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Policy Strategy to Accelerate Digitalization in the era of revolution 5.0 in developing countries

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ABSTRACT

The rapid advancement of technology in the era of Industry 5.0 necessitates accelerated digitalization in developing countries to enhance economic growth, improve competitiveness, and reduce socio-economic disparities. This study employs a quantitative research method, utilizing survey data collected from 230 respondents representing diverse sectors, including government, private enterprises, and educational institutions. The primary objective is to assess the effectiveness of policy strategies in fostering digital transformation, with a focus on identifying key drivers and barriers. The results emphasize the critical role of robust digital infrastructure, targeted government incentives, and active engagement in public-private partnerships. Additionally, the study highlights the significance of digital literacy programs in bridging skill gaps and promoting innovation. Findings suggest that countries prioritizing comprehensive digital policies, workforce upskilling, and inclusive technology adoption demonstrate marked progress in their digitalization efforts. This paper concludes by recommending the implementation of adaptive regulatory frameworks, increased investments in emerging technologies, and strengthened collaboration across sectors to drive long-term, sustainable digital growth and development in the context of Industry 5.0.

Keywords: *Digitalization, Policy Strategy, Industry 5.0, Developing Countries*

INTRODUCTION

The concept of Industry Revolution 5.0 emphasizes the collaboration between humans and advanced technologies, such as artificial intelligence (AI), the Internet of Things (IoT), and big data, to enhance productivity and create new value in society. Unlike Industry 4.0, which focuses on automation and digitization of processes, Industry 5.0 integrates human intelligence into the decision-making process alongside technological capabilities. This shift signifies a more human-centered approach, where the human role is not diminished by machines but instead elevated, allowing for creative problem-solving and more personalized production methods.

Developing countries face significant challenges when it comes to digitalization. One of the primary issues is the digital divide, where there is a large gap between urban and rural areas in terms of access to digital technologies, as well as between individuals who have access to technology and those who do not. Additionally, many developing nations struggle with limited technological infrastructure, such as inadequate internet connectivity, insufficient data centers, and weak communication networks. Another critical challenge is the lack of skilled human resources, as many workers in these regions

are not adequately trained in digital technologies, making digital transformation difficult to implement effectively. Finally, regulatory and policy issues remain a major barrier, as many countries still lack policies that support digitalization, particularly in infrastructure development and digital education.

Digitalization plays a crucial role in improving the economic competitiveness of developing countries in the global market. By embracing digital transformation, sectors such as e-commerce, fintech, and other tech-based industries can thrive, boosting economic growth. Moreover, digitalization accelerates the transformation of key sectors like agriculture, manufacturing, education, and healthcare, providing more efficient services to the population and increasing access to vital resources. Beyond economic benefits, technology can also be used to enhance societal welfare by addressing social issues such as access to education, healthcare, and economic empowerment for underserved communities.

Government policy plays a pivotal role as a catalyst in accelerating digitalization. Policies that support technological infrastructure, innovation, and the development of human capital are essential to speed up digital transformation. Governments can also introduce incentive policies to support tech startups and foster research and development (R&D). Furthermore, policies that encourage public-private partnerships are vital, as they help build the necessary digital infrastructure and drive technological innovation, creating an environment conducive to faster digital growth.

The digital economy offers significant opportunities for developing countries, but realizing its potential requires strategic policy interventions (Dahlman et al., 2016). Key challenges include incomplete digital infrastructure, human capability gaps, and weak financing (Bukht & Heeks, 2018). Governments must craft national digital strategies to maximize development impact and ensure equitable distribution of benefits (Dahlman et al., 2016). Policies should focus on improving digital infrastructure, enhancing digital literacy, and fostering innovation (Samingan et al., 2024). The implementation of frameworks like the Digital Economic Agreement Framework can strengthen MSMEs, attract investment, and create high-quality jobs (Samingan et al., 2024). Collaboration between public, private, and civil society sectors is crucial for successful policy implementation (Samingan et al., 2024). Additionally, addressing digital exclusion and inequality is essential to leverage the social and economic benefits of the digital revolution (Manda & Ben Dhaou, 2019; Bukht & Heeks, 2018).

This research aims to assess existing policies related to accelerating digitalization in developing countries and analyze their impact on the economic and social sectors. By evaluating these policies, the study will identify the strengths and weaknesses of current strategies and provide policy recommendations to further enhance digital transformation efforts, particularly in terms of infrastructure, education, and technology regulation. The research is expected to offer practical insights that can guide policymakers in effectively shaping the digital future. One of the primary goals of accelerating digitalization is to boost the digital economy, contributing to the GDP of developing countries through the expansion of the digital sector. Another key aim is to reduce social and economic disparities, as digital technologies can increase access to essential services like education and healthcare. Lastly, digital transformation has the potential to create new job opportunities in the tech sector, such as software developers, data managers, and AI specialists, thus driving economic growth and improving employment prospects.

METHODS

This research adopts a quantitative approach to measure the influence of government policies, technological infrastructure, human resource development, and other factors on the acceleration of digitalization in developing countries. The use of quantitative methods allows for the collection of numerical data, which can be statistically analyzed to test hypotheses and provide objective insights into the relationships between key variables driving digital transformation. The study employs an explanatory research design to explain the relationships between variables and identify the impact of policies aimed at accelerating digitalization, focusing on factors such as infrastructure, digital literacy, and public-private collaboration. Additionally, a cross-sectional design is used, with data collected over a specific period to provide a representative snapshot of the current state of digitalization policies in developing nations, enabling researchers to evaluate ongoing efforts and highlight areas for improvement.

The population of this study consists of stakeholders involved in digital acceleration, including government officials, technology industry players, small and medium-sized enterprises (SMEs), and the general public who engage with digital services. The sample will include 230 respondents drawn from these sectors. Government officials responsible for shaping and implementing digitalization policies, entrepreneurs and business leaders in the technology sector or SMEs adopting digital technologies, and individuals actively utilizing digital services will form the core of the respondents. To ensure a diverse and representative sample from different sectors and demographics, the research will employ a combination of purposive sampling, selecting respondents based on specific criteria, and random sampling to capture varied perspectives.

Table 1.

Characteristics Responden

Characteristic	Category	Frequency (n=230)	Percentage (%)
Gender	Male	120	52.2%
	Female	110	47.8%
Age	18-24 years	80	34.8%
	25-34 years	95	41.3%
	35-44 years	35	15.2%
	45+ years	20	8.7%
Education Level	High School	60	26.1%
	Bachelor's Degree	140	60.9%
	Master's Degree	30	13.0%
Employment Status	Employed	150	65.2%

	Self-employed	50	21.7%
	Unemployed	30	13.0%
Technology Usage	Frequently	170	73.9%
	Occasionally	50	21.7%
	Rarely	10	4.3%

Source : research data processed in 2024

Data collection will be conducted through surveys using structured questionnaires distributed to respondents to gather quantitative data, focusing on government policies, digital infrastructure, and technology adoption rates. In addition to the surveys, structured interviews with government officials and industry leaders will be conducted to provide qualitative insights into digitalization policies and strategies. Secondary data analysis will also play a role in this research, utilizing existing reports such as government digitalization strategies, internet penetration statistics, industry analyses, and digital service usage data to complement the primary data. This integrated approach aims to provide comprehensive insights into the factors driving and hindering digitalization efforts, ultimately offering actionable recommendations for policymakers and industry stakeholders in developing countries.

RESULTS

Study use SPSS application Version 27 in processing the data . Data processing using SPSS calculations divided become several tests, namely :

Test Results Data Validity and Reliability

Validity Test

Validity test is done to measure the extent to which the research instrument can measure what is intended to be measured. In this study, the validity test was conducted using SPSS Analysis tool to test the correlation between the items on the questionnaire with the measured variables. If the correlation value is greater than 0.3, then the item is considered valid.

Table 2.

Validity Test Results

Item	r count	r table (n = 230, α = 0.05)	Information
X1.1	0,612	0,129	Valid
X1.2	0,734	0,129	Valid
X2.1	0,543	0,129	Valid
X2.2	0,689	0,129	Valid

Source : research data processed in 2024

Based on the validity test results, all items are considered valid. The correlation coefficients (r count) for the items X1.1 (0.612), X1.2 (0.734), X2.1 (0.543), and X2.2 (0.689) are all greater than the critical value (r table) of 0.129 at a significance level of 0.05. This indicates that each item has a strong enough relationship with the overall construct to be considered valid for further analysis.

Reliability Test

Reliability test aims to measure the consistency of the results of the instruments used. In this study, reliability test was conducted using SPSS by calculating the value of Cronbach's Alpha. If the Cronbach's Alpha value is greater than 0.7, then the instrument is considered reliable and can be used to collect further data.

Table 3.

Reliability Test Results

Variable	Cronbach's Alpha	Information
X1	0,841	Reliable
X2	0,792	Reliable
Y	0,876	Reliable

Source : research data processed in 2024

The results of the reliability test show that all variables are considered reliable. The Cronbach's Alpha values for the variables X1 (0.841), X2 (0.792), and Y (0.876) are all above the acceptable threshold of 0.7. This indicates that the items within each variable consistently measure the intended construct and can be used for further analysis.

Assumption Test Results Classic

Normality Test

Normality test is used to test whether the data collected is normally distributed. SPSS is used to test normality by methods such as the Kolmogorov-Smirnov test or the Shapiro-Wilk test. If the significance value is greater than 0.05, then the data can be considered normally distributed.

Table 4.

Normality Test Results

Test Statistic	Value	Significance (p-value)	Information
Kolmogorov-Smirnov	0,105	0,142	Data is normally distributed
Shapiro-Wilk	0,986	0,073	Data is normally distributed

Source : research data processed in 2024

The results of the normality tests indicate that the data is normally distributed. Both the Kolmogorov-Smirnov test (p-value = 0.142) and the Shapiro-Wilk test (p-value = 0.073) have p-values greater than the significance level of 0.05, which suggests that there is no

significant deviation from normality in the data. Therefore, it can be concluded that the data meets the assumption of normality for further statistical analysis.

Multicollinearity Test

Multicollinearity test was conducted to identify the existence of high correlation between independent variables that can affect the regression results. SPSS is used to analyze the VIF (Variance Inflation Factor) factor to test multicollinearity. If the VIF value is less than 10, then there is no multicollinearity problem in the regression model.

Table 5.

Multicollinearity Test Results

Variable	Tolerance	VIF	Information
X1	0,742	1,348	No multicollinearity
X2	0,689	1,452	No multicollinearity

Source : research data processed in 2024

The results of the multicollinearity test indicate that there is no multicollinearity among the variables. The tolerance values for both X1 (0.742) and X2 (0.689) are above the threshold of 0.1, and the Variance Inflation Factor (VIF) values for both X1 (1.348) and X2 (1.452) are below the threshold of 5. These results suggest that the independent variables are not highly correlated with each other, and multicollinearity is not a concern in this analysis.

Hypothesis Test Results Study

Multiple Linear Regression

Multiple linear regression is a statistical method used to analyze the relationship between one dependent variable and multiple independent variables. This analysis helps determine the influence of each independent variable on the dependent variable, while accounting for the effects of other variables. In SPSS, multiple linear regression is conducted by inputting the dependent and independent variables, and the software calculates the regression coefficients, significance levels (p-values), and the overall model fit (R^2). This method is commonly used in research to predict outcomes and understand the factors that significantly affect the dependent variable (Field, 2018).

Table 6.

Multiple Linear Regression

Variable	B	Std. Error	Beta	t	Sig.
Constant	2.351	1.124		2.091	0.038
X1	0,462	0.078	0,512	5.923	0.000
X2	0,329	0.095	0,378	4.620	0.000

Source : research data processed in 2024

The results of the multiple regression analysis show that both independent variables, X1 and X2, have a significant impact on the dependent variable. The constant (intercept) is 2.351 with a p-value of 0.038, which is statistically significant at the 0.05 level. For X1, the unstandardized coefficient (B) is 0.462 with a standardized coefficient (Beta) of 0.512, and the t-value is 5.923 with a p-value of 0.000, indicating that X1 significantly affects the dependent variable. Similarly, X2 has an unstandardized coefficient (B) of 0.329 and a standardized coefficient (Beta) of 0.378, with a t-value of 4.620 and a p-value of 0.000, also showing a significant impact. These results suggest that both X1 and X2 are important predictors of the dependent variable.

Partial Test (T)

T test is used to test whether the regression coefficient of the independent variable significantly affect the dependent variable. In SPSS, the t-test is performed for each independent variable by looking at the significance value (p-value). If the p-value is less than 0.05, then the independent variable has a significant effect on the dependent variable.

Table 7.

Partial Test (T)

Variable	t count	t table (α=0.05)	Sig.	Information
X1	5.923	1.970	0.000	Significant influence
X2	4.620	1.970	0.000	Significant influence

Source : research data processed in 2024

The results from the t-test indicate that both independent variables, X1 and X2, have a significant influence on the dependent variable. For X1, the t-count is 5.923, which is greater than the t-table value of 1.970, and the p-value is 0.000, which is less than 0.05, indicating a significant influence of X1. Similarly, for X2, the t-count is 4.620, also greater than the t-table value of 1.970, and the p-value is 0.000, confirming that X2 also has a significant influence on the dependent variable. Therefore, both X1 and X2 significantly impact the outcome variable.

Coefficient Test Determination (R^2)

The R2 test is used to measure how much variation in the dependent variable can be explained by the independent variable in the regression model. SPSS calculates a value of R2 that indicates the proportion of variation in the dependent variable that can be described by the regression model. A higher value of R2 indicates a better regression model in explaining the relationship between variables.

Table 8.

Coefficient Determination (R^2)

Model	R	R^2	Adjusted R^2	Description
1	0,759	0,576	0,569	57.6% of the variation is explained by the model

Source : research data processed in 2024

The regression model shows that the independent variables collectively explain 57.6% of the variation in the dependent variable. The R value of 0.759 indicates a strong positive relationship between the predictors and the outcome. The R^2 value of 0.576 means that 57.6% of the variance in the dependent variable is accounted for by the model. The adjusted R^2 value of 0.569, which adjusts for the number of predictors in the model, also supports that a significant portion of the variance is explained by the independent variables. Therefore, the model provides a substantial explanation of the dependent variable's variation.

Simultaneous Test (F)

Anova F test is used to test whether there is a significant difference between two or more groups in the dependent variable used in the regression model. In SPSS, an F-test is performed to test whether the regression model as a whole can explain the variation in the dependent variable. If the significance value is less than 0.05, then the regression model can be said to be significant.

Table 9.

F test results

Model	Sum of Squares	df	Mean Square	F count	Sig.
Regression	215.231	2	107.616	38.274	0.000
Residual	158.438	227	0,698		
Total	373.669	229			

Source : research data processed in 2024

The ANOVA table shows that the regression model is statistically significant. The F-statistic is 38.274 with a significance (p-value) of 0.000, which is less than the 0.05 threshold, indicating that the model as a whole has a significant impact on the dependent variable. The sum of squares for regression is 215.231, with 2 degrees of freedom, and the mean square for regression is 107.616. The residual sum of squares is 158.438, with 227 degrees of freedom, and the mean square for residuals is 0.698. The total sum of squares is 373.669 with 229 degrees of freedom. This suggests that the model explains a significant portion of the total variation in the dependent variable.

DISCUSSION

The regression analysis reveals that government policies significantly influence digitalization acceleration. Policies supporting technological infrastructure development and providing incentives for the technology industry drive faster adoption of technology by society and businesses. This underscores the role of the government in creating a conducive environment for digital transformation. The availability of adequate digital infrastructure, such as high-speed internet and 5G networks, contributes positively to digitalization levels. This finding aligns with previous research, emphasizing that strong infrastructure is crucial for uninterrupted digitalization. Without sufficient infrastructure, digitalization efforts are likely to stall, highlighting the need for continued infrastructure development.

Enhancing digital skills among the workforce and society plays a vital role in technology adoption. Training and education programs initiated by both government and

private sectors significantly improve human resource capabilities, fostering faster digitalization. A digitally skilled population can effectively leverage technology, boosting productivity and innovation across sectors. Public-private collaboration accelerates digitalization by combining technological innovations from the private sector with supportive government policies. The private sector's role in providing technology complements the government's responsibility to develop a digital ecosystem. This partnership ensures the sustainable growth of digital infrastructure and services, fostering inclusive economic growth.

The study confirms that government policies facilitating infrastructure development ease technology access for businesses and society. Such policies promote technological investments and create a favorable environment for digital infrastructure growth. A strong digital infrastructure directly correlates with higher economic growth, demonstrating its critical role in the digital economy. Moreover, skilled human resources are essential for effective public-private collaboration in driving digital adoption. Without a capable workforce, the collaboration lacks efficiency, as the private sector relies on skilled talent to implement and manage new technologies. This highlights the importance of human resource development in ensuring successful digitalization initiatives.

The research findings align with previous studies emphasizing the pivotal role of government policies in digitalization, especially in developing countries. Inclusive policies that integrate private sector collaboration drive technology adoption, fostering equitable digital growth. This consistency reinforces the need for strategic policy formulation to overcome digitalization barriers. The study also highlights the persistent issue of digital divide in developing countries with limited infrastructure. Disparities between urban and rural areas remain significant, necessitating efforts to expand infrastructure across regions. Addressing this divide ensures equal access to technology, promoting balanced economic development. Additionally, the findings support the view that enhancing digital literacy accelerates digital transformation. Focused education and training on technological skills empower individuals and businesses, expediting the digitalization process in developing countries. Investment in digital education is crucial for long-term economic growth and innovation.

Despite policy advancements, challenges such as limited technology access, high costs, and geographical constraints hinder digitalization efforts. Regulatory frameworks in many developing countries remain inflexible, slowing innovation. Updating regulations to reflect technological advancements is essential to foster a thriving digital ecosystem. A major barrier to digitalization is the lack of skilled labor in technology fields. While training programs exist, their reach is often limited, leaving large segments of the population underserved. Expanding digital education initiatives ensures a broader talent pool, addressing this critical gap.

Policy recommendations suggest governments strengthen digital infrastructure development and expand digital skills programs. Collaboration with the private sector to foster a supportive ecosystem is essential. This approach drives technology adoption and ensures the sustainability of digital initiatives. Strengthening partnerships between the public and private sectors enhances technological development and innovation. By fostering robust collaborations, governments can accelerate digitalization and support inclusive digital economic growth. Expanding digital literacy programs, particularly in underserved regions, equips the workforce with the skills needed to thrive in a digital economy.

CONCLUSIONS

This research aims to analyze policy strategies that can accelerate digitalization in developing countries within the context of the Fifth Industrial Revolution (Industry 5.0). The focus is on identifying government policies, infrastructure development, human resource (HR) capacity building, and public-private sector collaboration to drive digital transformation. Key findings reveal that pro-digitalization government policies—such as technology sector incentives, regulatory simplification, and digital infrastructure investment—play a significant role in accelerating digitalization. Adequate digital infrastructure, including fast internet access, 5G networks, and reliable data centers, supports technology adoption across society and businesses. Digital skills development is essential for enhancing workforce and societal capabilities, with digital education and training programs proving effective, although challenges remain in accessibility and distribution. Closer public-private collaboration boosts efficiency and innovation, fostering a stronger and more inclusive digital ecosystem. Policy implications highlight the need for governments to strengthen infrastructure and provide incentives for the tech sector, promote innovation and research, and expand access to digital education. Strengthening collaboration between public and private sectors is crucial to developing inclusive digital policies and affordable technology solutions. However, challenges such as infrastructure limitations, digital divides, skilled workforce shortages, and outdated regulations persist, hindering digitalization efforts, particularly in rural areas. This research contributes by providing insights into effective policy strategies for accelerating digitalization in developing countries, identifying key obstacles, and offering recommendations to enhance digital transformation. Future research should explore qualitative and longitudinal studies to gain deeper insights into policy implementation and its long-term impact, as well as comparative studies in other developing nations. Ultimately, comprehensive policy strategies supporting infrastructure, HR development, and public-private collaboration are critical for accelerating digitalization and reducing digital divides, positioning digitalization as a cornerstone of economic growth, market expansion, and job creation in developing economies.

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