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Navigating Barriers to Innovation An Introduction to Regulatory Shielding and the RQSi Framework

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Abstract: This study introduces the Regulatory Quadrant of Shielding and Innovativeness (RQSi), a conceptual framework by the author that untangles the complex relationship between government regulatory practices and innovation within developing economies. This article forms part of a broader investigation into regulatory quality and technological growth dynamics, where the researcher identifies "regulatory shielding," a phenomenon where protective policy measures unintentionally hinder technological adoption and stifle innovation. Through comprehensive statistical analysis, the study uncovers critical insights into the roles of the Regulatory Quality Index (RQI), Human Development Index (HDI), and Global Innovation Index (GII), in fostering innovation. The findings reveal that supportive regulatory frameworks and targeted government interventions significantly enhance socio-economic readiness (SER), enabling the adoption of emerging technologies that drive competitive advantage and market evolution. This article advocates for reducing regulatory shielding and promoting collaboration among governments, industries, and academia to accelerate technological ambidexterity and economic transformation. By establishing the RQSi Framework, this research provides a robust foundation for future studies to refine policy designs that promote innovation and sustainable development. Therefore, offering actionable pathways to reshape regulatory environments and build innovation-led economies.

Keywords: *Developing Countries, Digital Economy, Global Innovation Index (GII), Human Development Index (HDI), Regulatory Shielding Quadrant Of Innovativeness Framework, Regulatory Quality Index (RQI), Regulatory Shielding.*

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I. INTRODUCTION

Governments worldwide employ policy and regulatory frameworks to drive growth and development. However, these frameworks can sometimes inadvertently inhibit the equitable transfer of technological and innovative knowledge toward valuable development goals. This phenomenon, termed regulatory shielding, describes the reliance on protective policies that, while aiming to safeguard domestic industries, hinder technological adoption, stifle innovation, and create barriers to broader economic progress.

The implications of regulatory shielding are far-reaching. By prioritizing protection over openness, governments risk delaying the adoption of emerging technologies and reducing competitiveness. Conversely, well-designed regulatory frameworks that balance protection and facilitation can foster innovation, encourage collaboration across sectors, and drive economic transformation.

This article introduces the Regulatory Quadrant of Shielding and Innovativeness (RQSi), a framework categorizing economies into quadrants based on regulatory quality and innovativeness. The RQSI Theory highlights the trajectory economies can follow, transitioning from "Innovative Laggards," characterized by low regulatory quality and innovation, to "Innovative Leaders," where robust policies drive technological and economic advancements. This framework underscores the critical role of government policy in shaping innovation ecosystems and provides a roadmap for fostering sustainable development and global competitiveness.

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II. RESEARCH OBJECTIVES AND FRAMEWORK

The study investigates the dynamics of regulatory shielding and its impact on innovation, focusing on the following key objectives:

- Assessing Relationships: Examine the correlation between the Regulatory Quality Index (RQI), Human Development Index (HDI), and Global Innovation Index (GII).
- Exploring Policy Impacts: Understand how regulatory shielding influences the capacity of businesses to adopt emerging technologies.
- Identifying Success Factors: Identify policy attributes that enhance socio-economic readiness and technological ambidexterity.

To achieve these objectives, the study focuses on data from three globally recognized indexes:

- Regulatory Quality Index (RQI): Measures the effectiveness of policy frameworks in fostering economic and social development [48].
- Human Development Index (HDI): Provides an overarching assessment of a nation's socioeconomic development [56].
- Global Innovation Index (GII): Evaluates the innovativeness of industries and businesses across countries [55].

Additionally, the study incorporates other supporting global indicators such as Gross Domestic Product (GDP) per capita, patent applications by residents, and population growth, offering a broader understanding of development and technological adoption in the context of regulatory frameworks.

The research addresses the following key questions:

- Does adopting new and emerging technologies foster competitive advantage and promote the development of data-centric industries?
- Do businesses that employ innovative corporate strategies, such as research and development, exhibit greater market dominance?
- Are companies in developing nations hindered by government policies that fail to facilitate the technological ambidexterity required to remain competitive?
- Can government-led adoption of emerging technologies enhance innovation within local industries?

III. METHODOLOGY AND HYPOTHESIS TESTING

The methodology presents a structured approach grounded in a positivist, deductive framework to investigate the interplay between human development, regulatory quality, and innovation in developing nations. This research employs a hybrid data collection strategy, incorporating primary data obtained through empirical statistical methods alongside secondary data to test two hypotheses.

➢ *Hypothesis Test 1:*

- H_0: No significant correlation exists between HDI and RQI.
- H_1: A significant correlation exists between HDI and RQI.

➢ *Hypothesis Test 2:*

- H_0: No significant correlation exists between RQI and GII.
- H_1: A significant correlation exists between RQI and GII.

Using regression and correlation analyses, the research examines the relationships among these variables. While the findings reveal statistically significant correlations, the explanatory power varies. For instance, the R^2 value for RQI and HDI is 0.387, indicating moderate explanatory strength but sufficient to validate the presence of a relationship. Similar results are observed for RQI and GII, with an R^2 value of 0.415, highlighting areas for further exploration.

Furthermore, the methodology considers potential limitations, including the lack of a universally accepted definition for developing nations, challenges in generalizing findings across diverse contexts, and the reliance on secondary data, which may introduce variability. To address these concerns, the research incorporates methodological safeguards such as systematic data verification and outlier analysis to enhance the reliability of results. The approach integrates theoretical constructs with quantitative methods to empirically validate the Regulatory Quadrant of Shielding and Innovativeness (RQSi) framework. This framework is designed to classify and analyze the economic conditions of developing nations concerning their regulatory and innovation dynamics, providing a robust foundation for understanding and addressing the complexities of development.

IV. RESULTS

The results confirm that regulatory quality significantly influences innovation and human development. Key findings include:

- Regulatory Quality and Innovation: Higher RQI scores correlate with increased GII rankings, underscoring the importance of supportive policies in fostering innovation.
- Socio-Economic Readiness: Nations with robust HDI scores exhibit better innovation outcomes, highlighting the role of education, infrastructure, and governance in enabling technological adoption.
- Policy Gaps: The variability in R^2 values suggests that while regulatory quality is a significant factor, other variables, such as cultural and economic conditions, also play a role.

The statistical results provide evidence for rejecting or accepting the stated hypotheses and drawing conclusions that inform future policy and strategy. The outcomes of these hypothesis tests, presented in Table I, provide insights into the relationships among regulatory quality, human development, and innovation. The findings aim to uncover whether regulatory shielding contributes to technological adoption and innovation stagnation or if strategic policy adjustments could unlock new growth opportunities.

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Table 1 Accept /Reject Criteria Analysis

	Alpha	***P-Value***	***Reject Criteria***	***Result***	***Outcome***
Hypothesis Test 1					
H_0 HDI versus RQI	.05	3.38356 *E -81*	P-value <= alpha	P-value < .05	Reject
H_1 HDI versus RQI					Accept
Hypothesis Test 2					
H_0 GII versus RQI	.05	1.58286 *E -67*	P-value <= alpha	P-value < .05	Reject
H_1 GII versus RQI					Accept

[a]*Notes:* Tabular output by author/researcher where E is the exponent of 10 and (-) refers to positions in front of the decimal point.

The results of the statistical regression analysis provide the basis for rejecting the null hypothesis in Test 1. The analysis indicates that the null hypothesis is not supported, and the alternative hypothesis is accepted. This confirms that the correlation coefficient significantly differs from zero, establishing a statistically significant linear relationship between the Human Development Index (HDI) and the Regulatory Quality Index (RQI).

However, the coefficient of determination (R^2) is relatively low, at 0.387, suggesting that the model does not provide a strong fit for the data (Table II). Meanwhile, the independent variable (RQI) correlates with HDI, accounting for only 38.7% of the variability around the mean. This limited explanatory power may be influenced by the differing scales of measurement for the variables, with HDI ranging from 0 to 1 and RQI from -2.5 to +2.5. Despite these limitations, the findings offer descriptive insights into the relationship between regulatory quality and human development, warranting further exploration of additional variables that may contribute to this relationship.

Table 2 Summary of Regression and Correlation

		Regression and Correlation			
Regression Statistics	***HDI vs RQI 2020***	***GII vs HDI 2021***	***GII vs RQI 2020***	***GII vs GDP 2020***	***GII vs Patents 2020***
Multiple R *(Correlation Coefficient)*	0.622	0.717	0.644	0.491	0.350
R Square	0.387	0.514	0.415	0.241	0.122
Adjusted R Square	0.381	0.509	0.409	0.233	0.113
Standard Error	0.098	0.088	5.576	7114.074	120126.755
Observations	95	95	95	95	95
Regression (ANOVA)					
df	1	1	1	1	1
SS	0.566	0.756	2891.841	1495853776	1.86988 E+11
MS	0.566	0.756	2051.717	1495853776	1.86988 E+11
F	58.751	98.509	65.982	29.556	12.958
Significance F	1.68811 E-11	2.94635E-16	1.87514E-12	4.35335E-07	0.001
Residual (ANOVA)					
df	93	93	93	93	93
SS	0.895	0.714	2891.841	4706733894	1.34203 E+12
MS	0.010	0.008	2891.841	50610041.868	14430437256
Intercept					
Coefficients	0.720	0.345	28.866	-8653.332	-158557.870
Standard Error	0.011	0.036	0.600	2867.239	49495.043
t Stat	68.173	9.723	48.130	2867.239	-3.204
P-value	3.38356 E-81	7.8745 E-16	1.58286E-67	-3.0180	0.0019
Lower 95%	0.699	0.275	27.675	0.003	-256845.217
Upper 95%	0.741	0.416	30.057	-14347.1	-60270.524

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		Regression and Correlation			
Regression Statistics	***HDI vs RQI 2020***	***GII vs HDI 2021***	***GII vs RQI 2020***	***GII vs GDP 2020***	***GII vs Patents 2020***
X- variable 1					
Coefficients	0.123	0.012	7.413	550.079	5845.593
Standard Error	0.016	0.001	0.913	101.181	1623.906
t Stat	7.665	9.925	8.123	101.181	3.600
P-value	1.68811 E-11	2.94635 E-16	1.87514E-12	5.436586	0.000513
Lower 95%	0.091	0.010	5.600	0.000	2620.837
Upper 95%	0.155	0.015	9.225	349.153	9070.349

[a]*Notes:* Summary of regression analysis computational outputs by author/researcher Fisher, D. S. (2022) using Microsoft Excel.

Table 3 Digital Survey Response Details

Survey Results		
Region	***Number of Countries***	***Respondents by Region***
Africa	8	21
Arab States	1	2
Asia & Pacific	12	31
Europe	13	31
Middle east	2	3
North America	2	41
South/Latin America	28	372
Total Participants	**66**	**501**

Survey Questions	***Mode***	***Mode (%)***	***Aggregate Popular Response***	***Result (%)***
2-Pandemic drove the need for digital models	5-Strongly Agree	56.89%	Agree	90.22%
3- Innovative corporate strategy drives competitiveness	5-Strongly Agree	50.10%	Agree	89.22%
4- R&D is too costly for businesses	4-Agree	31.14%	Agree	59.58%
5- Consumer demands drive innovativeness	4-Agree	42.51%	Agree	79.64%
6-Innovation improves decision-making	5-Strongly Agree	45.11%	Agree	89.22%
7-Innovative governments readily invest in industry infrastructure	4-Agree	43.11%	Agree	84.03%
8-Government policy impacts willingness to adopt new technologies	4-Agree	46.11%	Agree	83.83%
9- There is a greater need for collaboration with government during the post-pandemic era.	5-Strongly Agree	51.90%	Agree	90.82%
10- Government Initiatives drive the development of a digital economy	5-Strongly Agree	49.10%	Agree	92.61%

[a]*Notes:* Online survey responses collated in 2022 by author Fisher, D.S from a sample of 501 professionals across 66 countries.

Additionally, the results of the statistical regression test hypothesis Test 2 indicate that the research fails to accept the null hypothesis and rejects it in favour of the alternate hypothesis. Therefore, the significance of the correlation coefficient is significantly different from zero. Hence there is a significant linear relationship/correlation between the state of government regulative stability (Regulatory Quality Index - RQI) and the level of innovativeness of the industry or business (Global Innovation Index - GII). Concurrently, the R^2 for this test is at 0.415; in this case, the independent variable (RQI) shows a correlation with GII but does not explain more than 41.5% of the variability among the mean (Table II). While the explanatory power of RQI against GII is not great, there is sufficient evidence of a relationship towards improving innovation within developing countries. In similarity, the R^2 explanatory power is weaker due to the

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variability in ranking criteria where RQI negative two-point-five to positive two-point-five (-2.5: +2.5) versus GII zero to one hundred (0:100).

Concurrently, it is evident from the results that there is a linear relationship between developing countries (HDI-Human Development Index) and the level of innovation by ranking the Global Innovation Index (GII). However, the R^2 in this measure accounts for 51.4% of the variability in the test (Table II). This result shows a higher level of explanation of variability among developing countries and innovativeness, which could explain instances of other underlying variables.

V. DISCUSSION

The findings emphasize the need for governments to reduce regulatory shielding and adopt policies that encourage innovation. Effective regulatory frameworks should:

- Promote collaboration between governments, industries, and academia.
- Prioritize investments in education and infrastructure to enhance SER.
- Balance protectionist measures with policies that facilitate openness and competition

Critical to the research is that regulatory shielding and poor regulatory quality do have an impact but not a clear causative stance. It is worth noting that developing countries that suffer from regulatory challenges by definition of the Human Development Index (HDI) show that it weakens the Global Innovation Index (GII). The Human Development Index (HDI) collates factors outside economic peculiarities, including quality of regulations, infrastructure, education, partnerships, and access that affect the creative output.

A. Technology and Competitive Advantage

The findings of this research indicate a strong belief among professionals that adopting technology in business processes contributes to competitive advantage. A significant majority—89% of respondents—affirmed that technological advancement enhances competitive positioning (Table III). These results align with [39] argument in dependency theory, which posits that capital funding investments from external sources can create the conditions necessary for achieving competitive advantage.

Moreover, the findings support the perspective of [14], who argue that Industry 4.0 fosters increased competition by leveraging information technologies to optimize business processes and enhance output. Reference [2] further validates this through their research in Thailand, demonstrating that organizational innovation is a key driver of competitive advantage. This convergence of perspectives underscores the critical role of technological and innovative practices in shaping competitive dynamics across industries.

Similarly, [51] emphasizes that national and global market opportunities depend heavily on the ability of resources to leverage technology effectively. Their research highlights the importance of government support in enhancing organizational performance and international competitiveness. They also provide evidence that information technology creates an environment conducive to improving performance, which positively impacts digital innovation and competitiveness within industries. Additionally, the study suggests that the digital economy requires structured support to develop the competencies necessary for thriving in a rapidly evolving digital environment. These perspectives align with the findings, supporting the view that integrating technology is crucial for achieving competitive advantage.

Reference [10] explains that as governments provide roadmaps for entrepreneurial development, business innovation improves, enabling competitive advantage. Similarly, [7] quantitatively establishes a relationship between competitive advantage, innovativeness, and technological turbulence. Reference [1] provides further support, indicating that technology and innovation in Taiwan enable businesses and the government to achieve competitive advantage locally and regionally. The impact of the COVID-19 pandemic has further highlighted this need, with 90% of professionals globally agreeing that digital business models provide more advantages than traditional brick-and-mortar approaches.

However, technology alone does not guarantee a competitive advantage. Its effective application—particularly in advancing decision-making processes—is essential. Technology adds value to the business framework through data analytics and strategic implementation. Digital business models enable companies to transcend traditional competitive structures, fostering strategic relationships to handle global competition better locally and regionally. Porter and other theorists highlight the importance of understanding competitive environments and recognizing the impact of new and emerging technologies. The consensus among participants and theorists is that technology can bring a competitive advantage when applied correctly and in a value-adding manner.

B. Innovation, Corporate Strategy and Market Dominance

The research findings suggest that businesses integrating innovative corporate strategies gain significant advantages in decision-making, agility, and overall innovativeness, with 89% of professionals affirming this perspective (Table III). These results align with Francis's analysis of the evolution of technology through the lens of firm-level strategies and state policy, framed within Carlota Perez's techno-economic paradigm [15]. According to this framework, business leaders strategically align organizational objectives with government support mechanisms, extending beyond traditional investments in research and development [15]. This alignment fosters robust, innovative designs that translate into market dominance and competitive advantage, supported by local and regulatory policy frameworks.

Notably, the analysis highlights a linear relationship between the quality of regulations, the nature of regulatory shielding in developing countries, and levels of innovativeness. These findings suggest that businesses need guidance and regulatory support to effectively implement innovative strategies. Sustainable development goals and competitive advantages are achievable when companies in the

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adoption phase receive adequate support, including access to enhanced knowledge bases and expertise. Additionally, 89% of respondents agreed that technology improves decision-making processes, and 79% emphasized that business strategies must evolve in response to changing consumer needs and demands (Table III). Agile decision-making relies on accessible, accurate, and actionable information to create a competitive edge.

Building strategies that prioritize research and development (R&D) is critical for market evolution. However, more than 40% of the business community believes that R&D costs are prohibitive. Reference [15] argues that business leaders formulate strategies around government support, extending beyond traditional R&D investments. Similarly, [54] highlights that organizations must acknowledge the opportunities and threats posed by innovation to remain competitive. They recommend embracing technology and climbing learning curves through experimentation and research. Although the study underscores the importance of R&D, current literature provides limited evidence regarding the extensive cost impact of engaging in such activities. Nonetheless, survey results and literature agree on the necessity of government guidance in shaping R&D strategies without imposing restrictive stipulations.

Reference [47] proposes a five-step approach to implementing innovative strategies, arguing that this model supports modernization and competitive advantage. Their framework emphasizes embedding technological and management innovations, developing innovative products, building competencies, digitizing processes, and fostering intellectualization. Reference [47] concludes that innovative strategies must be progressive, adaptable, and competitive, enabling frequent updates and sustained financial strength. This framework aligns with the research findings, offering further validation for applying such models to achieve modernization and strategic corporate objectives.

C. Regulatory Shielding and Innovation

The findings indicate a broad consensus on the critical role of government in facilitating the adoption of new and emerging technologies. Eighty-three percent (83%) of respondents believe that laws and regulations significantly influence a firm's willingness and capacity to adapt to technological advancements (Table III). This aligns with the [18] perspective, which posits that while innovation is not the government's primary societal responsibility, it plays an entrepreneurial role in driving digital transformation. Furthermore, the global COVID-19 pandemic underscores the ongoing challenges faced by government agencies in embracing digital processes and transitioning from "digitization to being digital" [13]. These observations highlight the importance of supportive regulatory frameworks in fostering innovation and technological adoption [15].

This view is credible as the study of three African nations provides details supporting that; industrial policies exist to encourage technological development, but implementation and strategy are poor due to policy coherence, lack of accountability mechanisms, and inadequate policy financing [33]. If businesses thrive through technology and innovation, government policy must be less shielding and more encouraging. References [24] and [29] purport that government programs influence technological and innovative development, transfer, and commercialization. Their text provides evidence from various research intending to establish an academic correlation to determine the impacts of government regulation on technology marketing, economic development, infrastructure, and business practices which aligns with the findings of this study. The findings also find support in [57] study of economic development in China which focuses on the criticality of digital infrastructures to drive digital economic growth and digital transformation through modern industrial systems and capacities.

Coincidentally, the results align with [36] study that alludes to a latent relationship between the quality of policy and innovation levels in Africa. The authors arguably provide statistical evidence of such using SGMM estimation and state advancements in innovation through improving the quality of institutional regulations, which gains further support through the estimate of the equivalent effect of change between the variables. Moreover, this research alludes to scenarios where innovation outputs are significantly higher when governments' regulative quality is engaging and promoting innovation versus blocking and corruption [36]. This supports even further that their study recognizes the implication of regulatory barriers and the implications of managing regulatory quality to yield higher innovation results. African states that fall part of our primary research provide similar notions of innovative stagnations and provide evidence of a latent relationship between regulatory quality.

The statistical correlation between patent creation and innovativeness is not directly linked in developing countries, nor is the impact of government policy around it. Reference [30] examines how patent and intellectual property laws affect the direction of innovation. However, in 2012 Moser argues that patent laws did not increase patent requests but more on cross-industry differences [31]. Ideally, the introduction of better patent regulation does not affect the production of patent applications. Further support relating to patent protection indicates that no evidence strengthening patent protection positively affects innovation rates [23], coinciding with the research findings. While it does show a contrasting result in comparison to [4] analysis that innovation is a result of patent application in the OECD countries which shows there are underlying implications that may affect patent application.

Notwithstanding, the policies protecting intellectual property are still relevant. The distinction between classical regulation goals, intellectual property, and competition laws is important because it provides a basis for understanding the gaps in classic frameworks and how preceding government regulations seek to close the gap. These gaps include the variation between the markets inducing socially valuable innovations and the perception of demand [24].

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Given the effect of the global pandemic, the professional community agrees that the future of the digital economy rests on improving the level of collaboration between government and private organizations. More than ninety percent (90%) of the population aligns with this view and supports the idea (Table III). Existing literature also supports this finding in practicality. Reference [9] believes that digitalization within small organizations is low, and due to a lack of support programs and policies from the government, they struggle to transition. Reference [10] that governments should build collaborative ecosystems to improve development. Reference [25] analysis of the Chinese government's enrichment stage shows where policies encourage talent attraction outside the immediate environs, university collaboration, and research. The data also supports that an innovative ecosystem can reach self-management once it has governmental support in training and quality control. Qualitative and quantitative studies agree that collaboration is essential to innovation in businesses and industries.

Additionally, [48] highlights that government activities include improving collaboration, education, and mentoring from government, academia, and society as a whole. Through which government must build digital ecosystems and educational institutions to form the foundation for digital affluence [48]. The views and findings of their research align with the research findings in the previous chapter and provide additional support for the connections between the role and impact of government regulation on innovative development in businesses.

D. Socio-Economic Readiness and Technology Adoption

The literature suggests that an economy progresses along the innovation adoption cycle once it achieves an appropriate level of Socio-Economic Readiness (SER) [28]. Studies further emphasize that the rate of technological adoption across organizations correlates strongly with the degree of government involvement in fostering an environment conducive to SER. Nations with high levels of SER dimensions are more likely to develop successful digital economies [28].

The researcher's broader investigative study supports these findings, with 84% of professionals agreeing that digitally advanced governments play a pivotal role in creating innovative infrastructures, resources, and industries (Table III). Moreover, 92% of respondents believe that government-led education and infrastructure initiatives are critical for establishing a stable foundation for digital economic development(Table III). These insights highlight the importance of policy frameworks that prioritize education, knowledge dissemination, and infrastructure enhancement over protectionist measures. By fostering openness and support for emerging technologies, governments can improve the willingness and capacity of businesses to adopt innovations, ultimately enabling the disruptive benefits of technology rather than stifling them through restrictive practices.

The state of socio-economic readiness is paramount to the propelling of innovative development. Governments in developing countries must strive to identify ways to pivot toward digital maturity through the need for propulsion. This goes beyond understanding the relationship but rather acknowledging that policy definitions can provide a foundation for restricting or promoting the evolution of the digital landscape. Therefore, governments must go beyond shielding and blocking policies that influence the readiness of citizens, firms, and governments alike. Finding such a state of preparedness relies upon government policy to define building blocks. The research findings from the professional community align with [20] view that greater collaboration between government and private sector must happen to ensure that entrepreneurs can compete in a digital economy during and after the COVID-19 pandemic. Even to the point where further research must ensue to thoroughly understand the knowledge transfer needs to improve the state of readiness and variables that may impact or influence the digital economy.

Moreover, regulations should provide the necessary initiative for developing talent pools and networks that retool resources with digital competencies and in-demand expertise to improve the capacity of businesses. Not to mention the driving innovative ecosystem engagement between private entities through research and development. Through these incubators, startups emerge and gain valuable resources to improve ambidexterity in a digital age. The government must pivot data mastery by aggregating and cultivating data to efficiently create new ways of operating and instilling regulations that use infrastructure as the pivot towards balancing privacy, security, and flexibility concerning demand locally and globally. Equally, government policy creates the backbone of intelligent workflows that recalibrate industry processes to focus on high-value actors and outcomes. Lastly, using the regulative design through strategic architectures to improve business models by making the adoption of new and emerging technology appealing.

The underlying implications of shielding activities rest with the deterrence of adopting new and innovative technology to advance the offering to the ever-changing marketplace. Governments must understand and seek to understand that while policy can only act as enablers, it must create a situation where the socio-economic environment is ready for development. Business strategy is not independent of government action but is driven by the climate that the government creates in a bid to make a sustainable digital economy. In an era of a global pandemic, reliance on digital business models is growing because of the general fear of contact and indications and ease of contactless transactions. Notwithstanding, there appears to be a greater need for government support to create technology-supporting initiatives, infrastructure, and policies to ensure smooth transitions are plausible. The research highlights these inherent conditions present in academic literature and findings. It is not to say government policy is the final solution towards adopting technology or becoming innovative as clearly, the research results show it's more correlational than causative.

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Barring investment costs, policy structures should provide support to creating the springboard to allow further adoption of new technologies. This approach encourages making the fundamental necessities available and minimal costs such as access to electricity, the internet, and basic devices such as computers and mobile smart units. Through access comes an increase in use and openness to adopt newer unfamiliar technology. Government sustainability actions must include the promise to improve access to technological components to build the economy from the ground up rather than play catch up. The literature review examines the peculiarity of developing countries that focus on protecting the ideologies of monopolistic industries, and farming without catering to the global competitive environment driven by digital transactions. It is not only, a response to global changes that drives advancement but a need to ensure the right foundation and infrastructure are in place to propel the adoption and transition smoothly through the introduction phase.

The research clarifies the relationship is present, just as others have, but to the extent where empirically more needs to be understood. Developing countries continue to lag in the technology adoption life cycle and for reasons still not clear. While regulations impact readiness and openness through knowledge-based transference to citizens and businesses, it gives credence to the concept that openness is a function of education and infrastructural stability. The literature and findings suggest that government policy actions that build instead of guard give birth to an environment for learning, research, and development. It is through these incubators that businesses and industries learn to accept, acknowledge, and develop the technological ambidexterity to utilize new and emerging technology in business processes and compete effectively.

Collaboratively, government and private sector organizations need to support the adoption and execution of innovativeness to reap the benefits beyond simply having access without full utilization. Combining efforts and sustainable digital goals could result in closing the gap between developing and developed countries through infrastructure support and investments. Until these latent infrastructure gaps close the lag between the two widens. Government legislation as discussed before is critical to how technology and innovativeness develop within the economy and if policies are not clear or enabling the implications are severe.

However, is it simply just an ideal situation for policy to match the needs of innovativeness? The obvious response is no, but for many, it requires clarification. The ideologies of leading by example despite non-supportive policies put digitally affluent governments in a position to do what they can to catch the leaders. As the world advances in the world of digital currency, there has been a gradual increase in adoption among developing nations. Countries acknowledge digital currencies as mediums of financial exchange without fully endorsing regulatory policies to support their adoption at the local level, such as stringent Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations. Interestingly, however, it begs the question of whether innovative government processes translate to localized adoption in businesses and industries. The findings provide the support from the professional community. As governments seek to improve their processes, so comes an extension to the development of business processes and transactions.

E. The RQSi Framework

Through a detailed analysis of the literature and a root cause evaluation of the research findings, this study presents a conceptual framework designed to identify the relationship between regulatory shielding activities and the level of innovativeness in economic states. The introduction of the Regulatory Quadrant of Shielding and Innovativeness (RQSI) Theory marks a pivotal moment in the discourse on regulatory quality and innovation.

The RQSi Framework provides a creative and intuitive matrix that illustrates the dynamic interplay between regulatory policies and economic innovation. By categorizing economic states within a quadrant, this framework highlights the characteristics and performance outputs associated with varying levels of regulatory shielding. Figure 1 visualizes this concept, demonstrating how economies transition along the spectrum from weak to strong regulatory characteristics. The theory posits that as policies evolve to become more supportive and strategically aligned, the potential for innovative development and economic growth significantly increases.

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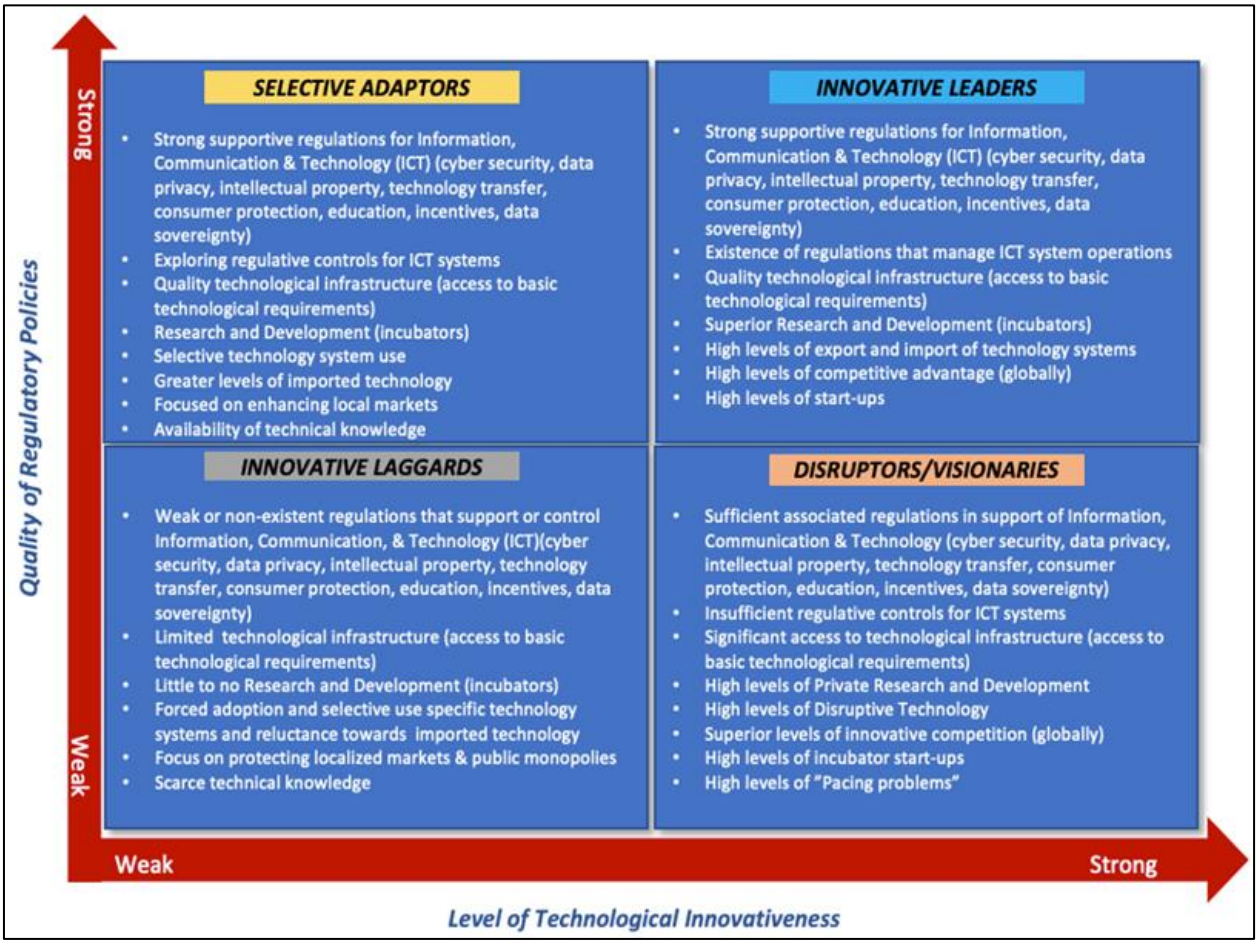

Fig. 1.RQSi Framework

Source: Adapted by the author/researcher Fisher, D. S. for illustration of the conceptual theory of Regulatory Quadrant of Shielding and Innovativeness (RQSi Theory).

The RQSi quadrant identifies four distinct categories of players within the regulatory quality and innovativeness paradigm, each characterized by unique attributes and implications for economic development:

➢ *Innovative Laggards*

This group represents economies with poor regulatory quality and low levels of innovativeness. Countries in this quadrant typically display limited technological infrastructure and a lack of Research and Development (R&D) initiatives, such as incubators. Their characteristics include forced adoption and selective use of specific technological systems, reluctance toward imported technologies, and a strong emphasis on protecting localized markets and public monopolies. These nations prioritize regulatory shielding to maintain domestic control at the expense of fostering innovation and openness.

➢ *Selective Adopters*

Economies categorized as Selective Adopters exhibit relatively strong regulatory quality but weak innovative output. While instances of regulatory shielding persist, these states often implement supportive regulations for Information, Communication, and Technology (ICT), focusing on areas such as cybersecurity, data privacy, intellectual property, technology transfer, consumer protection, education, incentives, and data sovereignty. Key characteristics include:

- Active realignment and exploration of regulatory controls for ICT systems.
- Access to quality technological infrastructure, meeting basic technological requirements.
- Selective adoption of imported technologies aimed at enhancing local markets.

➢ *Innovative Leaders*

This quadrant encompasses nations with high regulatory quality and strong innovative output. These economies benefit from robust regulatory frameworks supporting ICT, including cybersecurity, data privacy, intellectual property, and incentives for technology transfer. They demonstrate:

- Comprehensive regulatory management of ICT system operations.
- Superior technological infrastructure with advanced accessibility.
- Well-established R&D practices, incubators, and strong startup ecosystems.
- High levels of both export and import activities related to technology systems contribute to global competitiveness.

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➢ *Disruptors/Visionaries*

As the name suggests, Disruptors or Visionaries are characterized by high levels of innovation but lagging regulatory impact. In these economies, innovation progresses faster than the development and application of corresponding regulations, leading to challenges in governance. Key features include:

- Sufficient but inadequately aligned regulatory frameworks supporting ICT (cybersecurity, data privacy, intellectual property, etc.).
- Significant access to advanced technological infrastructure.
- High levels of private R&D activity and the emergence of disruptive technologies.
- Intense global competition is driven by superior innovation, supported by thriving startup ecosystems and incubators.
- The presence of "pacing problems," where technological advancements outstrip regulatory preparedness.

These classifications within the RQSi framework provide a comprehensive understanding of how regulatory quality and innovation interact across economic states. By analyzing the unique characteristics and challenges of each quadrant, policymakers and industry leaders can tailor strategies to enhance regulatory effectiveness and foster sustainable innovation.

VI. CONCLUSION

The findings of this study underscore the critical role of regulatory quality in fostering innovation and human development. By examining the interplay between the Regulatory Quality Index (RQI), Human Development Index (HDI), and Global Innovation Index (GII), it is evident that supportive regulatory frameworks significantly enhance socio-economic readiness and technological adoption. The results reveal that higher RQI scores correlate with increased GII rankings, highlighting the importance of well-designed policies in driving innovation. Additionally, nations with robust HDI scores exhibit better innovation outcomes, emphasizing the role of education, infrastructure, and governance in enabling technological progress.

However, the variability in R^2 values suggests that while regulatory quality is a significant factor, other variables such as cultural and economic conditions also play a role. This indicates the need for a holistic approach to policy design that considers these additional factors. The study advocates for reducing regulatory shielding and promoting collaboration among governments, industries, and academia to accelerate technological ambidexterity and economic transformation.

The research, in hindsight, provides an open avenue to recognize that government policy is more critical at the fundamental level of adopting innovative systems and technologies than it might initially appear. By establishing the Regulatory Quadrant of Shielding and Innovativeness (RQSi) framework, this research provides a robust foundation for future studies to refine policy designs that promote innovation and sustainable development. The actionable pathways identified in this study offer valuable insights for reshaping regulatory environments and building innovation-led economies.

Future research should explore advanced models beyond simple linear regression to provide greater insight into the relationship between regulatory stability and innovativeness. For example, binary logistic regression could be employed to better understand how fluctuations in explanatory variables influence specific outcomes, accounting for disparities in ranking scales. Additionally, non-least-squares fitting could be utilized to minimize the impact of outliers, a consideration not addressed in the current study design.

The findings reveal that while technology adoption is essential for competitive advantage, its impact is contingent on effective application, guided by robust decision-making and strategic alignment with market demands. Furthermore, the study demonstrates that government policies play a dual role: they can either enable innovation through supportive frameworks or hinder progress through excessive regulatory shielding.

To foster innovation and economic growth, policymakers must prioritize the development of digital infrastructure, education systems, and research initiatives. Collaboration among governments, industries, and academia is critical to creating an ecosystem that supports sustainable innovation and reduces barriers to technological adoption. By addressing these challenges, this research contributes to the ongoing discourse on sustainable development and provides actionable insights for academics, policymakers, and industry leaders aiming to navigate the barriers to innovation and build competitive, forward-thinking economies.

REFERENCES

[1]. Amesho, K. T. T., Edoun, E. I., Naidoo, V., & Pooe, S. (2021). Managing competitive advantage through technology and innovation systems in the local government authorities. *South African Journal of Information Management, 23*(1), Article a1348.

[2]. Banmairuroy, W., Kritjaroen, T., & Homsombat, W. (2021, March 12). The effect of knowledge-oriented leadership and human resource development on sustainable competitive advantage through organizational innovation's component factors: Thailand's new s-curve industries. *Asia Pacific Management Review.*

[3]. Biber, E., Light, S. E., Ruhl, J. B., & Salzman, J. (2019). Regulating Business Innovation as Policy Disruption: From the Model T to Airbnb. *Vanderbilt Law Review, 70*(5), 4.

[4]. Blind, K. (2011, October 22). The influence of regulations on innovation: A quantitative assessment for OECD countries. *Research Policy, 41,* 391-400.

[5]. Bubaker, S. (2020, September). Theories of development. *International Journal of Language and Linguistics, 2*(1), https://www.researchgate.net/publication/344135136.

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14810105

[6]. Butenko, A., & Larouche, P. (2015, March 26). Regulation for Innovativness or Regulation of Innovation? *TILEC Discussion Paper No. 2015-007*, Available at SSRN: https://ssrn.com/abstract=2584863 or http://dx.doi.org/10.2139/ssrn.2584863.

[7]. Casanovas, P., Koker, L. D., Mendelson, D., & Watts, D. (2017, May). Regulation of Big Data: Perspectives on strategy, policy, lay and privacy. *Health Technology, 7*, 355-349.

[8]. Celtekligil, K., & Adiguzel, Z. (2019). Analysis of the effect of innovation strategy and technological turbulence on competitive capabilities and organizational innovativeness in technology firms. *Pocedia Computer Science*(158), 772-780.

[9]. Chang, A., Kuentz, J. F., Wiseman, B., Seong, J., Lan, J., Tan, C., . . . Tang, D. (2017, September). *Taiwan's Digital Imperative: How a digital transformation can re-ignite economic growth*. Retrieved February 2022, from Mckinsey China: http://mckinseychina.com/wp-content/uploads/2017/10/McKinsey_Taiwans-Digital-Imperative-EN.pdf

[10]. Chen, C., Lin, Y. C., Chen, W. H., Chao, C. F., & Pandia, H. (2021, January). Role of government to enhance digital transformation in small business. *Sustainability, 13*(1028).

[11]. Ciobanu, O. G., & Neamtu, D. (2017, July). The impact and importance of new technologies in business development in the context of economic diversity. *Sciendo, 11*(1), 698-710.

[12]. Cooter, R. (2005). Innovation, Information and the Poverty of Nations. *Florida State University Law Review, 33*(2), https://ir.law.fsu.edu/lr/vol33/iss2/1.

[13]. Eggers, W. D., Manstof, J., Kishnani, P. K., & Barroca, J. (2021). *Seven pivots for government's digital transformation.* Deloitte Insights.

[14]. Erik, S. (2008). Entrepreneurship and innovation policy. *Jena Economic Research Papers, 2008*(006).

[15]. Francis, S. (2018). Evolution of technology in the digital arena: Theories, Firm-level strategies and state policies. Indian Institute of Foreign Trade. New Delhi: Centre for WTO Studies.

[16]. Grochova, L. I. (2014, November 6). Regulatory Quality and sustainable economic development. *Act Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 62*(6), 1201-1308.

[17]. Guerrero, M., & Urbano, D. (2019, May). Effectiveness of technology transfer policies and legislation in fostering entrepreneurial innovations across continents: an overview. *The Journal of Technology Transfer, 44*, 1347-1366.

[18]. Hanna, N. (2018). A role for the state in the digital age. *Journal of Innovation and Entrepreneurship, 7*(5).

[19]. Heck, S., & Rogers, M. (2014). Resource revolution: How to capture the biggest business opportunity in a century. Houghton Mifflin Harcourt.

[20]. Hertina, D., Effendi, K. A., & Ichsani, S. (2021, March). Technological education and its influence on digital economic readiness during the COVID-19 pandemic. *Review of International Geographic Education (RIGEO), 11*(1), 699-711.

[21]. Hogan, M., & Gallaher, M. (2018). Quantitative Indicators for Country-level Innovation Ecosystems, RTIPress.https://doi.org/10.3768/rtipress.2018.op.0051.1805. *RTI Press Publication, No. OP-0051-1805*, .

[22]. Kalthaus, M. (2020). Knowledge recombination along the technology life cycle. *Journal of Evolutionary Economics, 30*(ORCID: orcid.org/0000-0002-9177-3038), 643-704.

[23]. Lerner, J. (2009, May 2). The empirical impact of intellectual property. *American Economic Review, 99*(2), 343-48.

[24]. Lev-Artez, Y., & Strandburg, K. J. (2020, June 24). Regulation and Innovation: Approaching market failure from both sides. *Yale Journal on Regulation*.

[25]. Liao, Y., Lores, E. R., Deschamps, F., Brezinski, F., & Venancio, A. (2017). The Impact of the Fourth Industrial Revolution; a cross country/comparison. *SciELO, DOI: 10.1590/0103-6513.20180061*(28).

[26]. Ma, L., Liu, Z., Huang, X., & Li, T. (2019). The impact of local government policy on innovation ecosystem in knowledge resource-scarce region: Case study of Changzhou, China. *Science, Technology and Society, 24*(1), 29-54.

[27]. Madsen, D. O. (2019, August 19). The Emergence and Rise of Industry 4.0 Viewed through the Lens of Management Fashion Theory. *Administrative Sciences*.

[28]. Makins, J. (2009). Technology readiness assessments. *Acta Astronuatica, 65*(9), 1216-1223.

[29]. Marshall, K. P., Piper, W. S., & Wymer, W. W. (2005). *Government Policy and Program Impacts on Technology Development, Transfer and Commercialization.* Binghamton, NY/USA: Best Business Books imprint of The Haworth Press, Inc.

[30]. Moore, G. A. (2001). *Crossing the Chasm.* Harper Business.

[31]. Moser, P. (2003, August). How do patent laws influence innovation? Evidence from nineteenth-century world fairs. *National Bureau of Economic Research*.

[32]. Moser, P. (2012). Innovation without patents: evidence from world fairs. *Journal of Law and Economics, 55*(1), 43-74.

[33]. Mugwagwa, J., Edwards, D., & Haan, S. (2015). Assessing the implementation and influence of policies that support research and innovation systems for health: the cases of Mozambique, Senegal, and Tanzania. *Health Research Policy and Systems*(13:21), DOI 10.1186/s12961-015-0010-2.

[34]. Nyagadza, B., Pashapa, R., Chare, A., Mazuruse, G., & Hove, P. K. (2022, January 5). Digital technologies, Fourth Industrial Revolution (4IR) & Global Value Chains (GVCs) nexus with emerging economies' future industrial innovation dynamics. *Cogent Economics and Finance, 10*(1), 2014654, DOI: 10.1080/23322039.2021.2014654.

[35]. Obibuaka, L. O. (1983). Agriculture extension as a strategy for rural transformation. *University of Nigeria, Nsku Press*.

[36]. Oluwatobi, S., Oluribola, I. O., Alege, P. O., & Uchenna, E. (2014, January). Innovation in Africa: Why institutions Matter. *SSRN Electronic Journal, DOI: 10.2139/ssn.2460959*.

ISSN No:-2456-2165 https://doi.org/10.5281/zenodo.14810105

[37]. Rasiah, R. (2019, January). How much of Raymond Vernon's product cycle thesis is still relevant today: evidence from the integrated circuits industry. *International Journal Technological Learning, Innovation and Development, 11*(1), 56-57.
[38]. Reuschke, D., & Mason, C. (2020, February). The engagement of home-based business in the digital economy. *Futures, 135*.
[39]. Reyes, G. E. (2001, February). Four main theories of development: Modernization, Dependency, World-System, and Globalization. *Revista Critica de Cienncias Sociales y Juridicas, 4*.
[40]. Robleck, V., Mesko, M., & Alojz, K. (2016). A Complex View of Industry 4.0. *Sage Open*, 1-11.
[41]. Rogers, E. M. (2010). Diffusion of Innovations, Fourth Edition. Free Press.
[42]. Ross, P., & Maynard, K. (2021, January 20). Towards a 4th industrial revolution. *Intelligent Building International, 13*(No. 3), 159-161.
[43]. Taylor, M. R., Rubin, E. S., & Hounshell, D. A. (2005, April). Regulation as the Mother of Innovation: The Case of SO2 Control. *Law and Policy, 27*(2).
[44]. Tessey, G. (2020). Technology Life Cycles. Encyclopedia of Creativity, Invention, Innovation, and Entrepreneurship.
[45]. The Inter-Academy Partnership (IAP). (2007, October). *The role of Government and the contribution of science and technology.* Retrieved February 2022, from The Interacademy: https://www.interacademies.org/sites/default/files/2021-03/The%20Role%20of%20Government%20and%20the%20Contribution%20of%20Science%20and%20Technology.pdf
[46]. The World Bank. (2022). *TCdata360*. Retrieved January 2022, from The World Bank: https://tcdata360.worldbank.org/indicators/51ada6ba?country=BRA&indicator=40283&viz=line_chart&years=2013,2020
[47]. Tulchynska, S., Vovk, O., Popelo, O., Saloid, S., & Kostinunik, O. (2021, June 21). Innovation and investment strategies to intensify the potential modernization and to increase the competitiveness of microeconomic systems. *International Journal of Computer Science and Network Security, 6*, 161-168.
[48]. United Nations Development Programme. (2021). *Human Development Reports*. Retrieved January 2021, from United Nations Development Programme: http://hdr.undp.org/en/content/human-development-index-hdi
[49]. Veldhoven, Z. V., & Vanthieen, J. (2021, March 10). Digital transformation is an interaction-driven perspective between business, society, and technology. *Springer Link*.
[50]. Vukoszavlyez, S. (2019). The connection between Global Innovation Index and Economic Well-Being Indexes. *APSTRACT, 13*(3-4), DOI: 10.19041/APSTRACT/2019/3-4/11.
[51]. Wahyuningtyas, R., Disastra, G., & Rismayani, R. (2022, February 1). Toward cooperative competitiveness for community development in Economic Society 5.0. *Journal of Enterprising Communities: People and Places in the Global Economy*, ISSN: 1750-6204.
[52]. Wang, S., Zhao, S., Shao, D., & Liu, H. (2020, September 18). Impact of government subsidies on manufacturing innovation in China: the moderating role of political connections and investor attention. *Sustainability*(12).
[53]. Wang, Y., Han, J. H., & Beynon-Davis, P. (2019). Understanding blockchain technology for future supply chains: a systematic literature review and research agenda. *Supply Chain Management, 24*(1), 62-84.
[54]. Wilburn, K. M., & Wilburn, H. R. (2018). The impact of technology on business and society. *Global Journal of Business Research, 12*(1), 23-29.
[55]. World Intellectual Property Organization. (2021). *World Intellectual Property Indicators 2021*. https://www.wipo.int/publications/en/details.jsp?id=4571
[56]. World Trade Organization (WTO). (2020). *World Trade Report 2020.* Retrieved February 2022, from The World Trade Organization: https://www.wto.org/english/res_e/booksp_e/wtr20_e/wtr20_e.pdf
[57]. Zervoudi, E. K. (2020). Fourth Industrial Revolution: Opportunities, Challenges, and Proposed Policies. *Intech Open.*
[58]. Zhang, W., Zhao, S., Xiaoyu, W., & Yao, Y. (2021, September 21). Study on the effect of the digital economy on high-quality economic development in China, https://doi.org/10.1371/journal.pone.0257365. *Plos One, 16*(9).