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Total Quality Management and Business Performance: The Mediating Role of Competitive Advantage in Palm Oil Production in Lampung Province

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Abstract. *This study deals with the influence of Total Quality Management (TQM) on business performance through competitive advantage. The purpose of this study is to determine how the influence of Total Quality Management on business performance with competitive advantage as a mediating variable on oil palm fruit producers in Lampung Province. The sample taken in this study was 115 heads of oil palm fruit farmer groups in Lampung Province. Sampling using a non-probability sampling method with random sampling techniques. This study uses a quantitative research type with descriptive statistical analysis and inferential statistical analysis. The method used is Partial Least Square (PLS) and uses SmartPLS 4 software. The results of this study indicate that Total Quality Management (TQM) has a positive and significant influence on business performance and competitive advantage on oil palm fruit producers in Lampung Province. Competitive advantage in mediating is not full because its influence is smaller than the direct influence.*

Keywords *Total Quality Management (TQM), Business Performance, Competitive Advantage, Oil Palm Fruit Producers*

1. INTRODUCTION

Lampung Province has begun developing palm oil as a driver of economic growth, despite previously being known as a center for sugarcane, pepper, cassava, and coffee commodities. In 2020, the palm oil plantation area in Lampung reached 196,312 hectares, ranking 13th nationally. Mesuji Regency has the largest area, covering 21,600 hectares, with a production capacity of 36,987 tons per year. According to GIS data in 2020, four regencies in Lampung (Mesuji, Central Lampung, Tulang Bawang, and Way Kanan) have palm oil plantation areas exceeding 12,000 hectares.

Palm oil farmers in Lampung face low fresh fruit bunch (FFB) production, averaging only 6.5-7.0 tons per hectare per year. This is due to limited fertilization (only 41% during the immature plant stage), the use of non-superior seeds, insufficient maintenance, and weak plantation management. Similar issues are also experienced by smallholder plantations in other regions. Observations and interviews reveal a lack of awareness about strict quality standards in production and insufficient training on best practices for farmers, leading to a decline in product quality. Synergistic collaboration and open communication within the plantation environment are essential to improving performance and achieving sustainable competitive advantage.

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The issue is related to Total Quality Management (TQM), which focuses on improving quality, preventing failures, and meeting consumer expectations. Research shows that TQM is effective in enhancing company performance (Callystha & Devie, 2013). Gazpersz (2011) states that leadership in quality management aims to improve performance, quality, and job pride. Wibowo (2007) adds that TQM requires strong leadership for strategic success, while Goestsch and Davis (2006) emphasize the importance of a quality culture within organizations. The producers' inability to control the selling price of their palm fruit can lead to not competitive and low performance.

To stay competitive and improve performance, companies can implement Total Quality Management (TQM), which fosters continuous improvement and enhances competitiveness (Chase et al., 2005). Sustainable competitive advantage helps achieve high performance and profits (Regina & Devie, 2013). Palm fruit producers face challenges in improving product quality, ensuring consistency, and managing low operational efficiency, complex supply chains, and sustainable practices.

The issue above relates to business performance, which for palm fruit producers involves evaluating production efficiency, resource management, and environmental sustainability. Business performance is crucial for palm fruit producers due to the industry's significant impact on the environment and local communities. Good performance ensures short-term profitability and supports environmental sustainability, reputation risk management, and stakeholder relationships. By prioritizing sustainable business performance, producers can optimize economic outcomes while preserving the environment and improving social impact. Business performance is the output of a company, measured against expected outcomes (Jahanshahi et al., 2012).

Empirical studies show that TQM influences company performance (Antari & Setiawan, 2022; Dinata & Purnawati, 2021). Hartono et al. (2023) and others found TQM impacts employee performance and resource effectiveness, while Bazazo et al. (2017) Bazazo et al. (2017) found no significant effect. Research on competitive advantage (Rahmawati et al., 2022; Ukab, 2021) shows a positive impact on performance. Competitive advantage drives business success through strategies that improve outcomes, making it a mediating variable for achieving strategic goals and customer value. Then, due to the research gap, the author conducts this study.

2. LITERATURE REVIEW

Total Quality Management (TQM)

Quality is crucial for companies, leading them to adopt various methods to improve. With time, Total Quality Management (TQM) emerged as a discipline aimed at continuously improving company performance at every operational level and functional area, utilizing available resources and human capital (Gazpersz, 2011). TQM emphasizes management's commitment to guiding the organization toward excellence in all aspects of products and services important to customers. The need for TQM arises from the goal of competing effectively in the global market by delivering the best quality. To achieve this, companies must continuously improve processes, the environment, and human capabilities. The best approach to ensure continuous improvement is by applying TQM principles. Implementing TQM enhances company profitability and competitiveness.

Competitive Advantage

Kotler & Amstrong (2003) define competitive advantage as the edge a company has over its competitors, either by offering lower prices or more benefits at higher prices. In business, competitors are not just those already in the market, but also potential entrants. Companies take pride in having a competitive advantage, feeling no pressure to surpass their competitors. Competitive advantage occurs when a company can do something others cannot or possess something competitors lack. The Industrial Organization approach suggests that external factors (industry) are more important than internal factors for achieving competitive advantage. According to Li et al. (2006) indicators for measuring a company's competitive advantage include price, quality, delivery dependability, product innovation, and time to market.

Business Performance

Performance reflects the achievement of a company's tasks to fulfill its vision, mission, goals, and objectives (Bastian, 2001). Performance is the willingness of individuals or groups to carry out tasks responsibly to achieve desired outcomes. It is the result of an individual's work aligned with their role and responsibilities within the company, measured against company standards. Performance is the comparison between an individual's actual output and the company's set standards. Prayhoego and Devie (2013), as adopted from Jahanshahi et al. (2012), identify three indicators for measuring company performance: financial performance, operational performance, and market-based performance.

Hyphotesis

H_1: Total Quality Management (TQM) has a significant positive effect on business performance of palm fruit producers in Lampung Province.

H_2: Total Quality Management (TQM) has a significant positive effect on competitive advantage of palm fruit producers in Lampung Province.

H_3: Competitive advantage has a significant positive effect on business performance of palm fruit producers in Lampung Province.

H_4: Competitive advantage mediates the effect of Total Quality Management (TQM) on business performance of palm fruit producers in Lampung Province.

3. METHODS

Types and Sources of Data

This research uses a quantitative approach to describe and explain social phenomena (Martono, 2015). Data sources include primary data, obtained directly from respondents through questionnaires (Sekaran & Bougie, 2013), and secondary data, collected from existing sources like journals and books (Sekaran, 2017).

Population and Sample

The population refers to a general group of subjects or objects with specific characteristics defined by the researcher (Sekaran & Bougie, 2013). In this study, the population consists of palm fruit farmer group leaders in Lampung Province. The sample, a subset of the population, was selected using non-probability sampling with a simple random sampling technique. Based on Hair et al. (2014), the sample size is determined by multiplying the number of indicators (16 x 7 =112), rounded to 115 respondents.

Data Collection Techniques

Data collection in this study was conducted using questionnaires. According to Sugiyono (2016), a questionnaire is a method of gathering data by providing written questions or statements for respondents to answer. The questionnaires were distributed to palm oil producers in Lampung Province, using a 5-point Likert scale ranging from 5 (Strongly Agree) to 1 (Strongly Disagree) to measure responses on the variables.

Operational Definition of Variables

Table 1. Operational Definition of Variables

Variable	Definition	Indicators	Scale
Total Quality Management (Independent Variable, X)	An integrated approach to achieving and maintaining high-quality output through continuous improvement, maintenance, and failure prevention across all company levels and functions to meet or exceed customer expectations (Flynn et al., 1994)	1. Top Management Support 2. Quality Information 3. Process Management 4. Product Design 5. Workforce Management 6. Supplier Involvement 7. Customer Involvement 8. Employee Empowerment (Flynn et al., 1994)	Likert
Competitive Advantage (Intervening Variable, Z)	The ability to create unique, inimitable value (Li et al., 2006)	1. Price 2. Quality 3. Delivery Dependability 4. Product Innovation 5. Time to Market (Li et al., 2006)	Likert
Business Performance (Dependent Variabel, Y)	Actual output of a company measured and compared to expected results. (Jahanshahi et al., 2012)	1. Financial Performance 2. Operational Performance 3. Market-Based Performance (Jahanshahi, et al., 2012)	Likert

Factor Analysis (Validity and Reability Test)

This study uses Partial Least Square (PLS) to test convergent and discriminant validity. Convergent validity is assessed by loading values (0.5–0.6 is adequate). Reliability is tested using Cronbach's Alpha, with values above 0.6 indicating good reliability (Jogiyanto & Abdillah, 2009).

Structural (Inner) Model, Coefficient of Determination (R^2), Path Coefficient

The structural model test evaluates the correlation between constructs using R^2 and Path Coefficient (β). R^2 measures the variation in the dependent variable explained by independent variables, with values above 0.1 acceptable. Path Coefficient, assessed through bootstrapping, shows the strength of relationships between constructs, with significant values above 0.1 and a p-value < 0.05.

Hyphotesis Test

This test uses bootstrapping with PLS analysis to assess hypothesis support by comparing t-statistics and t-table values. If t-statistics exceed t-table, the hypothesis is accepted. For p-value, a value less than 0.05 with $\alpha = 5\%$ indicates significance, and the t-table value is 1.96.

3. RESULTS

Outer Model

1. Convergent Validity: It measures the correlation between constructs and latent variables, assessed by the loading factor of each indicator. According to Hair et al. (2016), a loading factor greater than 0.70 indicates valid indicators for the construct. Here are the results from the SmartPLS v.4:

Table 2. Outer Loading Value

Variable	Item Codes	Competitive Advantage	Business Performance	Total Quality Management	Results
Competitive Advantage	CA01	0,902			Valid
	CA02	0,914			Valid
	CA03	0,908			Valid
	CA04	0,930			Valid
	CA05	0,905			Valid
	CA06	0,890			Valid
	CA07	0,937			Valid
	CA08	0,896			Valid
	CA09	0,903			Valid
	CA10	0,940			Valid
Business Performance	KB01		0,854		Valid
	KB02		0,789		Valid
	KB03		0,870		Valid
	KB04		0,873		Valid
	KB05		0,905		Valid
	KB06		0,819		Valid
Total Quality Management	TQM01			0,880	Valid
	TQM02			0,875	Valid
	TQM03			0,886	Valid
	TQM04			0,882	Valid
	TQM05			0,901	Valid
	TQM06			0,855	Valid
	TQM07			0,899	Valid
	TQM08			0,881	Valid
Total Quality Management	TQM09			0,886	Valid
	TQM10			0,873	Valid
	TQM11			0,872	Valid
	TQM12			0,876	Valid
	TQM13			0,871	Valid
	TQM14			0,890	Valid
	TQM15			0,887	Valid
	TQM16			0,879	Valid

Source: Processed data by the researcher (2024)

The analysis using the outer model shows that the smallest loading factor is 0.789 (KB02) and the largest is 0.940 (CA10). Since all indicators have loading factors greater than 0.7, they are valid for measuring the constructs.

2. Discriminant Validity: It measures how distinct a construct is from others by comparing the square root of the Average Variance Extracted with correlations between constructs. It is considered valid if the square root of the AVE is higher than the correlations with other constructs (Fornell-Larcker criterion) (Sekaran & Bougie, 2013).

Table 3. Latent Variable Correlation

Variable	Competitive Advantage	Business Performance	Total Quality Management
Competitive Advantage	**0,913**		
Business Performance	0,765	**0,853**	
Total Quality Management	0,725	0,792	**0,881**

Source: Processed data by the researcher (2024)

The square root of the AVE for each variable is 0.913, 0.853, and 0.881, all higher than the correlations between constructs. Discriminant validity can also be tested using cross-loading values.

Table 4. Cross Loading Value

Variable	Item Codes	Competitive Advantage	Business Performance	Total Quality Management
Competitive Advantage	CA01	**0,902**	0,717	0,678
	CA02	**0,914**	0,661	0,686
	CA03	**0,908**	0,707	0,615
	CA04	**0,930**	0,708	0,671
	CA05	**0,905**	0,703	0,691
	CA06	**0,890**	0,646	0,616
	CA07	**0,937**	0,743	0,692
	CA08	**0,896**	0,646	0,643
	CA09	**0,903**	0,712	0,652
	CA10	**0,940**	0,730	0,670
Business Performance	KB01	0,629	**0,854**	0,648
	KB02	0,621	**0,789**	0,645
	KB03	0,726	**0,870**	0,670
	KB04	0,640	**0,873**	0,738
	KB05	0,628	**0,905**	0,687
	KB06	0,663	**0,819**	0,659
Total Quality Management	TQM01	0,713	0,752	**0,880**
	TQM02	0,572	0,663	**0,875**
	TQM03	0,668	0,716	**0,886**
	TQM04	0,599	0,657	**0,882**
	TQM05	0,660	0,704	**0,901**
	TQM06	0,609	0,663	**0,855**
	TQM07	0,674	0,728	**0,899**
	TQM08	0,629	0,710	**0,881**
	TQM09	0,658	0,704	**0,886**
	TQM10	0,597	0,709	**0,873**
	TQM11	0,639	0,677	**0,872**
	TQM12	0,613	0,691	**0,876**
	TQM13	0,644	0,700	**0,871**
	TQM14	0,623	0,684	**0,890**
	TQM15	0,694	0,731	**0,887**
	TQM16	0,602	0,657	**0,879**

Source: Processed data by the researcher (2024)

Cross-loading helps determine if a construct has adequate discriminant validity by comparing its loading values with those of other constructs (Hair et al., 2017). As shown in Table, the correlations for competitive advantage, business performance, and total quality

management with their respective items are higher than with other variables, indicating no issues with discriminant validity based on cross-loading.

Table 5. HTMT Criteria

Variable	Competitive Advantage	Business Performance	Total Quality Management
Competitive Advantage			
Business Performance	0,803		
Total Quality Management	0,738	0,830	

Source: Processed data by the researcher (2024)

The Heterotrait-Monotrait Ratio (HTMT) is the average correlation ratio between inter-item measurements of variables compared to the geometric mean of the average inter-item correlations. According to Hair et al. (2021), the accepted HTMT threshold is <0.9. Shown in Table, all HTMT analysis results in this study are <0.9, indicating validity.

3. Reability Test: It verifies if a research variable is reliable. A study is considered reliable if Cronbach's alpha >0.6, composite reliability >0.7 (Ghozali, 2016).

Table 6. Reability Test Results

Variable	Cronbach's alpha	Composite reliability	AVE	Results
Competitive Advantage	0,978	0,980	0,833	Reliable
Business Performance	0,924	0,941	0,727	Reliable
Total Quality Management	0,981	0,982	0,776	Reliable

Source: Processed data by the researcher (2024)

Cronbach's alpha for each variable is >0.6, composite reliability >0.7, and AVE >0.5, indicating that the variables in this study are valid and reliable. Then Figure 1. below shows that the model meets good statistical criteria: loading factors >0.7, composite reliability >0.7, AVE >0.5, and good discriminant validity. The model is ready for inner model analysis.

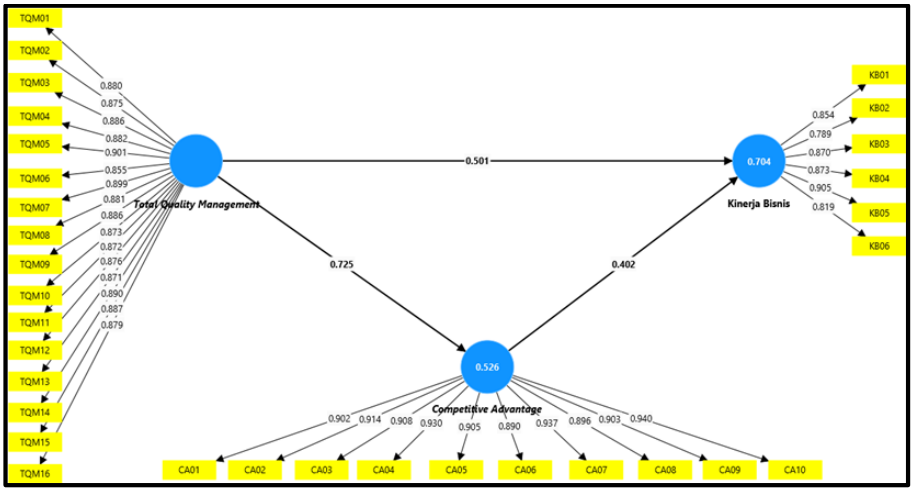

Figure 1. Outer Model Output by SmartPLS
Source: Processed data by the researcher (2024)

Inner Model (Structural)

1. Hypothesis Test (Direct Effect): Hypothesis testing was conducted using SmartPLS with bootstrapping, examining the path coefficient, t-statistics, and p-value. If t-statistics >1.96 and p-value <0.5, the coefficient is statistically significant and reliable (Hair et al., 2016).

Table 7. Hypothesis Test Results (Direct Path)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T- statistics	P- values	Results
Total Quality Management -> Business Performance	0,501	0,498	0,073	6,874	0,000	Significant
Total Quality Management -> Competitive Advantage	0,725	0,714	0,074	9,786	0,000	Significant
Competitive Advantage -> Business Performance	0,402	0,398	0,074	5,421	0,000	Significant

Source: Processed data by the researcher (2024)

Table 7. shows that all path coefficients are positive, indicating a positive relationship between variables. Additionally, all t-statistics are greater than 1.96, and all p-values are below 0.05.

2. R-Square: R-Square measures the impact of independent latent variables on the dependent variable. An R-Square of 0.75 is considered strong, 0.50 moderate, and 0.25 weak (Hair et al., 2011). Table 9 below shows an R-Square of 0.526 (52.6%) for business performance and competitive advantage, and 0.704 (70.4%) for the relationship between both variables. These results indicate a moderate R-Square.

Table 8. R-Square Value

Variable	R-square	R-square adjusted
Competitive Advantage	0,526	0,522
Business Performance	0,704	0,699

Source: Processed data by the researcher (2024)

3. Mediation Test (Spesific Indirect Effect): Mediation testing examines the indirect relationship between independent and dependent variables through a mediator. If t-statistics >1.96 and p-value <0.5, the coefficient is statistically significant and reliable (Hair et al., 2016). Table 10 below shows that Total Quality Management positively and significantly affects business performance through competitive advantage, with a path coefficient of 0.291, t-statistics of 4.383, and a p-value of 0.000. Competitive advantage partially mediates the relationship, supporting Hypothesis 4.

Table 9. Mediation Test Result (Spesific Indirect Effect)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T- statistics	P- values	Result
Total Quality Management -> Competitive Advantage-> Business Performance	0,291	0,286	0,066	4,383	0,000	Significant

Source: Processed data by the researcher (2024)

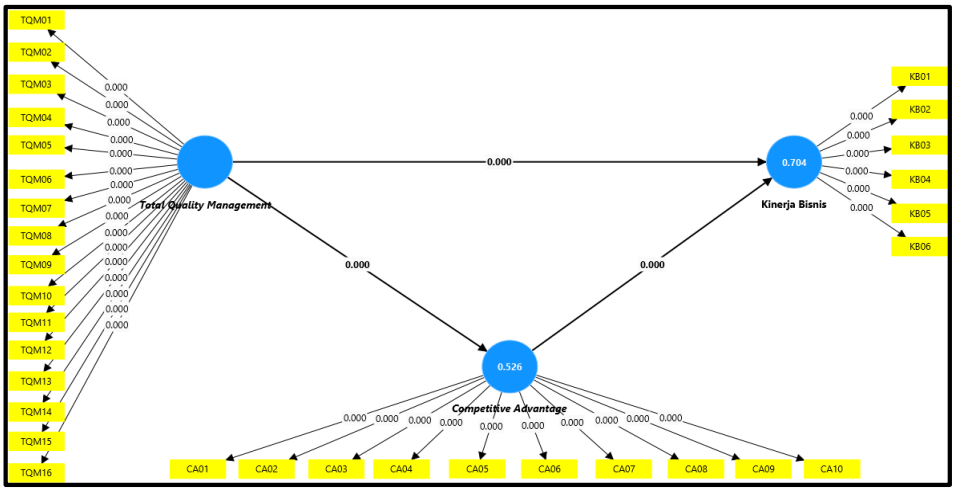

Figure 2. Inner Model Output by SmartPLS
Source: Processed data by the researcher (2024)

Figure 2. shows the proposed model meets good statistical characteristics, with all variables, t-statistics >1.96, p-values <0.05, it's positive and significant relationships.

Discussion

The Impact of Total Quality Management on Business Performance of Palm Fruit Producers in Lampung Province

This study shows that Total Quality Management (TQM) has a positive and significant impact on business performance. Palm fruit producers can leverage TQM's relationship with farmers to improve their business performance. The influence occurs when group leaders effectively implement quality management systems within their farmer groups, which leads to better business outcomes. By focusing on quality, TQM aligns with previous studies suggesting it is a best practice approach for enhancing company performance (Callystha & Devie, 2013). Gaspersz (2006) stated that quality management aims to improve quality, output, productivity, and employee pride. Regina & Devie (2013) found a significant link between TQM and company performance. Research by Muhmas & Sujiyani (2018) confirms that TQM positively

affects business performance, and Hilman et al. (2020) show that using TQM effectively improves performance.

The Impact of Total Quality Management on Competitive Advantage of Palm Fruit Producers in Lampung Province

The study shows that Total Quality Management (TQM) has a positive and significant impact on competitive advantage. A well-implemented TQM can enhance the competitive edge of palm fruit producers. Producers who adopt TQM gain an advantage over those who do not. To improve business performance and compete effectively, palm fruit producers are encouraged to implement TQM in their operations. As competition intensifies, many producers adopt TQM as a strategy to meet consumer demands. TQM, viewed as a management philosophy, aims to achieve competitive advantage through continuous improvement, contributing to both competitiveness and business performance (Chase et al., 2005). This aligns with studies by Regina & Devie (2013), Firman (2021), Irmadhani et al. (2019), and Minci (2018), which confirm a significant relationship between TQM and competitive advantage. According to Hardiani (2019), competitive advantage is crucial for sustaining continuous improvement and strengthening business competitiveness, while TQM enhances competitiveness by focusing on customer needs, continuous improvements, and employee skills development through training (Firman, 2021).

The Impact of Competitive Advantage on Business Performance of Palm Fruit Producers in Lampung Province

The study shows that competitive advantage has a positive and significant impact on business performance. This indicates that a strong competitive advantage can improve the business performance of palm fruit producers. Producers with high competitiveness, influenced by Total Quality Management (TQM), tend to perform better as they can compete effectively in a dynamic and competitive market. It is recommended that producers develop a unique system with distinct advantages, delivering value to customers by meeting market demands efficiently (Heizer & Rander, 2015). Research by Majeed (2011) also highlights that each organization's uniqueness contributes to its competitive advantage, ultimately improving performance. Studies by Regina and Devie (2013), Alipour and Mohammadi (2011), and Agha (2012) support the significant relationship between competitive advantage and company performance.

Competitive Advantage Mediates the Relationship Between Total Quality Management and Business Performance of Palm Fruit Producers in Lampung

The results of the mediation test show that competitive advantage mediates the effect of Total Quality Management (TQM) on business performance. This indicates that competitive advantage plays an important role as a mediator between TQM and the business performance of palm fruit producers. Producers with strong competitive advantage tend to have better performance, as good management quality and innovative strategies help businesses meet consumer demands by providing excellent service and quality products. This finding is consistent with previous studies by Firman (2021), Irmadhani, Atika, & Junaidi (2019), Hardiani (2019), Minci (2018), and Regina & Devie (2013), showing a significant positive mediation effect. However, the mediation is partial, as the effect is smaller compared to the direct impact.

4. CONCLUSION AND LIMITATION

Conclusion

The study, which involved 115 palm fruit producers in Lampung Province, found that Total Quality Management (TQM) has a significant positive impact on both business performance and competitive advantage. Effective TQM implementation leads to improved business performance and enhances competitive advantage among producers. Additionally, competitive advantage was found to significantly improve business performance, as farming groups with a strong competitive edge perform better. Furthermore, competitive advantage was shown to mediate the relationship between TQM and business performance, indicating that when TQM is effectively applied, it strengthens competitiveness, which in turn boosts business performance.

Limitation

The limitations of this study include its focus on palm fruit producers in Lampung Province, which may not be representative of other regions. Data collection relied on self-reported questionnaires, which may introduce response bias. The study's cross-sectional design limits the ability to infer causality, and external factors such as government policies or economic conditions were not considered in the analysis.

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