%)
2	Education Degree	Bachelor Master PhD	77 (61%) 46 (31%) 3 (2%)
3	Managerial Position	Managers General Managers Director Other (including academicians)	73 (58%) 24 (19%) 9 (7%) 20 (16%)
4	Green Building	Non-Green Building Green Building	91 (72.2%) 35 (27.8%)
5	Building Type	Office Building Mall Campus Others	45 (36%) 35 (28%) 14 (16%) 30 (23.8%)
6	Building Age	Less than 10 years (built after 2010) More than 10 years (built between 1980-2010)	45 (36%) 81 (64%)

Source: SmartPLS Outputs

⁸ 5.2 Descriptive Statistics

Table 2 below illustrates the descriptive statistics of respondents' answers. In particular, respondents' firms have implemented green building criteria to a large extent, as indicated by the mean value of the green building variable (4.76), which is quite close to the maximum value of this variable (six). Similarly, the respondents also perceive that their firms have already achieved sufficiently high business performance, as indicated by the mean value of this variable (4.44). Additionally, small standard deviation values (less than two) indicate that each questionnaire

item's variance error does not spread too widely. In other words, our data qualifies for further analysis because it is not subject to outliers (Gujarati & Porter, 2009).

Table 2
The Descriptive Statistics of Respondents' Answers

Variabel	Mean	Mode	Std. Deviation	Min	Max
GB	4.76	6	1.34	1	6
BP	4.44	4	1.37	1	6

Source: *Output SmartPLS* version 3.9

5.3 Validity and Reliability Test

PLS starts with the outer model test to evaluate the instrument's construct validity and reliability (Cooper & Schindler, 2011). The validity test measures the validity of the questionnaire. ¹⁵ The construct validity test uses convergent validity, discriminant validity, and average variance extracted (AVE). The reliability test evaluates the measurement tool's consistency in measuring concepts or respondents' consistency in answering instruments. We use composite reliability and Cronbach's alpha as the reliability tests (Abdillah & Hartono, 2016).

Convergent validity measures the inter-item correlation or compound score with construct score. The reflective scores are considered high if they exhibit correlation scores with the measured constructs greater than 0.7 (Chinn, 1998). Similarly, as a rule of thumb, the loading factor must be > 0.7 to have convergent validity. Initially, the loading factors of several indicators of the green building variable are less than 0.7. Table 3 below displays the outer loading test results after eliminating the indicators with scores < 0.7.

Table 3

The Results of the Outer Loading Test -
After Eliminating Indicators < 0.7

No	Green Building (GB)		Business Performance (BP)	
	Indicator	Nilai	Indicator	Nilai
1	GB2c	0.724	BP1	0.913
2	GB3b	0.774	BP2	0.862
3	GB3c	0.761	BP3	0.926
4	GB4b	0.758	BP4	0.917
5	GB6a	0.825		
6	GB6c	0.767		
7	GB7a	0.768		
8	GB7b	0.801		
9	GB7c	0.750		

Source: SmartPLS Outputs

Table 3 also indicates that our new indicators of the green building variable (continuous improvement and design process) are valid because the loading factors > 0.7 (GB7a, GB7b, and GB7c). Hence, the table suggests that the data can be analyzed further.

As the discriminant validity test, we also identify whether ² the square root value of average variance extracted (AVE) of each construct is greater than the correlation between the construct with other constructs in the model that indicates that ¹¹ the model exhibits good discriminant validity scores (Ghozali, 2016). It is recommended that the AVE value is greater than 0.50 (Fornell & Larcker, 1981). ²⁴ The analysis reveals that all our AVE values are greater than 0.5 (untabulated). Specifically, the AVE values (the root square of AVE values) are 0.819 and 0.593 (0.905 and 0.770) for the business performance and green building variables, respectively.

The discriminant validity uses cross-loadings, square roots of AVE, and correlations between latent constructs as the parameters. As a rule of thumb, the discriminant validity is achieved when cross-loadings > 0.7 and the ²² square root of AVE $>$ correlation between latent constructs. The discriminant validity test indicates that all indicators have cross-loadings > 0.7 (untabulated). Thus, the variables are considered valid.

For the reliability test, we use ¹⁶ Cronbach's alpha and composite reliability. As a rule of thumb, the instruments are considered reliable if ¹³ Cronbach's alpha and composite reliability are greater than 0.7. The analysis reveals that all remaining indicators (after elimination) exhibit ²⁶ Cronbach's alpha and composite reliability $>$ 0.7 (untabulated). ²⁵ In particular, the Cronbach's alpha (composite reliability) values are 0.926 and 0.914 (0.947 and 0.929) for the business performance and green building variables, respectively. Hence, the constructs are sufficiently reliable.

Next, the structural model is evaluated with the R-square and Q^2 predictive relevance. As a rule of thumb, an R-square value greater than 0.67 indicates a strong prediction, 0.33 moderate prediction, and 0.19 weak prediction. Meanwhile, the Q^2 predictive relevance must be greater than zero to have predictive relevance (Chinn, 1998). The analysis shows that the R-square value is 0.643, suggesting that the independent variable (green building) explains 64.7 percent of business performance as the dependent variable. Meanwhile, the ¹⁰ Q^2 -square value is greater than 0 (0.802), implying that the model has a predictive relevance value.

Further, we use the Goodness of Fit (GoF) as the fit index measure. The R-square of the latent dependent variable is used to evaluate the model's goodness of

fit. The analysis shows that the GoF score is $0.657 > 0.36$ (a threshold of high goodness of fit). Thus, our model exhibit a high goodness of fit.

5.4 Hypothesis Testing

This study evaluates the t-statistic produced by *SmartPLS* software against the t-table value to test the research hypothesis. The output of this software estimates the latent variables as the aggregate linear of the indicators. We use a 5% significance level (one-tailed) as the criterion to accept the hypothesis. ⁸ Table 4 below displays the results of the hypothesis testing.

Table 4
The Results of Hypothesis Testing

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (tO/STDEV)	P Values	Conclusion
Green Building affects Business Performance	0.802	0.806	0.041	19.775	0.000	Positive effect

Significant at $p < 0.001$

Thus, our hypothesis that predicts that green building implementation positively affects business performance is empirically supported. In other words, buildings that adhere more to green buildings standards tend to enable property management firms to have better business performance than those that comply less to the standards.

6. Conclusions

This study demonstrates that green building (GB) implementation in Indonesia significantly affects business performance (BP). Thus, buildings' property management firms can improve their business performance by enhancing their

green building implementation, especially through continuous improvement and design process.

The findings offer several practical implications. First, property management firms need to develop green building management and green old building renovation (retrofit) standards. Second, property management firms need to require property managers, building managers, facility managers, and other officials related to building maintenance activities to have greenship professional (GP) certification. Third, property management firms need to cooperate with green building consultants to organize green building training at affordable prices. Lastly, property management firms need to assess the maintenance activities of old buildings with green building standards.

Besides, our results also offer the following suggestions to regulators, such as the Green Building Council Indonesia (GBCI), the Indonesian Accountant Association (IAI), and the government. First, the continuous improvement and design process indicator need to be included in the green building certification process because of climate and technological changes and more intense business competition. Second, the government needs to support green building implementation by various incentives, including lower property taxes for buildings with green building certification, providing home mortgage loans with zero down payment for homeownership or renovation with green building certificate (in cooperation with financial institutions). Third, the government needs to reduce the costs of applying for the certificate of worthiness (SLF) permits for buildings with

green building certificate. Lastly, the central government needs to require all regional governments to have green building regulations.

This study is subject to the following caveats. First, we have only a limited sample number relative to the population (all Indonesian property management firms). Second, our research topic is still relatively novel. Hence, we often need to explain the knowledge and information related to the topic to enable the respondents to understand the questions better. Third, not all respondents have sufficient knowledge of green building, and only a few of them have greenship professional certification.

Consequently, we advise future studies to address these issues in their research design. Further studies could also include additional variables, such as healthy habits, green culture, and carbon and climate change-related variables in the analysis. Lastly, studies that utilize secondary data from various countries will arguably contribute to the literature.

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