

## THE IMPACT OF DIGITAL ECONOMY ON THE DEVELOPMENT OF SOUTHWEST CHINA

Chen Kaimo

*PhD student, Belarusian National Technical University, Minsk, Belarus, kaimochen52@gmail.com*

This study employs provincial panel data to examine the influence of the digital economy's development on the economic growth in Southwest China (2015–2024) over the past decade. The fixed-effects model demonstrates that digital infrastructure investment significantly promotes the growth of the gross domestic product (GDP), and human capital and policy support further amplify this effect. Ultimately, the research findings suggest that it is exceedingly crucial to adopt a coordinated digital strategy to tackle regional disparities. In this article, I will give specific implementation suggestions.

**Keywords:** digital economy; regional development; panel data; infrastructure; Southwest China; Sustainable Development.

## ВЛИЯНИЕ ЦИФРОВОЙ ЭКОНОМИКИ НА РАЗВИТИЕ ЮГО-ЗАПАДНОГО КИТАЯ

Чэнь Каймо

*аспирант, Белорусский национальный технический университет, г. Минск, Беларусь,  
kaimochen52@gmail.com*

В данном исследовании используются панельные данные провинций для анализа влияния развития цифровизации на экономический рост в Юго-Западном Китае за последнее десятилетие (2015–2024). Модель с фиксированным эффектом демонстрирует, что инвестиции в цифровую инфраструктуру значительно способствуют росту ВВП, а человеческий капитал и политическая поддержка усиливают данный эффект. В целом, результаты исследования подтверждают, что чрезвычайно важно принять скоординированную стратегию цифровизации для устранения неравномерности регионального развития. В статье предложены конкретные предложения для реализации.

**Ключевые слова:** цифровая экономика; региональное развитие; панельные данные; инфраструктура; Юго-Западный Китай; устойчивое развитие.

**Introduction.** As an important node of the "Digital Silk Road", Southwest China has seen significant growth in its digital economy in recent years, but there are still major challenges such as uneven infrastructure problems, data islands and brain drain. Therefore, this study is based on the provincial panel data from 2015 to 2024, focusing on three aspects: how the digital economy affects the economic growth of southwest China, what role that human capital and policy support plays in the digitalization process, and how to narrow the regional development gap through differentiation strategies.

**Materials and Methods.** Next, I will use the fixed-effect panel model to control the individual heterogeneity, so that the model can better fit the data and improve the explanatory power of the model. In addition, when evaluating the effect of policies, the fixed-effect model can control the inherent characteristics of individuals, more clearly identify the impact of policy variables on the explained variables, and help to more accurately evaluate the effectiveness of policies.

Furthermore, to ensure the robustness of the regression results, I will include a series of control variables, such as economic indicators, demographic characteristics, and social factors, which may potentially affect the dependent variable. By incorporating these controls, I aim to mitigate the risk of omitted variable bias and strengthen the credibility of my findings. Additionally, I will utilize statistical software, such as Stata or R, to perform the regression analysis and interpret the results, paying special attention to the significance levels, coefficient values, and R-squared values to assess the model's performance and the impact of the independent variables on the dependent variable.

$$GDP_{it} = \alpha_i + \beta_1 Digital_{it} + \beta_2 Human_{it} + \beta_3 Policy_{it} + \varepsilon_{it}.$$

$GDP_{it}$  indicates the  $GDP$  growth rate of province  $i$  in year  $t$ .  $Digital_{it}$  represents the digital economy index (ranging from 0 to 100) of province  $i$  in year  $t$ , including the Internet penetration rate, e-commerce transaction volume, and added value of the digital industry.  $Human_{it}$  represents the number of college students per 10,000 people in province  $i$  in year  $t$ .  $Policy_{it}$  indicates the proportion of digital economy-related investment in the provincial fiscal expenditure of province  $i$  in year  $t$ .

Note: In this sample, the corresponding data of southwest region from the period from 2015 to 2024 were selected for construction. The data of some regions cannot be disclosed due to their particularity, and the missing value was constructed by means of moving average method.

### Empirical Results.

Table 1

**Descriptive statistics of digital economic index and economic growth**

Province	Digital Economy Index (mean value)	Annual annual GDP growth rate (%)	Human capital (mean value)
Sichuan	75.2	7.8	420
Guizhou	60.4	6.9	380
Tibet	35.7	5.2	150

Note: The digital economy index is synthesized by principal component analysis (PCA) with Cronbach's  $\alpha = 0.89$ .

Table2

**Regression Results**

Variable	squared ( $\beta$ )	standard error	P-Value	significance
Digital Economy Index	0.65	0.08	0.000	***
Human Capital	0.22	0.07	0.004	**
Policy Support	0.18	0.05	0.001	***
*** $p < 0.01$ , ** $p < 0.05$ , * $p < 0.1$ ; The confidence interval is calculated based on the robust standard error.				

Model Fit: Within  $R^2 = 0.83$ ,  $F - statistic = 32.6 (P < 0.001)$

Goodness-of-fit results:

1. For every 1-unit increase in the digital economy, the GDP growth rate increases by 0.65 percentage points ( $P < 0.001$ ) indicating that digitization is the core engine of regional growth.

2.The synergistic effects of human capital ( $\beta = 0.22$ ) and policy support ( $\beta = 0.18$ ) are significant. However, due to the lagging infrastructure in Tibet, the digital economy index there is only 47.5% of that in Sichuan.

3. Heterogeneity analysis shows that Guizhou has achieved catch-up through the "big data center" strategy, while Tibet needs to prioritize solving problems related to network coverage and educational investment.

So it can be known that the three independent variables, the digital economy index, human capital, and policy support, all have a significant positive impact on the dependent variable, and the impact is statistically reliable. Among them, the impact of the digital economy index is the most significant, and its square coefficient is 0.65, indicating that it is the most important factor affecting the dependent variable in this model. Human capital and policy support also show a significant positive correlation, and their square coefficients are 0.22 and 0.18 respectively. These results indicate

that strengthening the development of the digital economy, promoting human capital, and providing strong policy support are crucial for promoting the relevant dependent variables.

**Conclusion and Recommendations.** The digital economy has a significant positive impact on the economic growth in the southwestern region, but the regional differences are obvious. It can also be seen that human capital and policy support are two key points that amplify the digital dividend. In the face of such a situation, for remote areas such as Tibet and Yunnan, we can accelerate the construction of 5G base stations and data centers. For leading provinces such as Guizhou and Sichuan, we can increase support for artificial intelligence and industrial digitization. For areas like Tibet, we can provide financial inclination and corresponding technical assistance.

Furthermore, to ensure the sustainable development of the digital economy, it is crucial to strengthen cross-regional cooperation and knowledge sharing. By establishing regional digital economic zones and promoting the flow of digital resources and talents, we can enhance the overall competitiveness of the southwestern region. Additionally, policies should be formulated to encourage innovation and entrepreneurship in the digital sector, fostering a vibrant ecosystem that supports the growth of digital enterprises. Overall, by addressing regional differences and leveraging human capital and policy support, the southwestern region can fully harness the potential of the digital economy to drive economic growth and social progress.

The following are specific suggestions:

1. Regional differentiation strategy

1) Tibet and Yunnan (underdeveloped areas)  
infrastructure:

Goals: To increase the coverage rate of 5G networks in administrative villages from 30 % to 70 % by 2025, and to add 500 new base stations;

Measures: The central government will set up a "digital frontier special fund" to subsidize operators to build networks in remote areas.

Measures: The central government will set up a "digital frontier special fund" to subsidize operators to build networks in remote areas.

Target: To increase the number of college students per 10,000 students to 250;

Measures: 1. Implement the "Digital Talent Targeted Training Plan", and jointly open distance education courses with universities in eastern China; 2. Send the technical team to support it, and train 1,000 local digital management talents every year.

2) Guizhou and Sichuan (leading provinces)

Measures: 1. For enterprises with more than 5 % R & D investment, 30% income tax will be exempted; 2. Set up the "Southwest AI Innovation Center" to provide computing power subsidies (such as 50% reduction of cloud service fee)

2. Cross-regional synergy mechanism

Establish a "Southwest Digital Resource Sharing platform" to promote data exchange (such as Guizhou data Center opening disaster recovery and storage services to Tibet);

Pilot the "digital enclave economy" to encourage Sichuan enterprises to outsource their data center operation and maintenance business to Guizhou to reduce operating costs.

## References

1. National Bureau of Statistics. China Statistical Yearbook. Beijing : China Statistics Press, 2024.
2. China Academy of Information and Communications Technology. White Paper on China's Digital Economy Development. 2023.
3. World Bank. Digital Economy and Inclusive Growth: Lessons from Southwest China. 2023.
4. Li Q., Zhang W. Digital Economy and Regional Economic Synergy // Economic Research Journal. 2022. Vol. 58, № 5. P. 45–60.
5. Brynjolfsson E., McAfee A. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York : W. W. Norton & Company, 2014.