Influence of Intellectual Property Rights (IPR) on Asean+5's International Trade (IT)

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Abstract
In accordance with the ASEAN IPR Action Plan 2016-2025, this study explores the connections and causality of Intellectual Property Rights (IPR) on international trade (IT) of ASEAN+5 countries represented by Malaysia, Thailand, the Philippines, Singapore, and Indonesia. According to this, international trade is measured in terms of trade (as a percentage of GDP). IPR is measured by patent applications filed by residents, patent applications filed by non-residents, industrial design applications filed by residents, and industrial design applications filed by non-residents. Along with IPR, the effect of government effectiveness (GE) on IT is also investigated. Foreign direct investment (FDI) and inflation are also utilized as control variables. This study adopts new growth theory as to further explain the variables involved. All ASEAN+5 data for the individual variables were derived from the World Bank Development database, and the panel dataset was investigated using the PFGLS estimator and Dumitrescu-Hurlin test for over 21-years period (2000-2020). The findings of this study revealed a strong effect between IPR and IT as well as a unidirectional relationship between IPR (except industrial design application, filed by residents) and IT for the ASEAN+5 region. The limitation of this study is that it only focused on five ASEAN countries, and the selection of IPR indicators was limited. Nevertheless, this study provides some important insights for policymakers and local merchants to focus and invest more on IPR in order to promote ASEAN's international trade in accordance with global norms.
Keywords: international trade (IT); IPR; ASEAN; government effectiveness; panel data

1. Introduction

Over the years, ASEAN states are involved in regional and worldwide IPR cooperation because collaboration with other countries and organizations will strengthen cross-border IPR protection and enforcement. Overall, with the rise of ICT concerning digital technology and e-commerce came new issues for IPR protection, particularly with regard to online infringement and digital piracy. ASEAN policymakers are working hard to overcome these issues ASEAN governments were working hard to build e-commerce legislation and regulations to manage digital trade and safeguard consumers. Consumer protection, data privacy, and cyber security were among the problems being addressed. Hence, ASEAN countries have been working to strengthen their IPR systems. The majority of member countries were signatories to international IPR treaties and accords, such as the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). ASEAN countries also had enacted national laws and regulations to safeguard IPR (ASEAN Intellectual Property Rights (IPR) Enforcement Action Plan, 2021).

Moreover, the gap between ASEAN's developed countries, such as Singapore, and ASEAN's least developed countries, such as Myanmar, is much greater. For example, when Singapore signs a Free Trade Agreement (FTA) with the United States (US), some kinds of IPR protection in Singapore surpass the TRIPs Agreement norm. Meanwhile, Myanmar's IPR framework continues to fall short of international minimal norms (Wongburanavart, 2022). Disparities in IPR rules can result in disparities in protection levels, enforcement, and standards, making it difficult for businesses to traverse international marketplaces. As to foster global innovation and facilitate international trade, countries' IPR laws should be harmonized, striking a balance between stimulating creativity and protecting IPR. Such convergence can help to create a more egalitarian and supportive environment for businesses and entrepreneurs all around the world.

Not only that, facilities is critical to trade, yet some ASEAN countries have inadequate transportation and logistics facilities. This restriction may result in inefficient trade flow and increased costs. At times, they may lack the resources, experience, and institutional ability needed to administer trade policy effectively. HERE Technologies, the leading location data and technology platform, released APAC On The Move, an inaugural study to provide insights from transportation and logistics (T&L) professionals across Asia-Pacific (APAC) on current technology trends and practices shaping supply chain, fleet, and logistics management. The extent to which end-to-end asset tracking and cargo visibility remains a barrier for logistics organizations three years after the pandemic's inception is a significant conclusion from APAC On The Move 2023. Despite desires to increase customer happiness and operational efficiency, nearly 90% of APAC logistics organizations polled listed technology implementation issues as their top impediment to obtaining real-time end-to-end supply chain visibility. More than half of the organizations polled (52%) listed the difficulty in discovering the suitable partners and suppliers as the most significant barrier to technology implementation (GlobeNewswire, 2023).

Despite the ongoing issues related on both IPR and IT, ASEAN+5 definitely has an edge over earnings. For instance, prior to 2020, ASEAN's GDP increased at a 5% annual rate. The ongoing pandemic had significantly interrupted economic activity, and growth had taken a considerable knock in 2020 and 2021. The economy, however, has since recovered. Further regional integration is expected to boost growth to up to 7% by 2025. With the third-largest population in the world, 60% of whom are under the age of 25, the region has enormous growth potential. Regional stakeholders are intrigued by the potential for IR4.0 to revolutionize economic systems and social institutions. IR4.0 has great prospects for the ASEAN area, stimulating broad-based growth in the region as consumer alternatives will expand as higher-quality goods are produced at lower costs with the help of IPR (Kumar, 2022).

Hence, this study expects to discover the significance of IPR in ASEAN+5 countries in influencing IT in terms of correlations and causality, as well as the correlations of government effectiveness against IT from 2000 to 2021 in line with ASEAN IP Action Plan 2016-2025. As a result, this paper has an edge over the past studies by having some important implications in terms of theoretical and empirical findings. Focusing on IPR of ASEAN+5 are very much encouraging as the protection of IPR across Southeast Asia countries are still uneven as it is in the process of development and revision to be aligned with global standards. In the context of ASEAN+5, IPR ensures the advantages of innovation and competitiveness to improve productivity growth that can be enjoyed by everyone, which goes hand-in-hand with government effectiveness in the region.

2. Literature Review

2.1 Theoretical Review

In general, it is thought by Amin Mansouri (2022) that the evolution of trade theories from classic to modern has occurred in three phases. The first level is concerned with promoting trade by continuing to implement free trade policies. This occurs as a result of intergovernmental ties, as well as pressure from international agencies such as the IMF and the World Trade Organization (Ricardo, 1821; Smith, 1776). This second stage is dependent on regulations that promote industry trade development. This level is attained by scale economies and specialized benefits (Heckscher, 1949). The third level, in turn, is based on relationships between countries and physical regions, with emphasis on the reasons for the advantages and disadvantages of transportation and manufacturing inputs. As a result, it appears that spatial trade patterns are capable of justifying future trade interactions of enterprises operating at the scale of one or more countries (Amin Mansouri, 2022; Zhou, 2013).

Modern growth theories have evolved over time, with contributions from a wide range of economists. Roy Harrod's dynamic model, which extended Keynes' static income determination theory, started this evolution. Following that, other economists introduced neoclassical growth theories and endogenous growth theories. These ideas included elements thought necessary for economic progress, such as knowledge and economies of scale (Diebolt & Perrin, 2014; Thirlwall,

2011). Modern growth theories are still being developed today, with economists such as Paul Romer receiving the Nobel Prize in 2018 for his work on economic growth.

It is apparent that the economic issues associated to growth are now putting more focus on the degree of technology, knowledge, and research and development, among other things, which will improve the economies of scale from a production process. While prior models placed greater emphasis on extrinsic elements, endogenous factors were overlooked. It may be stated that more breakthroughs and discoveries, technical advancements, and so on draw the attention of researchers to the importance of these elements in economic growth (Saikia et al., 2023).

In general, new growth theory is a theory of economics that introduces two key elements. To begin, it views technological growth as a result of economic activity, as opposed to previous perspectives that viewed technology as an external force. This viewpoint, known colloquially as "endogenous" growth theory, includes technology into the analysis of market operations. Second, unlike physical items, knowledge and technology have rising returns, implying that as they increase, they continue to generate additional expansion. In traditional economic models, this assumption is opposed by the concept of decreasing returns. In this view, knowledge is important to generating economic progress, and it has the ability to accrue indefinitely since it can be shared and utilized without decreasing rewards. Instead, economic growth is powered by increasing rewards from knowledge.

Thus, based on new growth theory, economic growth and productivity will continue to be driven by public wishes and wants. A major concept of the new growth theory is that competition pushes down profit, driving people to constantly seek out more profitable ways of doing things or developing new items. By emphasizing the significance of entrepreneurship, knowledge, innovation, and technology, the theory also disproves the widely held belief that external, uncontrollable forces drive economic progress. Finally, new growth theory highlights that knowledge is considered as a growth asset that is not confined by limited resources and is not prone to declining returns like other assets such as money or real estate (Mubanani & Fadhil, 2023).

In accordance to that, this study adopts new growth theory to further analyze the variables as the role of innovation and knowledge production in driving economic growth is highlighted in new growth theory. IPR play critical roles in international trade as enablers of innovation and knowledge diffusion. For instance, IPR are critical for promoting innovation and preserving innovators' rights. Strong IPR encourages local corporations to spend in R&D, resulting in the development of new products and technology with much security and reliability (Burrell et al., 2023). New growth theory definitely emphasis on governance and institutional variables that influence a country's ability to innovate and support knowledge creation. Government effectiveness, which includes measures that promote competition, protect IPR, and eliminate

corruption, fosters an atmosphere that fosters innovation and international trade (Aghion & Durlauf, 2007). Thus, new growth theory provides useful insights into how IPR and government effectiveness impact international trade of Southeast Asia countries. These ideas emphasize the importance of innovation, knowledge development, and institutional elements in shaping ASEAN's global trade competitiveness that encourage sustainable and inclusive trade growth by encouraging innovation, protecting IPR, and improving governance.

2.2 Empirical Findings

Based on the perspective of World Bank Group, Intellectual Property Rights (IPR) grant inventors, artists, and institutions with some exclusive rights to produce, copy, distribute, and license goods and technologies within a nation. When a country strengthens its IPR protection, it must strike a balance among several important tradeoffs. IPR regulation has includes both private and public rules as well as substantive and procedural standards. According to the ownership of legal division, it fit in to the special law of the civil law. In relation to that, almost all the basic principles, systems and legal norms of the civil law apply to IPR (Wang & Yuan, 2019).

IPR has increasingly assumed as a vital role with the rapid pace of technological, scientific and medical innovation in various sectors globally (Hossain, 2018; Rout, 2018; Saha & Bhattacharya, 2011). According to Smeets and Vaal (2016), IPR also helps in social and financial development of a country. Past researches that studied IPR and trade are available since late 70s. The emergence of borderless trade activities causes the usage of IPR to arise among businesses and thus, focus on that particular area rise over the years (Campi & Dueñas, 2019).

As international trade previously had been studied along with IPR by many researchers and mostly the findings proved a significant positive relationship between trade and IPR as nations with stronger IPR have the edge to increase the trade flow (Agung & Ngurah, 2020; Curtis, 2012; Davoudi et al., 2018; Doanh & Heo, 2007; Liu et al., 2020; Merges, 1996; Plasmans & Tan, 2005). The positive impact of IPRs was strongest in less-developed countries, as well as larger countries and those with a higher degree of imitative ability (Foster, 2014). On the other hand, Campi & Dueñas (2019), found significant negative relationship between IPR and trade flows as an increase in the IPRs of the exporter, has a negative effect on the probability of creating trade among developing countries.

Previously, many of the researchers focused on economic emerging countries like China and India as well as developed foreign countries like United States due to the increased level and potential of the digital trade activities (Akhtar & Fergusson, 2014; Curtis, 2012; Reichman, 1993). As for the indicator of trade openness, there are studies related on IPR and trade openness in the context of economic growth. That particular study analyze the possible interactive effects that IPR may have with trade openness in influencing growth (Bodine-Smith, 2013).

However, when estimating the effects of IPRs protection in a gravity model of bilateral trade flows, the empirical results suggested that, on average, higher levels of protection have significantly positive impact on non-fuel trade. Thus, the result is not confirmed when limiting the estimation to high technology goods where it was found that IPRs to have no statistically significant impact (Fink & Primo, 1999).

Past study that looked at the factors that influence the strength of IPR's in 25 Asian developing nations, found a positive impact of economic growth, trade openness, and WTO involvement for IPR. Meanwhile, education turned out to be a negative predictor of IPR (Le et al., 2022). When a third country appears, increasing IPR in importing countries encourages inventing countries to grow their exports. However, primary items have the largest export elasticity of IPR, whereas technology-intensive and human capital-intensive products have the lowest (Doanh, Gam, & Heo, 2022). Recent study also depicted that IPR improvement favors less capital-intensive enterprises, foreign-owned firms over domestic-owned firms, and firms in innovative industries. Meanwhile, in some geographic regions (central and western regions) and trade modes (processing trade), the effect of IPR on export product quality is statistically insignificant (Dong et al., 2022). Therefore, strengthening IPR protection reduces on-the-frontier and inside-the-frontier innovation in developing nations without necessarily enhancing global innovation (Auriol et al., 2023).

As for the causal relationship of IPR and IT, (Raizada & Dhillon, 2017) revealed that there was a unidirectional causal relationship from Indian trade to both export and import of patent related commodities and export of trademark related commodities. Moreover, an integrated model of causality between IPR, R&D, and economic growth, proposed by four causal channels revealed that the ideal causal path differs not only by industry but also by firm size (Cho et al., 2015). There also appeared to be a causal relationship between the amount of economic development, the import component of the IPR, the overall productivity factor, and inflation (Amassoma et al., 2020).

Generally, governments should be fiscally disciplined but also decentralized to discern and respond to citizen need, comprise politically neutral managers, yet also make and manage business friendly policies (Andrews, 2008). This is applicable for all the fields including international trade. For instance, global countries with above-average government effcetiveness, i.e., a well-established state bureaucracy and with a historically strong state tradition, will step up their efforts towards international integration through financial and trade openness (Ngouhouo et al., 2021; Nzama et al., 2023; Suntharalingam & Hassan, 2016).

Past study also confirms that macroeconomic performance and institutional considerations have a major impact on FDI flows into developing countries. With the exception of Singapore, it is stated in the study that most ASEAN countries have relatively poor institutions for good governance, low government efficacy, and poor regulatory quality and rule of law which affects FDI flows into ASEAN nations (Buracom, 2014). Along with that, only when a country's

government is effective enough can successfully profit from market access as attributing strong governance to a country that does not have it could result in a 20% boost in GDP (Felis-rota, 2010). Moreover, government effectiveness demonstrated a strong positive association with exports (Soeng & Cuyvers, 2018). Thus, depending on the method of evaluation, government effectiveness has complicated effects on an economy (Thu Hang & Lien, 2022).

There are favorable relationships between government size and international trade because the government provides many services to improve trade in the international market (Saghir et al., 2019). While, Wijaya et al., (2023) found that government effectiveness had positive and significant effect on trade openness. It was also discovered that a country's business regulations have a substantial indirect influence on its international trade, while the country's government effectiveness has a significant direct influence on its international trade. The results revealed full mediation, with the indirect effect of governance on foreign trade being fully mediated by business regulations (Khan, 2020). Meanwhile, evidence suggested that enhanced government effectiveness plays a role in lowering inequality in the most developed regions of the North, but has little effect in the Centre or the periphery Southern regions (Barra et al., 2023). The study's findings showed that reliance on Official Development Assistance (ODA) in government spending affects government effectiveness in developing countries. Furthermore, donor ODA funds have a negative impact on corruption control, ultimately limiting government effectiveness (Seung Hyun & To Bin, 2015).

Hence, this particular study will fill the gap by studying exactly on whether there is a significant correlations between IPR and IT of ASEAN+5 as it is being a scare topic. Similarly, there are very limited past studies on the effect of government effectiveness against international trade of developing nations, as well as the causal run on IPR towards international trade in ASEAN region. Reviews of past studies helps this paper to have some important and new contributions that yet to be discovered. In terms of empirical contribution, the regression findings will either support the role of IPR in improving IT which has been established in the literature or otherwise. Furthermore, this study will provide first-hand as well as more evidence on the possible causal relationship between IPR and IT together with the impact of government effectiveness towards IT. Despite the empirical contribution, there will be also theoretical contribution in this study in terms of the extension of new growth theory to explain IPR adoption in ASEAN+5.

3. Materials and Methods

From 2000 to 2020, a sample of 5 ASEAN countries was used in this study from World Bank Database. Trade (% of GDP), which represents international trade (IT) is the dependent variable. IPR variables include four different types of protections: (i) industrial design applications, residents, (ii) industrial design applications, non-residents, (iii) patent applications, residents and (iv) patent applications, non-residents as well as government effectiveness index are the independent variables. Generally, there are several indicators under IP activity. However, due

to data availability from World Bank, this study only select patent and industrial design applications for both residents and non-residents (World Intellectual Property Organization (WIPO)). The regression models additionally contain control variables such as FDI, net inflows (% of GDP) and inflation, consumer prices (annual %). Table 1 illustrates all of the variables included in the study, as well as their measurements and the sources from which the data was gathered.

Table 1. List of Variables

Variables	**Indicators (Symbol)**	**Proxies**	**Data Source – World Bank Database**
Dependent variable	International Trade (IT)	• trade (% of GDP)	World Bank Development
Independent variables	Intellectual Property Rights (IPR)	• industrial design applications, residents • industrial design applications, non-residents • patent applications, residents • patent applications, non-residents	
	Government Effectiveness (GE)	• government effectiveness index	Worldwide Governance Indicators
Control variables	Foreign Direct Investment (FDI)	• foreign direct investment, net inflows (% of GDP)	World Bank Development
	Inflation	• inflation, consumer prices (annual %)	

Since the study's goal is to look into the sole effects of IPR against IT, the analysis was conducted separately for each of the proxy, one at a time together with GE. The general model regression for this study is as followed:

Regression model:

$$IT_{it} = \beta_0 + \beta_1 IPR_{it} + \beta_2 GE_{it} + \beta_3 FDI_{it} + \beta_4 INF_{it} + \varepsilon$$

Based on the above regression model, the **IT** represents the dependent variable of this study, which is the international trade (IT) measured by trade (% GDP). The **IPR** and **GE** represent the independent variables, namely IPR (industrial design applications (residents and non-residents) and patent applications (residents and non-residents) and government effectiveness index (GE), respectively. **FDI** and **INF** represent the control variables, namely FDI measured as net inflows (% of GDP) and inflation measured as consumer prices (annual %), respectively. The β_0, β_1, β_2, β_3, and β_4 represent the parameters to be estimated, whereas ε represents the error term.

In general, the static panel data regression analysis used in this study is based on Panel Feasible Generalized Least Squares (PFGLS) approach. Before proceeding with the main model estimations, the Breusch-Pagan Lagrange Multiplier (BP LM) test is performed to test for data poolability to access whether Pooled OLS or random effects (RE), Following that, diagnostic testing for multicollinearity, autocorrelation, and heteroscedasticity concerns within the models is carried out. If the models are discovered to have autocorrelation and/or heteroscedasticity concerns, the standard errors must be rectified to assure the reliability of parameter estimations. As a result, the static panel data analysis in this study used the Panel Feasible Generalized Least Squares (PFGLS) method, which allows estimation when first-order autocorrelation exists within panels and cross-sectional correlation and heteroscedasticity exist across panels. Each IPR variable is regressed separately using the models. As a result, the static panel data analysis is repeated four times because the study employs four alternative measures of IPR variables, namely (i) industrial design applications, residents (ida_r), (ii) industrial design applications, non-residents (ida_nr), (iii) patent applications, residents (pat_r) and (iv) patent applications, non-residents (pat_nr). Similarly as for causality, this study uses Dumitrescu Hurlin test to examine the causality run between IPR and IT by separately analyzing each of the four proxies of IPR.

4. Results And Discussions

The results of the static panel data analysis for exploring the association between IPR and IT in ASEAN+5 are shown in the table below. Basically, for model testing patent applications, all 5 sample countries are used, whereas for model testing industrial design applications, only 4 sample countries are included as too many data for industrial design application is missing for Indonesia. Based on their low VIF scores, diagnostic testing revealed that all model specifications did not appear to have a multicollinearity problem. The substantial p-values of the Modified Wald Test and Wooldridge Test, on the other hand, indicate that the models have heteroscedasticity and autocorrelation issues. In order to address these issues, the PFGLS estimator is employed.

Table 2. Results of Static Panel Data Regression

	Model 1	Model 2	*Model 3	*Model 4
	FGLS Robust	FGLS Robust	FGLS Robust	FGLS Robust
PAT_NR	0.0164** (0.0167)			

PAT_R		-0.0424** (0.0374)		
IDA_NR			0.0736** (0.0395)	
IDA_R				-0.0931** (0.0350)
FDI	0.0179** (0.0113)	0.0253** (0.0124)	0.0089** (0.0145)	0.0211** (0.0160)
INF	0.0313** (0.0083)	0.0323** (0.0094)	0.0396** (0.0108)	0.0376** (0.0131)
GE	0.5402 (0.1452)	0.9846 (0.1404)	1.2215 (0.1791)	1.6828 (0.1492)
Constant	2.6481 (0.7047)	0.9028 (0.7175)	-0.9681 (0.8231)	-2.0146 (0.9365)
No. of observations	105	105	84	84
BP LM test	0.00	0.00	0.00	0.00
VIF (multicollinearity)	2.24	2.24	2.95	2.13
Modified Wald test (heteroscedasticity)	48.62***	36.31***	56.32***	94.01***
Wooldridge test (autocorrelation)	99.506***	80.505***	44.991**	68.346**

Notes: Robust standard errors are presented in parentheses. ***, **, and * indicate significance at 1%, 5% and 10%, respectively.

Except for GE, the results demonstrate that practically all IPR variables are significantly linked with IT of ASEAN+5. Previous researches flow of Agung & Ngurah, (2020); Curtis, (2012); Davoudi et al., (2018); Doanh & Heo, (2007); Liu et al., (2020); Merges, (1996); Plasmans & Tan, (2005) also demonstrated a substantial association between IPR and IT. In particular, IDA_NR had the highest positive coefficient values among all IPR variables in this analysis, implying that a 1% increase in industrial design applications, non-resident corresponds to a 0.07% rise in ASEAN+5's IT growth. Following that is PAT_NR, in which has significant and positive coefficients, showing that a 1% rise in PAT_NR is related with a 0.01% increase in IT.

PAT_R and IDA_R, on the other hand, were found to be negatively significant in the PFGLS model analysis when robust standard errors were established. Resident IPR tend to have a negative correlation, while Non-resident IPR possess a positive relationship towards IT. This is due to the level of innovation and competition. For instance, NR_IPR will have an edge over technological advancements in certain industries to produce highly innovate goods and service that are in demand worldwide. Thus, making it easier to compete in international markets and increase IT

(Kok, 2021). While R_IPR had to only focus on domestic market with less investment on innovation causes less IT (Organisation for Economic Co-operation and Development (OECD), 2021).

Meanwhile, GE as studied along with IPR against IT, was found to be insignificant with the assumption of ASEAN+5 members frequently participate in regional trade treaties such as the ASEAN Free Trade Agreement (AFTA) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). These agreements have a more direct and immediate impact on IT than government effectiveness.

Moving on to the results for control variables, it appears that both FDI and inflation are highly linked with IT. This suggests that increasing the level of FDI and inflation would improve IT in ASEAN countries altogether. This finding is consistent with previous studies with similar outcomes (Ali & Xialing, 2017; Cies, 2009; Dexter et al., 2002; El-Osta et al., 1996; Gilchrist & Zakraj, 2019; Kawai et al., 2002; Stockman, 1985).

Table 3. Causality Run between IPR and IT

NULL HYPOTHESIS	W-BAR	Z-BAR	Z-BAR TILDE	TYPES OF CAUSATION
Intrade does not Granger-cause **Inpat_nr**	4.5695	5.6438 (0.0000)	4.3211 (0.0000)	Unidirectional causality
Inpat_nr does not Granger-cause **Intrade**	1.8418	1.3310 (0.1832)	0.8910 (0.3729)	
Intrade does not Granger-cause **Inpat_r**	3.3809	3.7645 (0.0002)	2.8264 (0.0047)	Unidirectional causality
Inpat_r does not Granger-cause **Intrade**	1.0167	0.0265 (0.9789)	-0.1466 (0.8834)	
Intrade does not Granger-cause **Inida_nr***	5.4523	6.2965 (0.0000)	4.8579 (0.0000)	Unidirectional causality
Inida_nr does not Granger-cause **Intrade***	0.8064	-0.2738 (0.7842)	-0.3678 (0.7130)	
Intrade does not Granger-cause **Inida_r***	0.2481	-1.0633 (0.2876)	-0.9957 (0.3194)	Independence (no causality)
Inida_r does not Granger-cause **Intrade***	1.2723	0.3850 (0.7002)	0.1563 (0.8758)	

Notes: Robust standard errors are presented in parentheses.

In addition, the table above shows the causality results of IPR and IT from Dumitrescu-Hurlin test. Similarly, the test involves only 4 sample nations to test industrial design applications. As shown, at both 5% and 10% levels of significance, the probability values are too large (0.3194 and 0.8758) to justify the presence of causal relationship between IT and ida_r on both ways as it is identified as independence causation. However, there is a unidirectional causation only from IT towards pat_nr (0.0000), pat_r (0.0047) and ida_nr (0.0000). This is because of the causation from pat_nr (0.3729), pat_r (0.8834) and ida_nr (0.7130) towards international trade scored high significance value to justify the bidirectional causal relationship. This gives evidence that the causality hypothesis of IPR and IT in this particular study is not valid amongst ASEAN+5.

5. Conclusion, Implication and Recommendation

This study looks at the impact of several IPR variables on international trade (IT) of ASEAN+5 from 2000 to 2020. The empirical evidence discovered in this study, which used static panel data analysis methodologies, pointed to the substantial role played by industrial design applications (residents and non-residents) and patent applications (residents and non- residents). However, the government effectiveness (GE) index somehow does not affect in boosting IT in ASEAN+5. More specifically, industrial design applications, non-resident has the highest significant positive coefficient value followed by patent applications, non-resident. Basically, non-resident applications are prone towards global market competition which directly boost IT. Unlike resident applications are only valid across domestic markets and does not involve international transactions.

Additionally, this analysis concentrates on the relationship between IPR and international trade (IT), with the direction of causality hypothesized to run only from IPR to IT. This is because the decision to file IPR in a nation is influenced by various factors such as cost and feasibility, market competition and strength of IPR itself rather than IT. Hence, IPR will lead towards technology transfer, market demand and innovations that will cause IT. However, IDA_R with no causal relationship with IT shows the difficulty to comply with international standards and requirements, with no global demand. Although PAT_R causes IT but ida_r does not cause IT as it primarily concerned with the aesthetic qualities of a product within a jurisdiction and dependent on the individual industry dynamics rather than the underlying functioning or technical aspects.

The theoretical implication of this study highlighted the role of IPR on international trade, but also the correlation of government effectiveness and international trade, which resulted in having interaction upon the adoption of growth theory only for IPR. Traders must also consider filing IPR in order to avoid legal issues such as imitations, piracy and counterfieting to gain the trust of global investors to invest in a safe and secured nation. In this context, the World Intellectual Property Organization's (WIPO) and ASEAN’s role in promoting the development of a balanced and robust international IPR regime that encourages global innovation is crucial (WIPO Magazine, 2019).

Given these findings, governments should promote the use and acceptance of IPR protection by developing policies that are able to enhance the adoption and implementation of both IPR and government effectiveness among ASEAN+5 traders. As a consequence, policy-makers should provide encouragement by supporting and motivating local firms to actively engage with technologies while securing them with IPR by organizing workshops, seminars and courses to help the businesses from ASEAN nations to gain knowledge and the latest information about the current market situations across the globe. Moreover, authorities together with policy makers should provide financial support or loans adequately and continuously to help the local traders in order to have more elevation and innovative into their productions as per the worldwide standards in line with ASEAN IP Rights Action Plan 2016-2025.

Future research can look into different causality routes and whether there is a bidirectional relationship between IPR and IT. As well as the correlation of government effectiveness against IT can be further investigate to obtain a desired outcome. Furthermore, only ASEAN+5 countries are included in this analysis. Thus, for future research, the sample countries might be enlarged to include different country groupings from specific regions or development levels.

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