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The Role of Internet Usage in Enhancing Economic Freedom through International Trade in Developing Southeast Asian Countries

Monika Andrasari[*1], Hafnida Hasan[2], Lucky Satria Pratama[3], Dewi Ratna Sari Simatupang[4]
[1,4]*Universitas Sumatera Utara, Medan, 20155, Indonesia*
[2]*Applied Science University, East Al-Ekir, 5055, Bahrain*
[3]*Universitas Negeri Medan , Medan,20221, Indonesia*
[*]Corresponding Author: andramonika@usu.ac.id

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ABSTRACT
This study examines the impact of internet usage on economic freedom, with a particular focus on the mediating role of trade openness in developing Southeast Asian countries. Utilizing a quantitative explanatory approach with Partial Least Squares–Structural Equation Modeling (PLS-SEM), the analysis is based on balanced panel data from ten ASEAN member states—Indonesia, Malaysia, Thailand, the Philippines, Vietnam, Singapore, Myanmar, Laos, Cambodia, and Timor-Leste—covering the period from 2011 to 2022. The findings reveal a significant and positive direct effect of internet usage on economic freedom. However, the indirect effect through trade openness is statistically insignificant, suggesting that digitalization promotes economic freedom primarily through direct mechanisms rather than by increasing trade integration. Moreover, institutional quality, as measured by the Corruption Perceptions Index (CPI), shows a stronger influence on trade openness than internet access alone. These results underscore the importance of aligning digital transformation efforts with institutional reforms and good governance to fully capitalize on the benefits of the digital economy. This study offers empirical contributions to the literature on digitalization, trade liberalization, and economic freedom, and provides actionable policy insights for developing countries undergoing digital transitions.
Keywords: Economic Freedom, Internet Usage, Trade Openness, Corruption Perceptions Index, ASEAN, Developing Countries

1. Introduction

The advancement of information and communication technologies, particularly the internet, has become a central driver of global economic transformation, including in developing countries. The internet has evolved beyond a mere communication tool into a vital infrastructure that supports cross-border economic activities. In the era of globalization, digital connectivity accelerates market integration, strengthens global supply chains, and broadens access to information and economic opportunities. In this context, economic freedom—defined as the ability of individuals and economic entities to operate without excessive state intervention—emerges as a critical indicator for assessing how countries leverage digitalization to foster inclusive and sustainable growth.

In Southeast Asia, the internet has been strategically utilized to enhance competitiveness through expanded international trade, increased financial inclusion, and the creation of new markets. Countries such as Indonesia, Malaysia, and Vietnam have made notable progress in using digital platforms to boost export access and improve economic efficiency (Putri, 2022; Suryaningrum et al., 2023). Nevertheless, structural challenges persist, including digital divides, weak governance, and a reliance on foreign investment that remains unevenly distributed (Ichvani & Sasana, 2019; Savira & Amaliah, 2023). These challenges highlight that while the

internet opens pathways for strengthening economic freedom, its success is heavily contingent upon institutional conditions in each country.

As internet adoption rises across developing nations, understanding the specific mechanisms linking digitalization to economic freedom—particularly through international trade—remains limited. Structural inequalities such as weak regulatory quality, corruption, infrastructure gaps, and limited digital literacy hinder the full realization of digital potential (Ichvani & Sasana, 2019). While some countries have successfully expanded exports through digital platforms (Putri, 2022), many have yet to integrate digital transformation into inclusive trade systems and regulatory frameworks. This raises a fundamental question about how the interrelation among digitalization, international trade, and economic freedom can be empirically demonstrated. The existing literature generally suggests that the internet can serve as a catalyst for market expansion and economic efficiency, ultimately enhancing economic freedom (Suryaningrum et al., 2023). Digital technology enables businesses—including micro, small, and medium enterprises (MSMEs)—to access global markets, eliminate intermediaries, and connect more easily to digital financial services. However, the role of the state remains essential to ensure that digitalization does not widen inequalities or reinforce the dominance of large economic actors. Through inclusive economic policies—such as improving digital literacy, reforming trade regulations, and developing equitable digital infrastructure—developing countries can strengthen their position in the global digital economy (Supriandi et al., 2023; Kusumawardhana, 2023).

Previous studies have found that the internet can indirectly promote economic freedom by increasing international trade participation. The internet facilitates rapid information flows, connects businesses with global markets, and lowers transaction costs (Suryaningrum et al., 2023). Cross-border e-commerce platforms enable small firms to engage in export markets without complex and costly traditional procedures. Furthermore, digitalization enhances financial inclusion, which is essential for economic participation. Access to formal financial services through digital means has been shown to increase purchasing power, reduce poverty, and create jobs (Nugroho & Farida, as cited in Suryaningrum et al., 2023).

However, the effectiveness of these channels depends significantly on institutional quality and regulatory capacity. Ichvani and Sasana (2019) found that weak governance and high levels of corruption can obstruct the equitable distribution of digitalization's benefits. In contrast, Sihombing (2022) observed that some countries have responded to these challenges by introducing digital tax policies and enhancing oversight of foreign digital firms, as part of a broader effort to balance liberalization with national interest protection.

While current literature provides a strong theoretical foundation on the nexus between digitalization and economic integration, most studies remain focused on partial relationships between information technology and economic growth. Few explicitly examine economic freedom as an independent variable in the context of international trade (Putri, 2022; Suryaningrum et al., 2023). Moreover, institutional challenges such as corruption and regulatory deficiencies continue to hamper the linkage between digitalization and expanded economic freedom (Ichvani & Sasana, 2019; Savira & Amaliah, 2023). Although regulatory improvements have been initiated, empirical studies that directly test the mediating role of international trade in the relationship between internet use and economic freedom remain scarce—especially within the Southeast Asian context.

Against this backdrop, this article seeks to address both empirical and conceptual gaps by developing a model that simultaneously examines the linkages among internet usage, international trade, and economic freedom. The study employs panel data from ten ASEAN countries, offering institutional and digital adoption diversity. In doing so, this research aims to provide a more comprehensive understanding of the dynamics between digitalization and economic liberalization in Southeast Asia.

2. Literature Review

2.1 Internet as a Driver of Transparency and Economic Activity

The internet plays a transformative role in enhancing transparency, accountability, and informational efficiency, thereby fostering economic activity. As a medium for real-time communication and data dissemination, it allows the public to access economic information, monitor government performance, and engage more actively in the formal economy.

Empirical evidence from Hajriyanti and Ester (2019), based on data from 15 districts in Aceh from 2010 to

2017, shows that internet use contributes positively to economic growth by strengthening the financial sector. Broader access to information and financial services increases community participation in economic activities, thereby promoting economic freedom. Moreover, the internet amplifies public pressure against unethical economic practices, supports resource transparency, and enhances civil oversight of policy-making. These dynamics underscore the internet's strategic potential in building open, participatory economic systems.

2.2 Economic Openness and Global Market Integration

Economic openness—reflected in trade intensity, market liberalization, and financial integration—has been widely linked to accelerated economic growth and improved human development. In the ASEAN region, openness has contributed to improved human development indices and workforce quality (Azzaki, 2021), both of which are integral to advancing economic freedom. Amalia and Hasmarini (2024) found that openness significantly influences economic growth in six ASEAN countries during 2018–2022. International trade, particularly exports, facilitates access to new technologies and larger markets, thereby increasing domestic income and economic opportunities.

At a broader level, openness strengthens national positions within the global economy, fosters technology transfer, and accelerates foreign capital accumulation. Purnomo (2020) argues that financial sector liberalization enables the inflow of foreign capital and technology, which are crucial for advancing economic freedom.

2.3 Corruption Perceptions Index (CPI) as a Proxy for Institutional Quality

Corruption is a major impediment to building a transparent and competitive economic environment. The Corruption Perceptions Index (CPI) is widely used as a proxy for institutional quality and governance effectiveness. Countries with high corruption levels tend to experience lower economic growth, weaker investment climates, and constrained economic freedom.

Rijal et al. (2023) emphasize that government transparency and integrity are essential for building regional competitiveness and economic performance. An improved CPI not only attracts investment but also broadens economic freedom through more equitable market mechanisms. The CPI also affects economic openness. As trade and capital flows expand, transparency becomes increasingly essential. Poor institutional quality often impedes the equitable distribution of trade benefits due to rent-seeking behavior and corruption.

2.4 The Dynamic Interplay Between Internet Use, Trade Openness, and Corruption

Internet usage, trade openness, and institutional quality form an interdependent system that collectively shapes economic freedom. The internet can enhance transparency, reduce corruption, and accelerate market integration. In parallel, economic openness exerts external pressure on poor governance through global oversight mechanisms and international competition. Purba et al. (2024) argue that economic openness reduces income inequality, thereby expanding economic participation. In this regard, internet access enables the dissemination of corruption-related information and public policy awareness, which increases civic engagement and governmental accountability.

Nurdin and Fuady (2021) add that effective economic policies—including in the energy sector—are contingent on low corruption. Sustainable energy consumption, as part of a green growth agenda, is feasible only in the presence of clean institutions and open information systems. This implies that the internet is not merely a technological tool but also a social infrastructure for governance and sustainable development.

2.5 Convergence Toward Economic Freedom

Both global and regional literature affirm that the integration of internet use, economic openness, and institutional integrity directly contributes to enhanced economic freedom. Digital policies grounded in transparency and inclusiveness foster healthier business environments and support market efficiency. Conversely, the absence of any one of these factors—especially institutional quality—can undermine the benefits of the other components.

MY et al. (2023) show that economic growth is significantly influenced by the interaction between monetary policy and trade openness. Additionally, accessible economic information via the internet empowers individuals to make rational decisions about investment and consumption, reflecting economic freedom at the individual level. Collectively, these insights support an empirical model examining how internet use affects economic freedom through the mediating role of international trade and the moderating effect of institutional

quality, as reflected by CPI. This complex interplay underscores that economic freedom is not determined by a single macroeconomic factor but results from the synergy between technology, market integration, and institutional governance.

Based on the theoretical framework and causal modeling approach, the study formulates the following hypotheses:
H1: Internet usage has a positive effect on economic freedom.
H2: Internet usage has a positive effect on international trade.
H3: International trade has a positive effect on economic freedom.
H4: International trade mediates the effect of internet usage on economic freedom.

3. Research Methodology

3.1 Research Design and Analytical Approach

This study adopts a quantitative explanatory approach using a panel mediation model to assess the direct and indirect effects of internet usage on economic freedom, with international trade serving as a mediating variable. This approach enables the simultaneous estimation of causal relationships across multiple countries and time periods. The model includes the Corruption Perceptions Index (CPI) as a control variable to account for the role of institutional quality in influencing trade openness and economic freedom.

3.2 Scope and Data Sources

The study utilizes balanced panel data from ten ASEAN member countries—Indonesia, Malaysia, Singapore, Thailand, the Philippines, Vietnam, Myanmar, Laos, Cambodia, and Timor-Leste—covering the period from 2011 to 2022. These countries were selected based on data availability, variation in digital adoption, and institutional and economic heterogeneity. The primary data sources include:
• World Bank (World Development Indicators): Internet users (% of population), Trade Openness (% of GDP).
• Heritage Foundation: Annual Economic Freedom Index and sub-indices.
• Transparency International and Worldwide Governance Indicators (WGI): Corruption Perceptions Index (CPI).
All data were standardized to ensure cross-country comparability and model stability.

3.3 Operational Definitions of Variables

The study involves four main variables:
• Internet Usage (X): Measured as the percentage of individuals using the internet relative to the total population.
• Trade Openness (Z) : Measured as the ratio of total exports and imports to Gross Domestic Product (GDP)
• Economic Freedom (Y): Measured using the Economic Freedom Index published by the Heritage Foundation.
• Corruption Perceptions Index (CPI): Measured using the annual CPI scores from Transparency International.

3.4 Analytical Technique

The primary analytical method is Partial Least Squares–Structural Equation Modeling (PLS-SEM) using SmartPLS version 4.0. This method is selected due to its advantages in:
• Handling complex causal models with simultaneous direct and indirect paths.
• Tolerance to non-normal data distributions and relatively small sample sizes.
• Suitability for regional panel data involving reflective indicators and multivariate structures.

3.5 Statistical Testing Procedures

The statistical analysis is conducted in two major stages:

a. Measurement Model (Outer Model):
• Convergent Validity: Factor loading ≥ 0.70; Average Variance Extracted (AVE) ≥ 0.50.
• Construct Reliability: Composite Reliability (CR) ≥ 0.70; Cronbach's Alpha ≥ 0.70.

b. Structural Model (Inner Model):
• Path coefficient estimation, t-statistics, and p-values.
• R^2 values for explanatory power of endogenous variables.
• Q^2 and f^2 for predictive relevance and effect size evaluation.

Mediation analysis is performed using a bootstrapping approach with 5,000 replications. The mediation path is considered significant if the product of the indirect effect ($\alpha_1 \times \beta_2$) yields a p-value < 0.05 and the 95% confidence interval does not include zero.

4. Results and Discussion

4.1 Measurement Model Evaluation

The measurement model demonstrates satisfactory validity and reliability. All constructs exhibit strong internal consistency, with Composite Reliability (CR) values exceeding 0.88 and Average Variance Extracted (AVE) values above 0.78. Outer loadings for all indicators surpass 0.838, except for the Corruption Perceptions Index (CPI), a single-item construct with a loading of 1.000. Discriminant validity is confirmed via both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio, indicating clear conceptual distinction among latent variables.

4.2 Structural Model Results

The structural model estimation reveals the following key relationships:

- Internet usage → Economic freedom: positive and significant ($\beta = 0.213$, $p = 0.026$).
- Internet usage → Trade Openness: positive and highly significant ($\beta = 0.310$, $p < 0.001$).
- Trade Openness → Economic freedom: positive but not significant ($\beta = 0.263$, $p = 0.182$).

The indirect path from internet usage to economic freedom via international trade is not statistically significant, with an indirect effect coefficient of 0.082 ($p = 0.158$). This suggests that internet use promotes economic freedom primarily through direct rather than mediated pathways.

The explanatory power of the model is strong, with R^2 values of 0.895 for international trade and 0.835 for economic freedom, indicating high predictive capability. The effect size analysis shows that CPI has a large effect on trade openness ($f^2 = 3.220$), whereas the effect of internet usage on economic freedom is moderate ($f^2 = 0.111$).

Table 1. Outer Loading Values in the Initial Measurement Model Test

Indicator	Outer Loadings
X1.2 < - X1. Internet User	**0.951**
X2.1 < - X2. Corruption Perception Index	**1.000**
Y1.1 < - Y1. Economic Freedom	**0.935**
Y1.2 < - Y1. Economic Freedom	**0.838**
Z1.1 < - Z1. Trade Openness	**0.981**
Z1.2 < - Z1. Trade Openness	**0.982**
X1.1 < - X1. Internet User	**0.962**

Source: Data Processed, 2025

Table 1 presents the results of the outer loading test at the initial stage of the measurement model. Outer loading values are used to assess the strength of the relationship between each indicator and its corresponding latent construct. According to the criteria proposed by Hair et al. (2019), an outer loading of ≥ 0.70 indicates acceptable convergent validity. The initial test results show that most indicators have high outer loading values, indicating that these indicators adequately represent their respective latent variables.

Tabel 2. Discriminant validity

	X1 Internet User	X2 Corruption Perception Index	Y1 Economic Freedom	Z1 Trade Openness
X1 Internet User	**0.957**			
X2 Corruption Perception Index	0.600	**1.000**		
Y1 Economic Freedom	0.716	0.879	**0.888**	
Z1 Trade Openness	0.746	0.913	0.888	**0.981**

Source: Data Processed, 2025

Table 2 presents the results of the discriminant validity test, which aims to ensure that each construct in the model is truly distinct from the others. This test is conducted by comparing the square root of the Average Variance Extracted (AVE) with the correlations between constructs. The results show that the square root of

the AVE for each construct is greater than the inter-construct correlations, thus meeting the Fornell–Larcker criterion. This indicates that each construct is clearly differentiated and that there is no overlap among the latent variables.

Table 3 Cronbach's Alpha, CR and AVE Values

	Cronbach's Alpha	Composite Reliability (Rho_A)	Composite Reliability (Rho_C)	Average Variance Extracted (Ave)
X1 INTERNET USER	**0.908**	**0.919**	**0.956**	**0.915**
Y1 ECONOMIC FREEDOM	**0.742**	**0.838**	**0.881**	**0.788**
Z1 TRADE OPENNESS	**0.962**	**0.963**	**0.981**	**0.963**

Source: Data Processed, 2025

Table 3 presents the results of the construct reliability test using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). Cronbach's Alpha and CR are used to measure the internal consistency among indicators within a construct. According to the literature, acceptable values for Cronbach's Alpha and CR are above 0.70. Meanwhile, the recommended minimum AVE value is 0.50, indicating that more than 50% of the variance in the indicators is explained by the latent construct. The test results show that all constructs have Cronbach's Alpha and CR values above 0.70, as well as AVE values above 0.50. This indicates that the constructs in the model demonstrate strong reliability and meet the criteria for convergent validity.

Tabel 4. R-Square

	R-square	R-square adjusted
Y1 Economic Freedom	**0.835**	**0.824**
Z1 Trade Openness	**0.895**	**0.890**

Source: Data Processed, 2025

Table 4 presents the R^2 values, which reflect the ability of the independent variables to explain the variance in the dependent variables. According to Hair et al. (2019), an R^2 value of 0.67 is considered strong, 0.33 moderate, and 0.19 weak. The analysis results show that the R^2 values for each endogenous construct fall within the moderate to strong category, indicating that the model explains a significant proportion of variance in the dependent variables. Therefore, the model demonstrates good predictive power and is suitable for use in the structural analysis stage.

Tabel 5.F-Square

	f-square
X1 Internet User → Y1 Kebebasan Ekonomi	**0.111**
X1 Internet User → Z1 Trade Openness	**0.587**
X2 Corruption Perception Index → Y1 Economic Freedom	**0.240**
X2 Corruption Perception Index → Z1 Trade Openness	**3.220**
Z1 Trade Openness → Y1 Economic Freedom	**0.044**

Source: Data Processed, 2025

Table 5 presents the results of the f^2 effect size analysis, which is used to assess the strength of each independent variable's effect on the dependent variables. According to Cohen's (1988) criteria, an f^2 value of 0.02 is considered small, 0.15 medium, and 0.35 large. Based on the test results, most independent variables fall within the medium to large categories, indicating that each construct contributes substantively to the endogenous variables. This strengthens the evidence that the model has solid structural relevance.

1. Effect of Internet Users on Economic Freedom ($f^2 = 0.111$)
This value falls into the small category, suggesting that the number of internet users has a limited effect on the level of economic freedom. Despite increasing internet usage, its impact on economic freedom remains modest and not yet significant.

2. Effect of Internet Users on Trade Openness ($f^2 = 0.587$)
This value is categorized as large, indicating that internet usage plays a substantial role in boosting trade activity. This suggests that technological advancement and internet accessibility strongly drive growth in both digital and conventional trade sectors.
3. Effect of Corruption Perception Index on Economic Freedom ($f^2 = 0.240$)
This value is considered medium, indicating that perceptions of corruption significantly influence economic freedom. Improved perceptions of corruption (i.e., lower corruption levels) are associated with greater potential for enhancing economic freedom in a country.
4. Effect of Corruption Perception Index on Trade Openness ($f^2 = 3.220$)
This is a very large value, showing that CPI is the most dominant factor influencing trade activity. Lower corruption levels create a healthier business environment, significantly stimulating trade growth.
5. Effect of Trade Openness on Economic Freedom ($f^2 = 0.044$)

This value is categorized as small, indicating that increased trade activity contributes only modestly to economic freedom. Although trade is growing, its overall effect on improving economic freedom remains limited.

Table 6. Path coefficient results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (Stdev)	T Statistics (|O/Stdev|)	P Values
X1 Internet User → Y1 Economic Freedom	0.213	0.216	0.095	2.228	**0.026**
X1 Internet User → Z1 Trade Openness	0.310	0.311	0.069	4.526	**0.000**
X2 Corruption Perception Index → Y1 Economic Freedom	0.511	0.487	0.177	2.877	**0.004**
X2 Corruption Perception Index → Z1 Trade Openness	0.727	0.726	0.055	13.152	**0.000**
Z1 Trade Openness → Y1 Economic Freedom	0.263	0.285	0.197	1.334	**0.182**

Source: Data Processed, 2025

Table 6 presents the estimated path coefficients between latent variables. These coefficients indicate the direction and strength of the relationships among constructs within the structural model. A positive coefficient value signifies a direct relationship, while a p-value of less than 0.05 indicates statistical significance. The analysis reveals that several paths between variables demonstrate significant and positive effects, supporting the acceptance of the proposed hypotheses. On the other hand, paths with p-values greater than 0.05 indicate non-significant relationships, leading to the rejection of those hypotheses. These findings suggest that certain independent variables make a meaningful contribution to the dependent variables within the model.

Tabel 7. Special Indirect Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 Internet User → Z1 Trade Openness → Y1 Economic Freedom	0.082	0.084	0.058	1.413	**0.158**
X2 Corruption Perception Index → Z1 Trade Openness→ Y1 Economic Freedom	0.192	0.210	0.152	1.259	**0.208**

Source: Data Processed, 2025

Table 7 presents the results of the indirect effects testing between latent variables. This test is conducted to determine whether mediation effects exist within the model. The results indicate that some relationships between constructs exhibit significant indirect effects, suggesting the presence of a mediating variable in the relationship between the independent and dependent variables. Thus, the research model not only captures direct effects but also identifies the mechanisms of indirect influence that occur through the mediator variable.

Overall, the most influential variable in the model is the Corruption Perception Index on Trade Openness, followed by Internet Users on Trade Openness. Meanwhile, the direct relationships between these variables and economic freedom show relatively small to moderate effects. These findings suggest that improvements in economic freedom are more strongly driven by governance quality and economic integrity (via CPI), and by technological support (via internet usage), particularly through their indirect influence on trade activity.

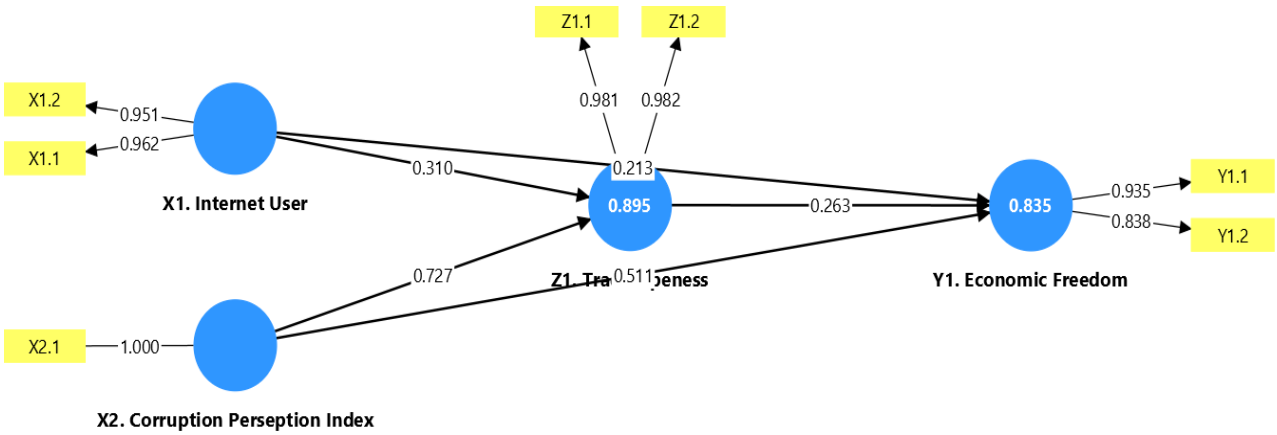

Figure 1. Results of Structural Path Analysis Model with SEM-PLS

Figure 1 illustrates the final structural model derived from the SEM-PLS path analysis. The model displays the direction of relationships among constructs, along with the corresponding path coefficients and levels of significance. Visually, the model highlights dominant pathways from independent to dependent variables, as well as the mediating role of international trade. The refined model confirms that all retained indicators make valid contributions to their respective constructs, and the inter-construct relationships collectively support the research hypotheses.

4.3 Interpretation of Findings and Contribution to the Literature

The findings of this study affirm a growing body of literature emphasizing the transformative role of internet usage in promoting economic freedom in developing countries. The significant and positive direct relationship between internet usage and economic freedom is consistent with studies by Meijers (2014), Suryaningrum et al. (2023), and Putri (2022), who highlight the internet's contribution to improved access to information, market liberalization, and financial inclusion. Digital connectivity enables individuals and firms to participate in formal markets more effectively, lowers entry barriers, and fosters innovation across sectors (Demir et al., 2023; Lynn et al., 2022; Maiti et al., 2019). Furthermore, the internet enhances regulatory transparency and government service delivery, which in turn supports entrepreneurial activity and institutional accountability (Gohmann et al., 2013; Hall & Lawson, 2013; Tomáš, 2015).

However, this study finds that the mediating role of trade openness between internet usage and economic freedom is statistically insignificant. This contrasts with Meijers (2014), who posits that digital technologies influence economic performance primarily through expanded international trade. While prior studies have shown some link between ICT expansion and trade growth (Clarke & Wallsten, 2006; Nguyen & Choi, 2025), the lack of a strong mediation effect in this context suggests that other structural factors—such as market inefficiencies, institutional gaps, or digital monopolies—may dilute the impact of digital trade on broader economic freedoms (Azu et al., 2024; Rizkallah, 2023). As emphasized by Seyoum and Ramírez (2019), without strong governance and inclusive regulations, trade liberalization driven by digital means may not effectively translate into institutional or individual economic liberties.

One of the most compelling findings of this study is the dominant role of institutional quality—measured through the Corruption Perceptions Index (CPI)—in influencing trade openness. This supports the arguments of Ichvani and Sasana (2019), Sihombing (2022), and Savira and Amaliah (2023), who note that weak governance and high levels of corruption inhibit the positive effects of digitalization on economic outcomes. Empirical evidence has long shown that countries with lower corruption levels tend to enjoy greater trade openness due to higher investor confidence, reduced bureaucratic burdens, and more predictable regulatory

frameworks (Bandyopadhyay & Roy, 2007; Wei, 2000; Treisman, 2000; Marjit et al., 2014). This finding also aligns with Berggren and Jordahl (2006), who argue that institutional trust and transparency are essential prerequisites for realizing the benefits of liberalization.

Taken together, these findings imply that digital technologies alone are insufficient to drive economic freedom unless accompanied by robust institutions and good governance. Internet infrastructure and digital literacy can empower citizens and businesses, but in the absence of institutional safeguards—such as secure property rights, anti-corruption enforcement, and transparent legal systems—their impact may be constrained or unevenly distributed (Lawson et al., 2024; Iqbal et al., 2023). Countries with stronger institutional frameworks are far more likely to benefit from internet-driven development in terms of both trade integration and economic freedom (Sart et al., 2022; Tokal et al., 2023). Therefore, this study reinforces the need to view digital transformation not as a standalone policy objective but as part of a broader reform agenda aimed at institutional integrity and inclusive economic governance.

4.4 Theoretical and Policy Implications

From a theoretical standpoint, this study enriches the discourse on digital liberalization by demonstrating that the relationship between internet usage and economic freedom does not necessarily require trade as an intermediary channel. This challenges trade-led liberalization frameworks and supports alternative perspectives that highlight the direct empowerment effects of digital technologies—through improved information access, streamlined regulations, and enhanced citizen participation.

The policy implications are particularly salient for developing economies in Southeast Asia. Policymakers cannot rely solely on international trade as the primary pathway for promoting economic freedom. Instead, digital transformation strategies must be accompanied by institutional reforms, including anti-corruption measures and transparent governance. Investment in digital infrastructure and the promotion of digital literacy are necessary but insufficient unless paired with regulatory environments that ensure equitable access and participation. Countries with weak CPI scores must prioritize institutional improvements to unlock the full potential of digitalization for economic freedom.

Moreover, development strategies that emphasize export growth and market integration must account for distributional impacts, as the benefits of digitalization can exacerbate inequality when concentrated among dominant market players. Hence, this study supports a more holistic reform agenda, where digital and institutional strategies are aligned to ensure inclusive and accountable economic participation.

5. Conclusion

This study concludes that internet usage has a significant and direct positive effect on economic freedom in developing Southeast Asian countries. Based on panel data from ten ASEAN nations spanning 2011–2022 and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM), the findings reveal that the indirect effect of internet use through international trade is statistically insignificant. This indicates that digitalization enhances economic freedom primarily through direct mechanisms, rather than being mediated by trade openness.

Importantly, institutional quality—measured by the Corruption Perceptions Index (CPI)—plays a more substantial role in influencing trade openness than internet usage. This underscores the necessity of strong governance and institutional integrity as prerequisites for ensuring that the benefits of digital expansion are widely distributed and sustainable. Theoretically, these results contribute to the growing literature on digital economics by proposing an alternative to trade-mediated liberalization models. They suggest that digitalization, when supported by institutional reforms, can directly advance economic freedom through improved transparency, regulatory efficiency, and citizen empowerment.

From a policy perspective, digital strategies in developing countries must be accompanied by governance reforms, particularly anti-corruption initiatives and inclusive regulatory frameworks. Investments in internet infrastructure and digital skills must be matched with institutional mechanisms that ensure fair market participation and accountability. Without such synergy, digitalization may not translate into broader economic liberalization or inclusive growth.

Future research could expand on these findings by integrating additional institutional indicators—such as rule of law or bureaucratic quality—and applying the model to subnational contexts or specific sectors such as SMEs or digital finance, to capture more nuanced economic transformation dynamics.

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