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The Impact of the Development of the Digital Economy on the Achievement of Common Prosperity: A Perspective on Employment Scale and Employment Quality

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Abstract: As the digital wave transforms production and wealth distribution, digital technologies reshape the economy and create new opportunities for inclusive development. This study evaluates common prosperity based on total wealth, distribution fairness, and sustainability while assessing the digital economy through industrialization, traditional industry transformation, and infrastructure robustness. Using 2013-2022 provincial panel data from China, it examines the digital economy's impact and mechanisms. Findings indicate that the digital economy promotes common prosperity by optimizing employment structures and enhancing job quality, with increasing marginal returns as workforce quality advances. However, regional disparities persist due to varying industrialization levels. To accelerate common prosperity, fostering digital innovation, improving employment services, and promoting regional coordination are essential.

Keywords: digital Economy, common prosperity, employment quality, employment scale

1. Introduction

Common prosperity is a core aspect of Chinese-style modernization and a national strategy, emphasized by the 20th National Congress of the Communist Party of China. The 14th Five-Year Plan sets clear goals for its advancement. Meanwhile, the digital economy is reshaping economic and social development, reaching 53.9 trillion yuan in 2023, accounting for 42.8% of GDP, and contributing 66.45% to economic growth, highlighting its crucial role. Understanding how the digital economy supports common prosperity is increasingly important for academics and policymakers. Innovative policies promote their coordinated development, while technologies like cloud computing, big data, and AI transform employment, creating diverse job opportunities and reducing income inequality. This paper examines the mechanisms linking the digital economy and common prosperity, providing an empirical basis for policy formulation.

2. Literature Review

2.1. Research on the Effects of the Digital Economy on Common Prosperity

Most studies suggest that the digital economy promotes common prosperity. Theoretically, achieving common prosperity relies on digital economy growth and optimized distribution. On one hand, it drives macroeconomic expansion, "making the cake bigger". On the other, it fosters industrial decentralization, urban-rural coordination, and a unified national market, ensuring balanced distribution or “dividing the cake well” [1]. Empirical research examines this impact at micro and macro levels. Firm-level data show that digital transformation boosts revenue and labor income share. City-level studies indicate that digital industries promote balanced development and reduce regional disparities. At the provincial level, research using the entropy weight method finds that smart city development, a core aspect of the digital economy, enhances common prosperity [2]. However, the digital economy may undermine labor rights in emerging industries and negatively impact low-skilled workers. Digital monopolies and the digital divide pose risks, exacerbating social imbalances [3].

The digital economy exhibits temporal-spatial duality in advancing common prosperity. Temporally, its impact follows diminishing marginal returns, with digital maturity initially widening then narrowing the urban-rural income gap (inverted U-curve). Spatially, it enhances income distribution in central or western China while concentrating growth effects in the east [4].

2.2. Analysis of the Mechanism of Action of the Digital Economy from the Perspective of Common Prosperity

Research identifies four mechanisms through which the digital economy advances common prosperity: (1) Education: enhancing educational quality, streamlining resource allocation, and fostering interregional talent collaboration to reduce spatial disparities [5]; (2) Innovation: creating open platforms that catalyze integrated urban development across productive, ecological, and social domains [6]; (3) Industrial Transformation: synergizing industrial digitization with digital industries to optimize resource distribution and structural modernization [7]; and (4) Employment: amplifying workforce skills while policy interventions elevate job quality and wages, collectively raising shared prosperity [8].

2.3. Research on the Effectiveness of Employment on Common Prosperity

Domestic research on employment’s impact on common prosperity mainly focuses on theory. High-quality, full employment is essential for Chinese-style modernization, enhancing both material and spiritual well-being. Digital technology has introduced new employment forms, fostering regional development [9]. However, challenges like income inequality and unequal opportunities persist. Addressing employment discrimination, improving public services, and optimizing employment structures are key solutions [10]. Empirical studies highlight employment’s role in promoting prosperity. Ji et al. found that digital inclusive finance boosts farmers’ entrepreneurship and income, while Guo et al. emphasized that expanding non-agricultural jobs raises low-income earnings and grows the middle class [11-12]. Foreign studies take an empirical approach. Gary found employment crucial for linking African economic growth to poverty reduction. Heng et al. showed that digital village development in China enhances household entrepreneurship and non-agricultural employment, increasing income inclusively [13-14].

Overall, research explores the digital economy’s effects on common prosperity. However, few studies empirically assess both employment quality and scale in this context.

3. Theoretical Model and Research Hypotheses

The digital economy enhances wealth creation by utilizing modern information networks to improve efficiency. It transforms production methods, optimizes resource use, reduces costs, and increases profitability, thereby expanding economic growth. This new economic form reshapes business models, fosters emerging sectors, creates jobs, and promotes fair wealth distribution. According to network externality theory, the digital economy’s value grows exponentially with more participants, facilitating innovation. However, disparities in digital technology adoption can leave low-skilled and

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low-income groups behind, worsening regional inequalities. Additionally, monopolistic practices may restrict competition and innovation, intensifying wealth inequality. These insights lead to the proposal of Hypothesis 1.

H1a: Digital economy development exhibits a positive correlation with common prosperity attainment.

H1b: This relationship follows an inverted U-curve, where initial growth phases widen disparities before net gains emerge.

The digital economy drives industrial structure adjustment and upgrades by fostering emerging industries and creating high-skilled jobs. This shift enhances job quality and attracts talent. According to employment multiplier theory, growth in the digital sector expands employment in related industries, stimulates entrepreneurship, and raises overall income levels. Improved labor allocation boosts productivity and fosters industrial clusters. As more individuals secure high-income positions, societal consumption rises, promoting high-quality economic growth and enabling greater public investment, ultimately benefiting the population. This leads to the proposal of Hypothesis 2.

H2a: Digital economy development indirectly modulates regional prosperity through employment dynamics.

H2b: Employment scale/quality enhancements transform this linkage into progressively amplified non-linear effects.

Regional development in China varies significantly in resource endowment, infrastructure, and economic levels, creating distinct development ladders across different regions. This disparity affects digital economy growth and common prosperity differently. Developed areas effectively leverage resources to boost incomes, while underdeveloped regions face challenges like weak infrastructure and brain drain. Policies such as "Eastern Data Processing, Western Computing Support" aim to transform industrial structures, but less industrialized areas struggle to integrate the digital economy, limiting their impact on common prosperity. This leads to Hypothesis 3.

H3: Digital economy growth differentially advances common prosperity across geographic, industrial, and developmental contexts.

4. Model Setting and Description of Variables

4.1. Research Design

4.1.1. Basic Regression Model

To investigate the impact of the development of the digital economy on common prosperity, a benchmark regression model as shown in Equation (1) is established.

$$Cp_{it} = \beta_0 + \beta_1 Dig_{it} + \beta_j Z_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (1)$$

Considering that the impact of the digital economy on common prosperity may be nonlinear, a squared term of the development level of the digital economy is introduced.

$$Cp_{it} = \beta_0 + \beta_1 Dig_{it} + \beta_2 Dig_{it}^2 + Z_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (2)$$

4.1.2. Mechanism Test Model

This study investigates the digital economy's role in advancing regional prosperity via employment quality and scale, employing Jiang's framework [15] to test causality through benchmark regressions. Mechanism validity is quantified via Equations (3)-(4), which analyze mediator variable interactions.

$$EQ_{it} = \alpha_0 + \alpha_1 Dig_{it} + \alpha_j Z_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (3)$$

$$ES_{it} = \alpha_0 + \alpha_1 Dig_{it} + \alpha_j Z_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{4}$$

The reasons why this paper selects employment quality (EQ_{it}) and employment scale (ES_{it}) as the mediator variables are as follows: Firstly, the digital economy, driven by innovation, improves the quality of employment from multiple dimensions, providing workers with generous rewards and broad development space, and promoting common prosperity both materially and spiritually. At the same time, the improvement of employment quality helps to eliminate employment discrimination, improve public employment services, alleviate the uneven distribution of income, and enable the achievements of the digital economy development to benefit all workers more fairly. Secondly, digital technologies catalyze novel employment modalities, crucially amplifying labor market access to elevate low-income earnings and enlarge middle-class demographics. Concurrently, enhanced entrepreneurship and non-farm occupational shifts structurally optimize income distribution, fostering inclusive growth through shared development dividends.

4.1.3. Threshold Effect Model

To further test the nonlinear relationship between the two variables, this paper will construct a threshold effect model by taking the employment quality and the employment scale as threshold variables respectively, as shown in Equation (5).

$$\begin{aligned} Cp_{it} = \alpha_0 + \alpha_1 Dig_{it} * I(TH_{it} \le \gamma_1) + \alpha_2 Dig_{it} * I(\gamma_1 < TH_{it} \\ \le \gamma_2) + \cdots + \alpha_n Dig_{it} * I(\gamma_{n-1} < TH_{it} \le \gamma_n) + \alpha_{n+1} Dig_{it} * I(TH_{it} \\ > \gamma_n) + \alpha_j Z_{it} + \mu_i + \theta_t + \varepsilon_{it} \end{aligned} \tag{5}$$

α represents the impact coefficient. *TH* represents the threshold variable. *I(·)* is the indicator function, and its value depends on the relationship between the threshold variable and the threshold value. If the condition within the parentheses is satisfied, *I(·)* = 1; otherwise, it takes the value of 0. γ_n represents the threshold value to be estimated.

4.2. Variable Selection

4.2.1. Explained Variable

The dependent variable, common prosperity development level, is measured through a hierarchical indicator system (3 primary, 14 secondary, 30 tertiary dimensions) using entropy-weighted aggregation.

4.2.2. Core Explanatory Variable

This study's key independent variable quantifies digital economy advancement, operationalized via a three-tiered evaluation framework (3 primary, 21 secondary metrics) [15].

4.2.3. Mediator Variable

Employment Scale (ES): Quantified using annual regional employment figures. Employment Quality (EQ) [16]: Calculated as [0.4×farmers' wage income+0.6×urban wages]×0.6+0.4×social security expenditure, integrating income parity and fiscal welfare metrics.

4.2.4. Control Variable

This study includes four control variables: (1) Government intervention (Gov) measured by regional public budget expenditure to GDP ratio; (2) Innovation level (Inn) indicated by patent authorizations per 10,000 people; (3) Social employment security (Sec) as the ratio of social security expenditure to public budget; (4) Urbanization level (Urb) as the urban population ratio.

4.3. Data Source and Descriptive Statistics

This study utilizes 2013-2022 panel data from 29 Chinese provinces (excluding Xinjiang, Tibet, Hong Kong, Macao, and Taiwan), sourced from national and provincial statistical yearbooks. To address scale disparities, variables underwent min-max normalization prior to analysis. Table 1 summarizes variable distributions and methodological rigor.

Table 1: Descriptive Statistics of Variables

Variable	Mean	Std Dev	Max	Min
Cp	0.232	0.082	0.503	0.091
Dig	0.134	0.118	0.689	0.017
ES	2.691	1.775	7.150	0.256
EQ	1.559	0.811	4.144	0.351
Inn	1.611	1.761	9.282	0.088
Urb	0.604	0.124	0.239	0.896
Gov	0.256	0.109	0.753	0.105
Sec	0.142	0.037	0.290	0.078

5. Analysis of Empirical Results

5.1. Benchmark Regression

Table 2 summarizes the benchmark regression analysis of digital economy effects on common prosperity. Column (1) isolates the core predictor, with columns (2)-(5) progressively incorporating controls. The index maintains 1% significance, demonstrating robustly positive influence that validates the model’s core proposition. As control variables are added, the impact coefficient increases, highlighting the synergy between the digital economy and other factors. A 1% rise in the digital economy index raises common prosperity by 68.5%. In further regression, incorporating Dig^2 reveals an inverted U-shaped relationship. Initially, the digital economy reduces information costs, improves resource flow, and enhances income growth. However, as it advances, challenges like digital divide, market monopolies, and unequal resource distribution weaken its positive impact. This confirms Hypothesis 1.

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Table 2: Regression Results

Variables	Cp					
	(1)	(2)	(3)	(4)	(5)	(6)
Dig	0.219***	0.273***	0.351***	0.364***	0.338***	0.685***
	(0.048)	(0.034)	(0.061)	(0.060)	(0.055)	(0.112)
Dig^2						-0.371***
						(0.088)
Constant	0.159***	-0.156	-0.041	-0.089	-0.148	-0.152*
	(0.017)	(0.099)	(0.110)	(0.123)	(0.104)	(0.080)
Control variables	Yes					
Time, province fixed						
R^2	0.9289	0.9397	0.9424	0.9436	0.9470	0.9542
N	290					

Note: Robust standard errors are in parentheses; ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively, as in the table below.

5.2. Robustness and Endogeneity Test Analysis

To reinforce reliability, this study implements three robustness checks: 1) excluding municipalities (Beijing/Tianjin/Shanghai/Chongqing); 2) excluding pandemic-affected 2020 data; 3) applying 1%-99% winsorization to curb outliers. Results in Table 3-(1)-(3) confirm baseline stability. For endogeneity (omitted variables/reverse causality), two-stage least squares (2SLS) regression deploys two instruments: IV1-interaction of lagged national IT service revenue and prior-year digital economy index; IV2-time-adjusted 1984 post offices per 100M population. All outputs align with core findings, validating robustness.

Table 3: Robustness and Endogeneity Test Results

Variables	(1)	(2)	(3)	Instrumental Variable Approach			
				(4)		(5)	
				Dig	*Cp*	*Dig*	*Cp*
Dig	0.412***	0.359***	0.310***		0.258***		0.541***
	(0.077)	(0.059)	(0.065)		(0.040)		(0.160)
Rev×L1.Dig				0.075***			
				(0.009)			
MDig×Pos						0.184***	
						(0.035)	
R^2	0.947	0.949	0.941	0.990	0.988	0.971	0.984
Kleibergen-Paap rk Wald F				70.668		28.206	
N	250	261	290	261	261	290	290

5.3. Mediating Effect Test Analysis

5.3.1. Improve employment quality

The digital economy drives emerging industries that demand high-skilled workers, offering better salaries and career prospects, thus improving employment quality. It also accelerates digital transformation in traditional industries, where new technologies enhance automation and efficiency.

This reduces labor intensity, improves working conditions, and encourages continuous skill development, fostering sustainable careers. Regression results in Table 4-(1) confirm a significant positive impact of the digital economy on employment quality, passing the 1% significance test. It helps overcome limitations in traditional employment models, addressing poor work environments and limited career growth. As employment quality improves, workers gain higher wages, better conditions, and more promotion opportunities. This reduces income inequality, strengthens social cohesion, and advances common prosperity.

5.3.2. Expand employment scale

The regression shows that the digital economy's impact on employment expansion is not significant due to several factors. The data, based on year-end provincial employment figures, mainly reflect traditional jobs, missing flexible employment. Issues like mismatched skilled positions, blurred industry boundaries, and statistical delays further complicate measurement. Industries vary in adopting the digital economy, and traditional sectors may face short-term job losses during digital transformation. Additionally, slow industrial upgrades in some regions limit the digital economy's job-creating potential. These factors support the validity of Hypothesis 2.

Table 4: Results of Mechanism Testing (N=290)

Variables	(1)	(2)
	Employment Quality (EQ)	*Employment Scale (ES)*
Dig	3.335***(0.889)	0.719(1.330)
Constant	-0.664(1.292)	3.654*(1.927)
Control Variables	Yes	
Time, province fixed		
R^2	0.9778	0.3507

5.4. Threshold Effect Test

The digital economy's advancement of shared prosperity extends beyond employment quality enhancement, manifesting non-linear dynamics contingent on labor market conditions. Threshold regression analysis (Table 5) reveals employment quality triggers dual critical junctures (1.6265 and 2.0715) at 1% and 5% significance, while employment scale exhibits a singular threshold (0.3450) at 5% significance. These phase transitions confirm escalating digitalization generates leapfrog gains in prosperity outcomes as labor metrics surpass identified inflection points.

Table 5: Results of Threshold Effect Test

Threshold Variable	Model	Threshold	F-value	P-value	BS count	Threshold value 1%	5%	10%
EQ	Single	1.627	55.06	0.000	300	28.951	22.981	18.926
	Double	2.072	19.83	0.030		25.029	18.527	16.452
ES	Single	0.345	34.06	0.047		38.023	33.057	28.188

Table 6 shows how the digital economy's impact on common prosperity varies with employment quality and scale. The relationship follows a non-linear pattern. When employment quality is below 1.6265, low digital skills, a labor-intensive industrial structure, and weak social security limit the digital economy's role, making its effect insignificant. Between 1.6265 and 2.0715, the digital economy significantly boosts common prosperity. Above 2.0715, the effect strengthens further. For employment scale, when below 0.345, the digital economy has a non-significant negative impact, likely due to a limited labor force and weak industrial coordination. When employment scale exceeds 0.345, its effect on common prosperity becomes significantly positive.

These findings confirm that the digital economy's contribution to common prosperity is not linear. Continuous monitoring and employment adjustments are essential to maximizing its benefits, reinforcing the importance of employment support in digital economic development.

Table 6: Threshold Effect Results

Variable	Threshold Variable	
	EQ	*ES*
$Dig * I(EQ \leq 1.6265)$	0.019 (0.408)	
$Dig * I(1.6265 < EQ \leq 2.0715)$	0.141***(0.035)	
$Dig * I(EQ > 2.0715)$	0.222***(0.029)	
$Dig * I(EQ \leq 0.3450)$		-0.144(0.103)
$Dig * I(EQ > 0.3450)$		0.279***(0.030)
Constant	-0.220***(0.020)	-0.226***(0.021)
Control Variables	Yes	
R^2	0.933	0.920

5.5. Heterogeneity Analysis

Geospatial development gaps mediate the digital economy's heterogeneous effects on shared prosperity. Fixed-effects regressions across eastern, central, western, and northeastern China reveal pronounced positive correlations (strongest in central/western zones) due to latecomer advantages enabling rapid digital assimilation and industrial-market synergies. Conversely, northeastern stagnation stems from structural rigidities, talent attrition, and fragmented digital ecosystems. Stratification by industrialization further shows 1%-significant amplified impacts in advanced zones, where mature digital-industrial integration spurs innovation clusters and high-value employment. In low-industrialization regions, weak industrial structures limit digital adoption, preventing full realization of the digital economy's benefits.

Table 7: Heterogeneity Analysis

Variables	*Cp*					
	East	Central	West	Northeast	Ind>0.836	Ind<=0.836
Dig	0.259*** (0.0419)	0.684*** (0.190)	0.686*** (0.136)	-0.472*** (0.122)	0.594*** (0.166)	0.212*** (00.037)
Constant	-0.153 (0.139)	-0.288 (0.180)	0.123** (0.063)	-0.0415 (0.186)	-0.040 (0.108)	0.084 (0.087)
Control Variables Time, province fixed	Yes					
N	100	60	100	30	143	147

6. Conclusion and Recommendation

6.1. Conclusion

Key findings reveal: (1) Digital advancement drives shared prosperity through an inverted U-curve dynamic--initial gains transition to maturity-phase risks like monopolies and access divides, exacerbating spatial inequities. (2) Direct prosperity elevation coexists with indirect optimization via employment quality enhancement. (3) Threshold analysis identifies escalating employment metrics (quality/scale) triggering non-linear prosperity gains through compounding digital-labor synergies. (4) Spatially, prosperity dividends concentrate in central/western regions via latecomer advantages, while industrialized zones amplify impacts through mature digital-industrial integration.

6.2. Recommendation

To advance the digital economy and common prosperity, three key strategies are recommended: First, foster digital innovation and industrial modernization. The government should support AI, smart agriculture, industrial Internet applications, and digital transformation in services to enhance efficiency and competitiveness. Second, optimize employment by expanding digital job opportunities. A multi-level support system should boost workforce participation, improve wage structures, and enhance social security to reduce income gaps and improve job quality. Finally, implement a regional development strategy. The central and western regions should strengthen digital infrastructure and specialized industries, the east should focus on high-end digital innovation, and the northeast should promote digital transformation in traditional industries. Tailored policies will ensure balanced growth.

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