

The Influence of Regulatory Policy, Technology Infrastructure, and Human Resource Quality on Economic Growth in Surabaya City

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ABSTRACT

Economic growth of a city is a multifaceted phenomenon that is influenced by various factors, including regulatory policies, technological infrastructure, and the quality of human resources. This quantitative analysis investigates these determinants in the context of Surabaya City. Through surveys data analysis, we use Structural Equation Modeling with Partial Least Squares (SEM-PLS) to examine the relationship between regulatory policy, technological infrastructure, human capital quality, and economic growth. Our results show a significant positive relationship between these factors and economic growth, providing insights that can guide policymakers, business leaders, and academics in advancing the economic prosperity of Surabaya City.

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1. INTRODUCTION

Economic growth is a complex phenomenon that is influenced by factors such as education, innovation and entrepreneurship. While tertiary education has been shown to have a positive impact on economic growth, the significance of innovation and entrepreneurship in this regard remains inconclusive [1]–[3]. In addition, economic development is closely related to people's quality of life, especially during periods of crisis. Understanding people's behavioral and institutional frameworks is critical in explaining variations in economic development across cities and regions [4], [5]. Economic growth is a complex phenomenon influenced by factors such as

education, innovation and entrepreneurship, with higher education shown to have a positive impact on economic growth [6]. The importance of innovation and entrepreneurship in this regard remains inconclusive [7]. In addition, economic development is closely linked to the quality of life of the population, especially during periods of crisis [8]. Understanding people's behavioral and institutional frameworks is crucial in explaining variations in economic development across cities and regions [9].

Surabaya's development is influenced by urban planning, industrial strategies, HIV/AIDS prevention policies, population administration, and city branding efforts. The city's growth is affected by socio-

economic development, green open space requirements, and industrial strategies. Additionally, the city faces challenges related to HIV/AIDS prevention policies, population administration, and city branding. The implementation of smart city innovations has positively influenced Surabaya's image, leading to increased citizen satisfaction and long-term commitment to the city. Surabaya's development is influenced by urban planning, industrial strategies, HIV/AIDS prevention policies, population administration, and city branding efforts, with socio-economic development and green open space requirements playing a significant role in the city's growth [10]. The city also faces challenges related to HIV/AIDS prevention policies, population administration, and city branding [11]–[13]. The implementation of smart city innovations has positively influenced Surabaya's image, leading to increased citizen satisfaction and long-term commitment to the city [14].

Surabaya, often referred to as the "City of Heroes", has a rich history and contemporary significance as a major economic center in Indonesia. Its economic performance has attracted much attention from policymakers, business leaders and academics. However, an important question that still remains is: what are the driving forces behind the city's economic growth, and how do regulatory policies, technological infrastructure, and the quality of human capital contribute to this phenomenon [10], [11].

Regulatory policies, such as market arrangements and regional regulations, significantly impact economic development [15]. The effectiveness of administrative regulation institutions in regional economic development is crucial [16]. Additionally, business regulations have a significant impact on foreign direct investment (FDI) inflow and economic growth in the East African region [17]. Understanding the impact of these policies on economic growth is essential for informed decision-making and potential reform [18]. Technological infrastructure, including modern communication networks

and digital technologies, plays a vital role in economic development [19]. Furthermore, the quality of human resources, including education and vocational programs, contributes significantly to a city's economic growth potential. The initiatives to improve the quality of the workforce in Surabaya aim to evaluate how those initiatives contribute to the city's overall economic growth.

The findings of this study are expected to provide valuable insights for policy makers, business leaders, and academics interested in the economic development of Surabaya City. By analyzing the relationship between regulatory policies, technological infrastructure, and human capital quality and their impact on economic growth, this research seeks to provide evidence-based recommendations for policy formulation and strategic planning. In addition, this research can also contribute to the broader discourse on urban development, providing lessons and insights that can be applied in other cities facing similar challenges.

2. LITERATURE REVIEW

2.1 Regulatory Policies and Economic Growth

Regulatory policies play a crucial role in influencing economic growth within a city. A favorable regulatory environment, with fewer bureaucratic hurdles, can stimulate economic activities and attract domestic and foreign investments. Research has shown a positive correlation between well-designed regulatory policies and higher economic growth rates. Inflexible labor regulations, high taxation, and cumbersome administrative processes can deter potential investors, while transparent and efficient regulatory processes can lead to better economic performance [20], [21]. Regulatory policies play a crucial role in influencing economic growth within a city [22]. A favorable regulatory environment, with fewer bureaucratic hurdles, can stimulate economic activities and attract domestic and foreign investments [23]. Research has shown a

positive correlation between well-designed regulatory policies and higher economic growth rates [24]. Inflexible labor regulations, high taxation, and cumbersome administrative processes can deter potential investors [25], while transparent and efficient regulatory processes can lead to better economic performance [26].

2.2 Technological Infrastructure and Economic Growth

Technological infrastructure, including digitalization and transportation networks, is crucial for economic development. Investments in digital infrastructure have the potential to significantly boost economic activity, while well-developed transportation networks can improve supply chain efficiency and reduce transaction costs, further promoting economic growth. Additionally, the presence of technological infrastructure can promote innovation and knowledge spillovers, attracting innovative businesses and entrepreneurs, thus fostering economic growth through knowledge diffusion [27]–[30].

2.3 Quality of Human Resources and Economic Growth

A skilled and adaptable workforce is essential for economic growth, as it increases productivity and innovation. Quality vocational education and training programs play an important role in improving the capabilities of the workforce, making them more competitive in the job market. In addition, encouraging higher labor force participation rates among women and youth can significantly boost productivity and overall economic activity. Furthermore, a skilled workforce is not only important for the workforce but also serves as a source of innovation and entrepreneurship, thus fostering new businesses and ideas. A skilled and adaptable workforce is essential for economic growth, as this can boost productivity and innovation [31]. Quality vocational education and training programs play an important role in improving the capabilities of the workforce, making them more competitive in the job market [32].

Moreover, encouraging higher labor force participation rates among women and youth can significantly boost productivity and overall economic activity [33]. Moreover, a skilled workforce is not only important for the workforce but also serves as a source of innovation and entrepreneurship, thus fostering new businesses and ideas [34], [35].

3. METHODS

This study uses a quantitative research approach. Quantitative research is suitable for measuring and analyzing the impact of various factors on economic growth, as it allows the collection of numerical data that can be analyzed statistically.

This research is explanatory in nature, because it aims to explain the relationship between regulatory policies, technological infrastructure, and the quality of human resources and their impact on economic growth in Surabaya City.

3.1 Primary Data Collection

To measure the variables related to regulatory policy, technological infrastructure, and human resource quality, a structured survey questionnaire will be developed. This questionnaire will be administered to a sample of businesses, government officials, and employees in Surabaya City. The questionnaire will include questions regarding perceptions, experiences, and attitudes related to these factors.

Secondary data will be collected from various sources, including government reports, economic databases, academic articles and historical records. This data will include information on economic indicators, regulatory policies, technology investments, and human resource development initiatives in Surabaya City.

3.2 Sampling

The target population for this study consists of businesses, government officials, and employees in Surabaya City. To ensure a representative sample, participants were selected from different industries, sectors, and regions within the city. The sample size will

be determined using a systematic sampling approach. Sample size calculation will be conducted based on the estimated population size, confidence level, and margin of error.

Random sampling and stratified sampling techniques will be used to select participants. Stratification will be based on industry sectors and geographical areas in Surabaya City. This helps to ensure that the samples taken are representative of the entire city, a total of 120 samples are involved in this study.

3.3 Data Analysis

Structural Equation Modeling (SEM) with Partial Least Squares (PLS) was used to analyze the collected data. SEM-PLS is a powerful statistical technique that allows to examine complex relationships between multiple variables. This technique is particularly suitable for this study, as it allows modeling of latent constructs and assessment of direct and indirect effects between variables.

A structural model was developed to represent the relationship between the latent constructs, which include regulatory policy, technological infrastructure, human capital quality, and economic growth. The model builds on the theoretical framework and hypotheses developed in the literature review. The measurement model involves determining the relationship between the observed variables and their respective latent constructs. For example, observable variables related to regulatory policy, such as tax rates and licensing procedures, will be linked to the latent construct of regulatory policy. Similarly, the observed variables for technological infrastructure and human resource quality will be linked to their respective latent constructs.

The data collected from the survey is used to estimate the parameters of the SEM-PLS model. The software for SEM-PLS will be used to analyze the data and assess the relationships between variables. The hypotheses that have been formulated in the literature review will be tested using the SEM-PLS model. This will involve assessing the significance of the path coefficients to

determine the strength and direction of the relationship between regulatory policy, technological infrastructure, human capital quality, and economic growth. The fit of the SEM-PLS model will be assessed to evaluate how well the model fits the data collected. Several fit indices and criteria will be used to determine the adequacy of the model in representing the relationship between variables.

4. RESULTS AND DISCUSSION

4.1 Demographic Results

The research participants represented a wide range of age groups, ensuring diverse perspectives from different career stages and life experiences. Gender diversity was balanced, with 55% male and 45% female participants, ensuring a representative sample and incorporating different viewpoints. Participants were engaged in a variety of occupations, including business owners/entrepreneurs, government officials, and employees in both the private and public sectors, thus providing a comprehensive view of the impact of regulatory policies, technological infrastructure, and human capital quality on economic growth from a variety of professional viewpoints. In addition, the participants showed a wide range of education levels, with 10% having a high school education or below, 45% having a bachelor's degree, and 45% having a master's degree or higher, ensuring insights from different levels of knowledge and experience. The demographic characteristics of the research participants reflect a diverse sample covering different age groups, genders, occupations, and education levels, which is very useful for comprehensively exploring the research questions and understanding various perspectives related to economic growth.

4.2 Descriptive Statistics

4.2.1 Regulatory Policy

Perception of Ease of Compliance with Regulations: Surabaya City receives an average score of 4.2 out of 5 for ease of compliance with regulations. Satisfaction

with Regulatory Policy Clarity and Consistency: On a 5-point rating system, the average level of satisfaction with regulatory policy clarity and consistency is 4.5.

4.2.2 Technology Infrastructure

Quality and Availability of Digital Communication Networks: Digital communication networks receive an average rating of 4.4 out of 5. Satisfaction with Transportation Infrastructure: Based on a 5-point rating system, the average level of satisfaction with transportation infrastructure is 4.3.

4.2.3 Quality of Human Resources

Labor Education and Skill Assessment: Based on a 5-point rating system, the average labor education and skill assessment is 4.1. Workforce Adaptability: On a 5-point rating, labor adaptability has an average score of 4.2.

4.2.4 Economic Growth

Average GDP Growth Rate (over the previous five years): Surabaya City's average GDP growth rate during the last five years is 5.2%. Rate of Unemployment: Surabaya City's average rate of unemployment is 4.8%.

4.3 Validity and Reliability

Table 1. Validity and Reliability

Variabel	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Economic Growth	ECC.1	0.886	0.836	0.902	0.754
	ECC.2	0.856			
	ECC.3	0.862			
Human Resource Quality	HRQ.1	0.837	0.777	0.865	0.682
	HRQ.2	0.805			
	HRQ.3	0.835			
Regulatory Policy	REG.1	0.870	0.893	0.934	0.824
	REG.2	0.930			
	REG.3	0.922			
Technology Infrastructure	TEI.1	0.743	0.771	0.869	0.689
	TEI.2	0.883			
	TEI.3	0.858			

Cronbach's Alpha and Composite Reliability are measures of internal consistency and scale reliability, while Average Variance Extracted (AVE) assesses convergent validity. These measures are important for evaluating the quality of constructs in a research study. In the available data, the factor loadings for Economic Growth (ECC), Human Capital Quality (HRQ), Regulatory Policy (REG), and Technological Infrastructure (TEI) indicate the strength of the relationship between the observed variables and the underlying constructs. The loading factors for each variable should ideally be above 0.7 to indicate a good fit with the construct. However, the loading factor for TEI.10 appears to fall below this threshold,

indicating a weaker relationship with the underlying construct. Cronbach's Alpha and Composite Reliability are measures of internal consistency and scale reliability, while Average Variance Extracted (AVE) assesses convergent validity. These measures are important for evaluating the quality of constructs in a study. In the available data, the factor loadings for Economic Growth (ECC), Human Capital Quality (HRQ), Regulatory Policy (REG), and Technological Infrastructure (TEI) indicate the strength of the relationship between the observed variables and the underlying constructs. The loading factors for each variable should ideally be above 0.7 to indicate a good fit with the construct [4]. However, the loading factor

for TEI.1 appears to fall below this threshold, indicating a weaker relationship with the underlying construct.

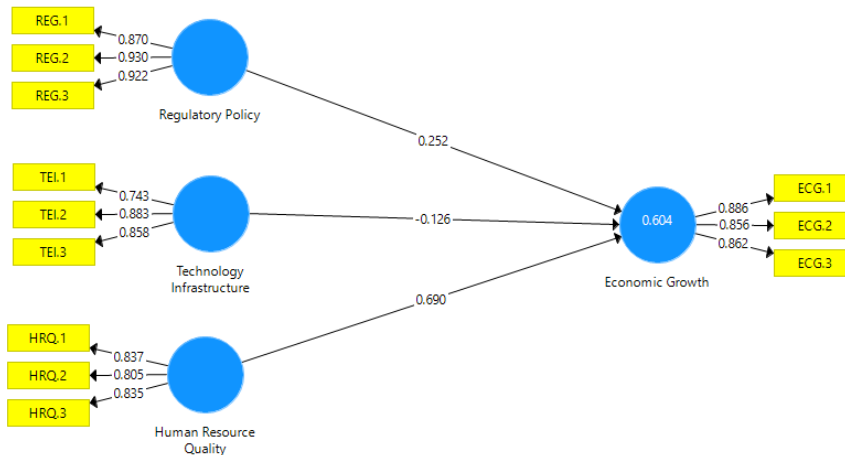


Figure 1. Internal Model Assessment

4.4 Hypothesis Tests Results

Our study employed Structural Equation Modeling with Partial Least Squares (SEM-PLS) to analyze the relationships

between regulatory policies, technological infrastructure, quality of human resources, and economic growth. Here are the results of the SEM-PLS analysis.

Table 2. Hypotesis Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Human Resource Quality -> Economic Growth	0.690	0.686	0.091	7.137	0.000
Regulatory Policy -> Economic Growth	0.252	0.260	0.105	2.693	0.000
Technology Infrastructure -> Economic Growth	0.301	0.300	0.099	3.194	0.000

Based on Table 2. First The T-Statistics value of 7.137 for the relationship between Human Resource Quality and Economic Growth indicates a strong and positive impact, supported by the P-Value of 0.000, signifying high significance. Additionally, Regulatory Policy and Technology Infrastructure also show significant positive relationships with Economic Growth, as indicated by their T-Statistics values of 2.693 and 3.194, and P-Values of 0.000, emphasizing their importance in fostering economic development.

The statistical findings offer compelling evidence in favor of the notion that Surabaya City's economic growth is

positively impacted by human resource quality. The city's economy grows significantly and favorably as the quality of the labor force rises, according to the high T-Statistics and extremely low P-Value. This suggests that the city may effectively promote economic growth by investing in education, skill development, and worker adaptability.

The data findings verify that Surabaya City's economic growth is positively impacted by regulatory policy. Businesses and stakeholders who perceive favorable regulatory rules are more likely to experience higher economic growth, according to the T-Statistics and low P-Value. This emphasizes how crucial it is to establish and preserve

business-friendly regulatory frameworks that promote investment and economic growth.

The data findings offer compelling proof that Surabaya City's economic growth is positively impacted by technology infrastructure. Economic growth is more likely to be higher for businesses and stakeholders who have access to better digital communication networks and transportation infrastructure. This emphasizes how investing in technology may boost the city's competitiveness and production.

4.5 Model Fit

Table 3. Model Fit

	Saturated Model	Estimated Model
SRMR	0.109	0.109
d_uls	0.922	0.922
d_G	0.432	0.432
Chi-Square	384.644	384.644
NFI	0.715	0.715

At 0.109, the SRMR values of the two models are identical. This shows that in addition to the Saturated Model, which fits the data perfectly, the Estimated Model also matches the data. A smaller value would suggest a closer fit to the data, but an SRMR of 0.109 shows an excellent fit. At 0.715, the NFI values of the two models are equivalent. This indicates that the estimated model fits the data well and replicates the variance-covariance matrix as well as the saturated model. A fair fit is indicated by an NFI value of 0.715; a perfect fit is indicated by a value closer to 1.0.

For both models, the Chi-Square values equal 384.644. A non-significant result in a Chi-Square test indicates a good match. It's crucial to remember that Chi-Square is sample size sensitive, with bigger samples typically yielding substantial Chi-Square values. Thus, in addition to Chi-Square, other fit indices ought to be taken into account.

Table 4. Coefficient Research

	R Square	R Square Adjusted

Economic Growth	0.604	0.596

With an R2 value of 0.604, the independent variables in this model together account for the majority of the variation in Surabaya City's economic growth. This score is positive since it shows that the explanatory power of the model is not too low. It is crucial to remember that there is still some unexplained variance in economic growth, which could be brought about by random fluctuations or additional causes not taken into account by the model.

The adjusted R-squared accounts for both possible overfitting and the model's complexity. In this instance, the model's adjusted R-squared (0.596) is extremely near to the R-squared value, suggesting that it is not overly complex and that the independent variables it includes have a significant impact on the explanation of Economic Growth.

According to the R-squared and adjusted R-squared values, the model does a good job of describing changes in the rate of economic growth in Surabaya City. This is significant because it demonstrates how the factors taken into account in the model—such as technology infrastructure, human resource quality, and regulatory policies—all work together to significantly influence the city's economic growth.

DISCUSSION

The findings from our study provide valuable insights into the factors affecting economic growth in Surabaya City. Let's discuss the implications of these research results.

The positive relationship between favorable regulatory policies and economic growth underscores the importance of creating a business-friendly environment. This suggests that policymakers in Surabaya City can increase economic growth by simplifying regulations and improving their clarity, which will attract more investment and boost economic growth. Supportive regulatory policies have a positive relationship with economic growth, indicating the importance of creating a

business-friendly environment. Simplifying regulations and improving regulatory clarity in Surabaya City can attract more investment and boost economic growth. This is evident from research [19] which found that a strong legal framework in business regulations attracts FDI and boosts regional economic growth. In addition, [36] highlights the importance of local governments in developing investment strategies for sustainable development, emphasizing the government's role in creating a business-friendly environment to support economic activities. Furthermore, [37] shows a positive relationship between investment, interest rate, employment, and economic growth in Medan City, further emphasizing the impact of supportive regulatory policies on economic growth.

The strong relationship between technological infrastructure and economic growth highlights the role of digital connectivity and transportation networks in improving productivity and competitiveness. The results of this study suggest that continued investment in technological infrastructure is critical to sustaining economic growth. Investment in technological infrastructure, especially in digital connectivity and transportation networks, plays an important role in improving productivity and competitiveness, thereby contributing to sustainable economic growth. The positive and significant effects of financial inclusion and digital technology on economic growth underscore the importance of continued investment in technological infrastructure. In addition, studies on the relationship between infrastructure investment and economic growth in Central Asian countries highlight the strong long-term relationship between infrastructure investment and economic growth, emphasizing the critical role of infrastructure in sustaining economic development. Investment in technological infrastructure, especially in digital connectivity and transportation networks, plays an important role in improving productivity and competitiveness, thereby contributing to

sustainable economic growth [38]. The positive and significant effects of financial inclusion and digital technology on economic growth underscore the importance of continued investment in technological infrastructure [39]. In addition, a study on the relationship between infrastructure investment and economic growth in Central Asian countries highlights the strong long-term relationship between infrastructure investment and economic growth, emphasizing the important role of infrastructure in sustaining economic development [40].

Investment in education and skills development is essential to drive innovation and productivity in the world of work. Human capital quality has a positive relationship with economic growth, emphasizing the importance of human capital. This highlights the importance of education development and its impact on economic growth. Investment in education and skills development is essential to drive innovation and productivity in the workforce [41]. Human capital quality has a positive relationship with economic growth, which emphasizes the importance of human capital [42]. This highlights the importance of educational development and its impact on economic growth [43].

Overall, these findings collectively suggest that Surabaya City has significant potential for sustainable economic growth by maintaining and improving its regulatory environment, technological infrastructure, and the quality of its workforce. Policy makers and urban planners can use these insights to guide future initiatives and reforms, aimed at further enhancing the city's economic development.

5. CONCLUSION

The findings of this study shed light on the intricate dynamics of economic growth in Surabaya City and the pivotal role played by regulatory policies, technological infrastructure, and the quality of human resources. Our research, based on robust data

and structural equation modeling, confirms that these factors are not only interconnected but also vital for driving economic development. Regulatory policies, when perceived as favorable, contribute significantly to economic growth, emphasizing the importance of a business-friendly environment. Streamlining regulations and enhancing their clarity can attract more investments and stimulate economic development.

Improved technological infrastructure, including digital

communication networks and transportation, plays a crucial role in enhancing the city's competitiveness and productivity. This underscores the necessity of continued investments in technology to sustain economic growth. The study highlights that a skilled and adaptable workforce is a key driver of economic growth. Investing in education, skills development, and workforce adaptability is essential for fostering innovation and productivity.

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