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Assessing the Role of Digital Readiness in Regional Tourism Growth: A Supervised Learning Approach

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ABSTRACT

This study aims to examine the effect of digital readiness on tourism sector growth at the provincial level in Indonesia during the period 2020–2024. The study employs panel data regression methods, including pooled ordinary least squares (Pooled OLS), fixed effects, and random effects, to analyze the relationship between digital readiness and tourism growth by incorporating control variables, namely unemployment and education levels. In addition, a Random Forest model is applied to assess the relative importance of each variable and to validate the consistency of the results. The findings indicate that digital readiness has a positive but statistically insignificant effect on tourism growth across all regression models. In contrast, the unemployment level has a negative and significant impact, while the education level shows a positive and significant influence on tourism growth. Results from the Random Forest model support these findings, revealing that unemployment and education level contribute more substantially than digital readiness. Furthermore, the low predictive performance of the Random Forest model suggests that tourism growth may also be influenced by other factors not captured in this study. These findings imply that the development of the tourism sector cannot rely solely on improvements in digital infrastructure. Greater emphasis should be placed on enhancing human capital and strengthening the capacity of industry stakeholders to effectively utilize digital technologies. This study contributes to the literature by integrating econometric and machine learning approaches to better understand the determinants of tourism growth in developing countries at the provincial level.

Keywords: *Digital readiness, Tourism growth, Panel data, Random Forest, Indonesia.*

1. INTRODUCTION

The tourism sector is widely recognized as an important contributor to economic growth in many countries. Tourism activities can stimulate economic development through various mechanisms, including increased income, job creation, and the expansion of related sectors such as transportation, accommodation, and other services. Several empirical studies have demonstrated a significant relationship between tourism development and economic growth in major destinations [1]. Other studies also highlight the existence of a causal relationship between tourism development and economic growth at the global level [2]. Therefore, tourism is often regarded as a key driver of economic development, particularly for developing countries with abundant tourism potential.

The rapid advancement of digital technology has brought significant changes to the tourism industry. The use of the internet, digital platforms, and information and communication technologies has transformed how tourists search for destination information, make travel bookings, and share their travel experiences. Digital technology also enables more interactive and personalized tourism experiences through various applications, online booking platforms, and social media in travel planning [3]. In addition, digital transformation plays an important role in increasing the visibility of

tourist destinations, expanding market reach, and strengthening local community participation in tourism development [4]. As a result, digital technology has become a key factor in enhancing the competitiveness of the tourism sector.

Despite its important role, the level of digital adoption and readiness is not evenly distributed across regions within a country. Differences in digital infrastructure, internet access, and digital literacy can lead to disparities in the utilization of digital technology in the tourism sector. Some destinations have successfully integrated digital technologies into tourism management and promotion, while others still face limitations in infrastructure and human resource capacity. Previous studies indicate that the level of digital readiness in the tourism sector varies across destinations, depending on infrastructure, institutional support, and the ability of local stakeholders to utilize digital technologies effectively [4]. Therefore, regional digital readiness plays a crucial role in determining how effectively digital technology can support tourism development [5].

In Indonesia, the tourism sector plays a strategic role in promoting regional economic growth. The country offers diverse tourism resources across provinces, ranging from natural and cultural attractions to marine tourism. However, the ability of each region to leverage this potential varies significantly. Differences in digital infrastructure, internet accessibility, and technology adoption influence how effectively regions can develop and promote tourism destinations. Several studies suggest that digitalization can improve tourism sector performance by enhancing information dissemination, increasing service efficiency, and optimizing resource allocation. Furthermore, the integration of digital technologies enables innovation in services and business models, thereby strengthening the competitiveness of destinations at both regional and global levels [6]. The development of the digital economy and information technology has also accelerated the transition toward smart tourism, which integrates data, digital infrastructure, and information systems in destination management [7]. Hence, digital readiness is considered a key factor influencing the ability of the tourism sector to drive regional economic growth [8].

With the growing attention to digital transformation in the tourism sector, numerous studies have explored the role of digital technologies in enhancing tourist experiences and improving destination management [3]. However, research that links digital readiness with tourism sector performance and regional economic growth remains relatively limited and requires further investigation [5]. In the context of Indonesia, disparities in digital infrastructure development and technology adoption across provinces may affect the ability of regions to effectively utilize digital technologies in supporting tourism development. Therefore, this study aims to examine the impact of digital readiness on tourism sector performance and regional economic growth in Indonesia using provincial-level panel data. In addition to employing econometric approaches to analyse the relationships between variables, this study also applies machine learning methods to identify the most influential factors in the relationship between digital readiness and tourism sector development.

2. LITERATURE REVIEW

2.1. Digital Transformation in the Tourism Sector

Digital transformation refers to the process of integrating digital technologies into various organizational activities, which can potentially reshape business models, operational processes, and the way organizations interact with consumers. It is not limited to the adoption of information technology, but also encompasses broader changes in how digital technologies are utilized to enhance efficiency, foster innovation, and improve service quality. The rapid development of technologies such as the internet, mobile devices, and digital platforms has encouraged various economic sectors to adapt to an increasingly dynamic and competitive technological environment [5] [9].

In the tourism sector, digital transformation plays a crucial role. Digital technologies enable tourists to access information about destinations more easily, make travel bookings online, and share their experiences through various digital platforms. As a result, the adoption of digital technologies in the tourism industry has become a key factor driving changes in how destinations are promoted, managed, and developed [3] [10].

Various digital innovations have also led to the emergence of concepts such as digital tourism and smart tourism, which emphasize the use of information technology to enhance service quality and enrich tourist experiences. Online booking platforms, social media, travel applications, and destination information systems are among the technologies widely used in modern tourism management. The use of these technologies not only improves access to information for tourists but also helps industry stakeholders increase destination visibility and expand their market reach [11].

2.2. Digital Technology and Tourist Behaviour

The advancement of digital technology has transformed how tourists obtain information and plan their travel activities. The internet and various digital platforms enable tourists to access information about destinations, compare different travel services, and

organize their travel plans more efficiently. The wide availability of information through digital media also enhances transparency in the tourism industry, allowing tourists to make travel decisions based on diverse online sources [12] . Beyond facilitating access to information, digital technology also influences tourists' decision-making processes. Social media, travel review platforms, and various travel applications provide spaces for users to share experiences and evaluate destinations as well as tourism services. User-generated content often becomes an important reference for other tourists when making travel decisions [13] [14].

Digital technology also contributes to enhancing tourist experiences by enabling more personalized and interactive services. Innovations such as travel applications, data-driven recommendation systems, and other digital services allow tourists to obtain experiences that better match their preferences. Therefore, the use of digital technology not only affects travel planning processes but also shapes the overall tourism experience [3].

2.3. Digital Transformation and Tourism Development

Digital transformation is increasingly recognized as a key factor in supporting the development of the tourism sector. The use of digital technologies enables tourist destinations to enhance their visibility through various online platforms, making it easier for tourists to access information about these destinations. In addition, digital technologies provide opportunities for tourism industry stakeholders to market their products and services more widely and reach a more diverse range of tourists [15].

Beyond promotion and marketing, digital transformation also contributes to improving the efficiency of tourism management. The use of information technology allows destination managers to manage tourism-related information more effectively, enhance service quality, and support more data-driven decision-making processes. Therefore, digitalization in the tourism sector is not only associated with improved access to information but also contributes to the development of a more integrated tourism ecosystem [16].

Several empirical studies also indicate that the adoption of digital technologies can have a positive impact on tourism sector development. Digitalization enhances destination promotion, expands market reach, and stimulates economic activities related to tourism. Therefore, empirical analysis of the relationship between digital transformation and tourism development is essential to better understand the role of digital technologies in shaping the dynamics of the tourism industry [3] [11].

Based on the literature discussed above, digital transformation plays an increasingly important role in the development of the tourism sector. The use of digital technologies not only influences how tourists obtain information and plan their travel, but also contributes to enhancing destination visibility and improving tourism services. In the context of developing countries such as Indonesia, digital technologies also have the potential to support regional tourism development. Therefore, a more comprehensive understanding of the relationship between digital transformation and tourism development becomes increasingly important. To examine this relationship systematically, this study adopts a quantitative approach using regression analysis to investigate the relationship between digital transformation indicators and tourism sector development at the regional level in Indonesia.

2.4. Random Forest in Empirical Analysis

Random Forest is an ensemble learning method based on decision trees, developed to improve predictive accuracy while reducing the risk of overfitting [17]. This method constructs multiple decision trees using bootstrap sampling and feature bagging, and then aggregates their predictions through majority voting for classification tasks or averaging for regression tasks. One of the main advantages of Random Forest lies in its ability to capture non-linear relationships between variables, as well as to provide measures of relative importance (feature importance) for each variable in influencing the dependent variable [18].

In this study, the Random Forest model is employed to evaluate the influence of digital readiness, infrastructure, and socio-economic factors on tourism sector growth. This approach enables the identification of the most influential variables contributing to variations in tourism growth across provinces, thereby complementing the panel regression approach, which is inherently linear and more restrictive [19].

3. METHOD

3.1. Research Approach

This study adopts a quantitative approach to analyse the relationship between digital readiness and economic growth in the tourism sector at the provincial level in Indonesia. The analysis is based on secondary data obtained from official publications of Statistics Indonesia (Badan Pusat Statistik / BPS). A quantitative approach is chosen as it enables a systematic examination of relationships between variables using statistical models.

To estimate the relationship between digital readiness and tourism sector growth, this study employs a panel data regression approach. The use of panel data allows

the integration of both time-series and cross-sectional dimensions, providing a more comprehensive understanding of inter-provincial variations as well as changes over time. In addition to econometric analysis, this study also applies a machine learning approach using the Random Forest method to explore potential non-linear relationships that may not be fully captured by conventional regression models. The combination of econometric and machine learning approaches enables a more comprehensive analysis in understanding the relationship between digital readiness and tourism sector development at the regional level.

3.2. Data

This study uses secondary data obtained from official publications of Statistics Indonesia (Badan Pusat Statistik / BPS). The data are selected based on the availability of consistent observations across all variables included in the study. The analysis covers the period from 2020 to 2024 and includes digital indicators, labor indicator, and education indicator at the provincial level. The unit of analysis in this study is provinces in Indonesia.

The study utilizes data on Gross Regional Domestic Product (GRDP) in the accommodation and food service sector at constant 2010 prices, obtained from BPS for the period 2020–2024. Due to the administrative expansion in Indonesia in 2022, particularly in the Papua region, several new provinces were established, including South Papua, Central Papua, Highland Papua, and Southwest Papua. This regional expansion resulted in inconsistencies in the time series data, as newly formed provinces only have data for certain periods, while parent provinces experienced significant changes due to territorial separation. Therefore, to ensure data consistency and validity, this study includes only 32 provinces with complete and consistent data throughout the observation period.

The digital readiness index in this study is constructed from several indicators representing access, infrastructure, and the utilization of information and communication technology. These indicators include the percentage of households with internet access, the availability of digital infrastructure, and the use of information technology in economic and social activities. All indicators are obtained from telecommunications statistics publications and the National Socio-Economic Survey issued by BPS. The number of villages/urban wards with Base Transceiver Stations (BTS) is used as a proxy for digital infrastructure availability, based on data from the Village Potential Statistics (PODES) 2021. Since this variable is not available annually, it is assumed to be constant over the period 2020–2024 and treated as a time-invariant variable in the panel model. Similarly, data on 4G network coverage are obtained from official government sources, namely the Ministry of Communication and Digital Affairs, and are not available annually. Therefore, this study uses a single observation point and assumes that network coverage remains relatively stable over the study period, treating it as a time-invariant variable.

The control variables used in this study include the open unemployment rate and average years of schooling. Data on unemployment are obtained from the National Labor Force Survey, while data on education are sourced from education indicator publications issued by BPS.

The dataset used in this study has a panel structure, combining both cross-sectional (provincial) and time-series dimensions. All data utilized in this study are publicly available and can be accessed through official publications of Statistics Indonesia (BPS).

3.3. Variables

This study employs several variables, including a dependent variable, a main independent variable, and control variables. The definitions and sources of all variables used in this study are summarized in Table 1. The dependent variable is tourism sector economic growth, measured by the growth rate of Gross Regional Domestic Product (GRDP) in the tourism sector at constant prices. The use of constant prices aims to capture real economic growth by eliminating the effects of price changes.

The main independent variable in this study is the Digital Readiness Index, which reflects the level of digital preparedness at the provincial level. This index is constructed from several indicators representing three main dimensions: digital access, infrastructure availability, and ICT utilization. A detailed description of the indicators used to construct the Digital Readiness Index is presented in Table 2. The digital access dimension captures the ability of the population to access digital technologies, infrastructure availability reflects the presence of information and communication technology infrastructure, while ICT utilization represents the extent to which digital technologies are used by the population. To ensure comparability across provinces, all indicators are normalized before being aggregated into a composite digital readiness index.

In addition to the main variable, this study incorporates control variables to account for differences in socio-economic characteristics across provinces. The control variables include the unemployment rate and average years of schooling. The unemployment rate represents labor market conditions, while average years of schooling serves as a proxy for human capital, which may influence the ability of individuals to utilize digital technologies and participate in economic activities.

Table 1. Description of Variables

Variable	Description	Data Source
Tourism Growth	Growth rate of Gross Regional Domestic Product (GRDP) in the tourism sector at constant prices	Statistics Indonesia
Digital Readiness Index	Composite index constructed from indicators of digital access, ICT infrastructure availability, and ICT utilization	Statistics Indonesia
Unemployment Rate	Percentage of unemployed population in the labor force	Statistics Indonesia
Average Years of Schooling	Average number of years of schooling for population aged 15 years and above	Statistics Indonesia

Table 2 Description of Digital Readiness Index

Dimension	Variable / Indicator	Data Source
Digital Access	Percentage of population owning or using mobile phones	Statistics Indonesia
	Percentage of households with internet access	Statistics Indonesia
Infrastructure Availability	Number of villages/urban wards with BTS towers and signal reception per province	Statistics Indonesia
	4G network coverage	Ministry of Communication and Digital Affairs
ICT Utilization	Percentage of population using computers/laptops	Statistics Indonesia
	Percentage of households using the internet for social media	Statistics Indonesia
	Percentage of households using the internet to obtain information on goods/services	Statistics Indonesia

3.4. Empirical Model

To analyze the relationship between digital readiness and tourism sector growth at the provincial level, this study employs a panel data regression model. The panel data approach allows for the integration of cross-sectional and time-series dimensions, enabling the analysis to capture both inter-provincial variation and changes over time. This model is used to estimate the effect of digital readiness on tourism growth while accounting for differences in socio-economic conditions across provinces.

The empirical model used in this study is specified as follows:

$$Tourism\ Growth_{it} = \beta_0 + \beta_1\, Digital\ Readiness_{it} + \beta_2 Unemployment_{it} + \beta_3 Education_{it} + \epsilon_{it}$$

Where:

- $Tourism\ Growth_{it}$ represents the growth rate of GRDP in the tourism sector in province i at time t,
- $DigitalReadiness_{it}$ represents the digital readiness index in province i at time t,
- $Unemployment_{it}$ represents the unemployment rate in province i at time t,
- $Education_{it}$ refers to the average years of schooling in province i at time t,
- β_0 is the intercept,
- $\beta_1, \beta_2, \beta_3$ are the estimated coefficients,
- ϵ_{it} is the error term.

The equation indicates that tourism sector growth in a given province and year is influenced by digital readiness and other regional characteristics. The relationship between variables is expressed as a linear combination, where each independent variable is associated with a coefficient representing its marginal effect on the dependent variable.

The parameters β_1, β_2, dan β_3 reflect the magnitude of the effect of each independent variable on tourism growth. Specifically, β_1 measures the change in tourism growth associated with a one-unit increase in the digital readiness index, holding other variables constant. The intercept β_0 represents the expected level of tourism growth when all independent variables are equal to zero. Meanwhile, the error term ϵ_{it} captures the influence of other unobserved factors that may affect tourism growth across provinces and over time.

To account for unobserved heterogeneity across provinces, the model is estimated using panel data techniques. This approach allows for controlling differences across regions that may influence tourism sector performance. Model selection is conducted by comparing commonly used panel data specifications, namely pooled regression, fixed effects, and random effects models. These tests are intended to determine the most appropriate model specification for explaining the relationship between digital readiness and tourism sector growth at the provincial level.

3.5. Random Forest Approach

In addition to the econometric analysis, this study employs a machine learning approach using the Random Forest method to complement the empirical findings. This approach is used to identify potential non-linear relationships between variables that may not be captured by linear regression models and to assess the relative contribution of each variable through feature importance. As a result, it enables the identification of the most influential factors driving tourism sector growth across provinces.

In this study, the Random Forest model is utilized to complement the panel regression results by providing additional insights, including: (1) validating the role of digital readiness in influencing tourism sector growth; (2) evaluating the effects of control variables—namely unemployment rate and average years of schooling—which may exhibit varying levels of influence across provinces; and (3) generating a feature importance ranking to highlight the most influential variables affecting tourism growth, which can serve as a basis for policy recommendations related to digital readiness and regional infrastructure development. The Random Forest model is evaluated using an 80:20 train–test split, and its predictive performance is assessed using the R^2 metric.

4. FINDINGS AND DISCUSSION

This study examines the impact of digital readiness on tourism sector growth at the provincial level in Indonesia using two analytical approaches, namely panel regression and Random Forest.

4.1. Descriptive Statistics

Descriptive statistics of the variables used in this study are presented in Table 3. On average, tourism sector growth (GRDP Growth) is 4.47%, with a standard deviation of 0.109, indicating substantial variation across provinces. The minimum value of -0.41 reflects a significant contraction in certain regions, which is likely associated with the impact of the COVID-19 pandemic during the early period of observation.

Table 3 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev	Min	Max
GRDP Growth	160	0.0448	0.1091	-0.4100	0.4970
Digital Readiness (DRI)	160	0.4208	0.1103	0.2223	0.7583
Unemployment (TPT)	160	5.1394	1.7496	1.7900	10.9500
Education (EDU)	160	9.2736	0.7484	7.9000	11.4900

The Digital Readiness Index (DRI) has an average value of 0.420 with a standard deviation of 0.110, indicating noticeable differences in digital preparedness across provinces. Meanwhile, the unemployment rate averages 5.13%, and the average years of schooling is 9.27 years, reflecting variations in socio-economic conditions across regions.

The distribution of the two main variables is illustrated in Figure 1. The figure shows that both digital readiness and tourism sector growth exhibit a relatively wide spread. This suggests the presence of heterogeneity across provinces, which justifies the use of a panel data approach in this study. The density plot represents the distribution of observations across different values, where higher density indicates a greater concentration of observations around certain values.

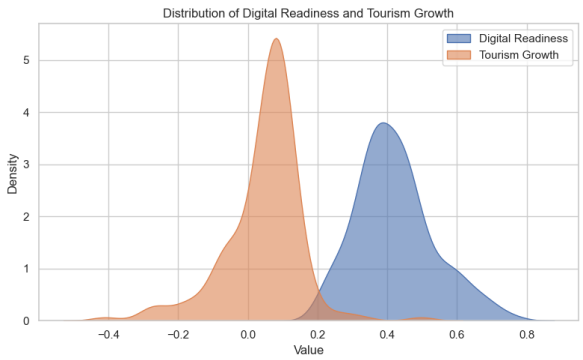


Figure 1 Distribution of Digital Readiness and Tourism Growth

4.2. Panel Regression Results

The results of the panel regression estimation are presented in Table 4, which includes three approaches: pooled ordinary least squares (Pooled OLS), fixed effects (FE), and random effects (RE). Overall, the estimation results exhibit a consistent pattern across all model specifications.

Table 4 Panel Regression Results

Variable	Pooled OLS	Fixed Effects	Random Effects
Digital Readiness (DRI)	0.123	0.383	0.123
Unemployment (TPT)	-0.025***	-0.049***	-0.025***
Education (EDU)	0.013***	0.370***	0.013***

Notes: *** p < 0.01, ** p < 0.05, * p < 0.10

The digital readiness variable shows a positive coefficient across all models, indicating a positive association with tourism sector growth. However, this variable is not statistically significant in any model specification (p-value > 0.05), suggesting that improvements in digital readiness have not yet translated into a direct impact on tourism growth at the provincial level.

In contrast, the control variables demonstrate strong and consistent results. The unemployment rate has a negative and statistically significant effect on tourism sector growth across all models, indicating that labor market conditions play an important role in supporting tourism activities. Furthermore, average years of schooling exhibit a positive and significant effect, suggesting that human capital is a key driver of tourism sector growth.

The consistency of these findings indicates that the results are robust and not sensitive to model specification. In this study, the fixed effects model is considered the preferred specification, as it is better suited to control for unobserved heterogeneity across provinces.

4.3. Relationship between Digital Readiness and Tourism Growth

To further support the regression results, the relationship between digital readiness and tourism sector growth is visualized in Figure 2. The scatter plot indicates that the data points are widely dispersed, with no clear linear pattern observed.

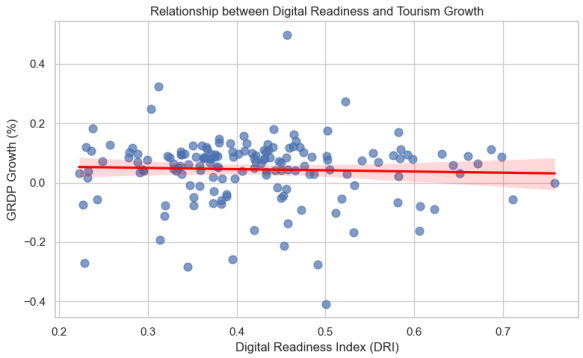


Figure 2 Relationship between Digital Readiness and Tourism Growth

The absence of a clear visual pattern suggests that the relationship between digital readiness and tourism sector growth is relatively weak. This finding is consistent with the panel regression results, which indicate that digital readiness does not have a statistically significant effect on tourism growth. Overall, both the statistical and visual evidence suggest that digital readiness has not yet become a primary driver of tourism sector growth at the provincial level in Indonesia.

4.4. Results from Random Forest

As a complementary approach, this study also employs the Random Forest method to evaluate the relative contribution of each variable in explaining tourism sector growth. The results of the analysis are presented in Figure 3.

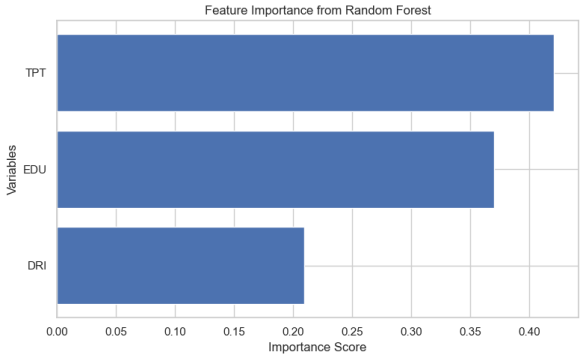


Figure 3 Feature Importance from Random Forest

Based on the feature importance results, the unemployment rate has the highest contribution (0.420), followed by average years of schooling (0.370), while digital readiness has the lowest contribution (0.210). These findings indicate that socio-economic factors play a more dominant role than technological factors in explaining variations in tourism sector growth across provinces.

In addition, the Random Forest model yields an R^2 value of -0.898, indicating very low predictive performance in explaining the dependent variable. This

suggests that the relationship between the independent variables and tourism sector growth is relatively weak or influenced by other factors not included in the model.

Despite this limitation, the feature importance results still provide valuable insights into the relative contribution of each variable. These findings are consistent with the panel regression results, where digital readiness does not exhibit a statistically significant effect on tourism sector growth.

4.5. Discussion

The findings of this study indicate that digital readiness does not have a statistically significant effect on tourism sector growth at the provincial level in Indonesia. Although in theory digital transformation is expected to enhance efficiency, expand market access, and improve the visibility of tourism destinations, the empirical results suggest that these benefits have not yet been directly realized. One possible explanation is that the digital readiness indicators used in this study primarily capture the availability of infrastructure and access to technology, rather than the effective utilization of digital technologies within the tourism sector. As such, the presence of digital infrastructure alone does not automatically translate into economic gains without the capacity of industry actors to effectively utilize these technologies.

Furthermore, the tourism sector in many regions remains heavily influenced by conventional factors, such as destination quality, physical accessibility, and service provision. In this context, human capital appears to play a more critical role, as evidenced by the consistently significant effect of the education variable across all regression models. The Random Forest results further reinforce this interpretation, showing that education and unemployment have a greater contribution compared to digital readiness. These findings are consistent with the regression results, suggesting that digital readiness is not the primary driver of tourism growth during the observed period. The consistency of results across econometric and machine learning approaches indicates that the findings of this study are robust.

Moreover, the low predictive performance of the Random Forest model ($R^2 = -0.898$) suggests that tourism sector growth is likely influenced by other factors not included in the model, such as the quality of physical infrastructure, the attractiveness of tourism destinations, local government policies, and broader macroeconomic conditions. These findings imply that policies aimed at developing the tourism sector should not rely solely on improving digital infrastructure. Instead, they should be complemented by efforts to enhance human capital and strengthen the capacity of industry actors to effectively utilize digital technologies.

From a policy perspective, these findings suggest that efforts to improve digital readiness should not be treated as a standalone strategy for tourism development. Instead, greater attention needs to be given to strengthening the enabling conditions that support the effective functioning of the tourism sector. In particular, the significant role of education indicates the importance of human capital in determining tourism performance. Therefore, policy efforts should be directed toward enhancing the capacity of tourism-related actors, so that existing resources—including digital infrastructure—can be utilized more effectively within the sector.

5. CONCLUSIONS

This study aims to examine the impact of digital readiness on tourism sector growth at the provincial level in Indonesia during the period 2020–2024. By employing panel regression analysis and a complementary Random Forest approach, this study provides a comprehensive evaluation of both linear relationships and the relative importance of variables. The results indicate that digital readiness has a positive but statistically insignificant effect on tourism growth across all regression models. This finding suggests that improvements in digital infrastructure and access have not translated into measurable economic gains in the tourism sector.

In contrast, the control variables show consistent and significant effects. The unemployment rate has a negative impact on tourism growth, while education, measured by average years of schooling, has a positive and significant effect. These findings highlight the crucial role of labor market conditions and human capital in supporting tourism sector performance. The Random Forest analysis further confirms these results, indicating that education and unemployment have greater importance compared to digital readiness. Although the predictive performance of the model is relatively low, the consistency of findings across econometric and machine learning approaches strengthens the robustness of this study.

Overall, this study concludes that digital readiness alone is insufficient to drive tourism growth. Instead, human capital and broader socio-economic factors remain the primary drivers. These findings imply that policies aimed at developing the tourism sector should not focus solely on improving digital infrastructure, but also prioritize human resource development. From a policy perspective, the findings of this study underscore the importance of adopting a more integrated approach to tourism development. Policymakers should not rely solely on expanding digital infrastructure, but also prioritize strengthening key supporting factors that influence tourism growth, particularly human capital. Accordingly, policy interventions should be formulated to ensure that improvements in digital readiness are complemented by broader structural efforts aimed at

enhancing the overall performance and effectiveness of the tourism sector.

Finally, this study acknowledges several limitations, particularly the limited set of variables and the relatively short observation period. Future research is recommended to incorporate additional factors, such as infrastructure quality, destination attractiveness, and policy variables, as well as to explore non-linear modeling approaches using larger datasets.

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