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# Research on the Coupling Coordination Relationship between Regional Information Technology Level and Economic Development

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***Abstract***

*The impact of the information technology industry on economic development is becoming increasingly important. In this study, we take China's provincial-level regions from 2015 to 2020 as the research object, comprehensively evaluates the level of their information technology systems by the entropy weight method, and then measures the coupling coordination relationship between the information technology system and the economic development system by the coupling coordination degree model. As a result, we found that the income of the information technology industry, the investment of talents and science research have the most important influence on the level of the information technology system. During the research period, with increasing values, the coupling degree of the two systems was at a high level. Affected by development strategies, diffusion effects and industrial relocation, the coupling degree in the central and western regions has shown a rapid growth trend. The coordination degree of the two systems is relatively low, and 83.9% of the provinces are in the medium-low coordination stage. The information technology industry has obviously promoted economic development. Besides, relevant policies should be introduced to effectively support and guide the high-quality development of the information technology industry and promote the high-level coordinated development of the two systems.*

**Keywords:** *Information Technology, Economic Development, Entropy Weight Method (EWM), Coupling Coordination Degree (CCD)*

## 1. Introduction

At present, the mobile Internet, Internet of Things, cloud computing and big data have greatly changed economic and social life. These specific technical applications are derived from the improvement of production efficiency and economic externalities brought about by the deep integration of informatization and the three industries. The rapid development of information technology has created new forces to promote economic

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growth.

Since the reform and opening up, China's information technology construction has achieved rapid progress, and China has become one of the countries with the fastest growth in the level of information technology. At present, informatization has risen to a national strategy. Emerging information technologies, including mobile Internet, cloud computing, big data, Internet of Things, e-government, etc., are profoundly changing people's social life and becoming an important force in promoting economic and social change. However, there are still inconsistencies and mismatches between the information technology system and the economic development system, which not only hinders the high-quality development of the information technology industry, but also may lead to a slowdown in economic growth. Therefore, it is necessary to study the relationship between the level of information technology and economic development to find the impact mechanism. In fact, this relationship and its contribution to economic growth has always attracted people's attention.

This study takes the data from 2015 to 2020 of China's provincial-level regions as research samples, calculates the weight of the index system through the entropy weight method (EWM), and conducts a comprehensive evaluation of the information technology system. Then, the coupling coordination degree (CCD) model is used to analyze the coupling coordination relationship between the information technology system and the economic development system, so as to clarify the impact mechanism between the information technology industry and economic development, and to put forward suggestions for the high-quality development of China's information technology industry and the sustainable development of the economy.

## 2. Literature Review

The traditional neoclassical growth theory regards information technology as an exogenous technological progress which cannot explain its permeability. The endogenous economic growth model incorporates technological factors into the economic growth system and explains the spillover effect of knowledge, believing that the diffusion effect of information technology is the result of the endogenization of technological progress in “learning by doing”, “knowledge spillover”, “human capital accumulation” and “research and development”, and the technological endogenation is a decisive factor in achieving sustained economic growth.

Research related to this is as follows.

As a result of analyzing the relationship between informatization and industrialization using the time series joint integration test and the Granger causality test, it was pointed out that industrialization had a greater impact on informatization [1]. Using static panel data, analyze the impact of regional informatization on regional economic growth in two aspects: the total informatization index and the sub-index [2]. Focus on whether there is a critical effect of information technology on economic growth and use dynamic panel data to analyze the impact of information technology on economic growth continuously [3]. A two-way fixed effect model is established at an individual point in time using unit route tests and joint integrated analysis, and an empirical analysis is conducted on the relationship between Internet development and economic growth [4]. Panel vector autoregression is used to predict multiple economic variables in a mutually self-sustaining system, finding that there is a causal relationship between informatization and economic growth, and that there is a difference in relations between eastern, central, and western regions of China [5]. Using the simultaneous equation model, the relationship between informatization and economic scale development in China is analyzed, and equations related to informatization development by cross-sectional data of 31 provinces and cities in China are derived [6]. Study the degree of integration of informatization and industrialization using stochastic frontier analysis methods [7].

Analyzing the performance of ICT on the local economy from the perspective of network effectiveness and production efficiency, we find that ICT has a significant impact on regional economic growth [8]. It is argued that advances in information and communication technologies contribute significantly to economic growth and that there are regional differences in the correlation between ICT and economic growth [9]. By analyzing the economic growth and structural adjustment effects of informatization through instrumental variable and fixed effect regression, it is argued that the development of informatization contributes significantly to economic growth and that the industry structure needs to be tailored to the service sector [10].

Therefore, we first construct the information technology level index evaluation system, then comprehensively evaluates the information technology system through the EWM, and finally analyzes the coupling coordination relationship between the information technology system and the economic development system through the CCD model. The spatial and temporal characteristics of the coupling coordination relationship in 31 provincial-level regions in China are compared and analyzed, eventually, corresponding suggestions are put forward.

## 3. Analytical Methods and Index System

### 3.1 Entropy Weight Method Model

Most of the traditional methods for index system evaluation, such as Delphi method, factor analysis and AHP are subjective methods, which are difficult to evaluate the index weights objectively, fairly and scientifically. In this paper, the EWM, which focuses on the meaning of the data itself and eliminates the influence and interference of human factors, is used to measure the weights of information technology level indicators. In information theory, entropy can measure uncertainty. The greater the amount of information, the smaller the uncertainty and entropy, and vice versa. According to this characteristic, the randomness and disorder degree of specific variables can be effectively judged by calculating the entropy value.

First, n provinces and m indicators are selected. Due to the large differences in the dimensions of indicators, normalization is required. Moreover, positive and negative indicators have different meanings, and their processing methods are also inconsistent, as follows.

$$x'_{ij} = \frac{x_{ij} - min(x_{ij})}{max(x_{ij}) - min(x_{ij})} \tag{1}$$

$$x'_{ij} = \frac{max(x_{ij}) - x_{ij}}{max(x_{ij}) - min(x_{ij})} \tag{2}$$

Equations (1) and (2) represent the normalization methods of positive and negative indicators, respectively. $min(x_{ij})$ and $max(x_{ij})$ represent the minimum and maximum values in the information technology level indicators respectively. After obtaining the standardized value, calculate the proportion of each information technology level indicator $\gamma_{ij} = x_{ij} / \sum_{i=1}^{n} x_{ij}$ and the entropy value of the $j_{th}$ index $e_j = -k \sum_{i=1}^{n} p\gamma_{ij}\, ln(\gamma_{ij})$, in which $k=1/ln(n)>0$, $e_j>0$. Calculate the difference coefficient of the information entropy redundancy indicator $d_j = 1 - e_j$, and get the weights of each indicator.

$$w_j = \frac{d_j}{\sum_{j=1}^{m} d_j} \tag{3}$$

Finally, the comprehensive level of information technology in each province is obtained.

$$s_i = \sum_{j=1}^{m} w_j \cdot \gamma_{ij} \tag{4}$$

### 3.2 Coupling Coordination Degree Mode

Drawing on the coupling model in physics, we study the coupling relationship between the information technology level and the economic development level [11]. The calculation formula of coupling degree is as follows:

$$C = \{(s_1 \times s_2)/[(s_1 + s_2) \times (s_1 + s_2)]\}^{1/2} \quad (5)$$

in which C is the coupling degree of local information technology and economic development; $s_1$ and $s_2$ are the local information technology level and economic development level respectively. However, this model cannot judge whether the coupling is benign or not, that is, when the comprehensive level of local information technology and economic development is low, a high coupling degree can still be obtained. To avoid this deficiency, this study introduces CCD model to objectively reflect the coordinated level of local information technology and economic development. The model [12-13] is as follows:

$$D = \sqrt{C \times T}, T = \alpha s_1 + \beta U s_2 \quad (6)$$

in which $D$ is the CCD; $T$ is the comprehensive coordination index of local informatization level and economic development level, indicating the contribution of the two systems to the coordination degree; α and β are undetermined coefficients. In the process of coupling and coordinated development, we believe that information technology and economic development are equally important, so this study takes α and β as 0.5. Then the CCD model can be used to quantify the coupling and coordination between two systems.

### 3.3 Index Description and Data Source

This paper establishes the information level system and the economic development system. For the information level system, according to the index system of the IDI（Information Development Index）in China's "Twelfth Five-Year" national informatization plan, combined with previous research, this paper constructs the local informatization level index system from five levels, including infrastructure construction level(A1), industrial technology level(A2), information technology application level(A3), talent support level(A4) and development effect(A5). There are 13 indicators as shown in the following table 1.

**Table 1. Information level index system**

| Level(A) | Level(B) | Code |
|---|---|---|
| Infrastructure Construction Level (A1) | Fixed asset investment in information transmission, software and information technology services increased over the previous year (%) | B1 |
| | Optical cable line length (kilometer) | B2 |
| | Telephone penetration rate (including mobile phones) | B3 |
| | Internet broadband access ports per capita | B4 |
| Industrial Technology Level (A2) | R&D expenditure per capita (10,000 yuan) | B5 |
| | Number of domestic invention patent applications authorized per 10,000 people | B6 |
| Information Technology Application Level (A3) | Capacity of mobile telephone exchanges per 10,000 households | B7 |
| | Mobile Internet users per 10,000 households | B8 |
| Talent Support Level (A4) | 1/Illiteracy rate | B9 |
| | Number of students in ordinary institutions of higher learning per 10,000 people | B10 |
| | Proportion of employed persons in information transmission, software and information technology services industry | B11 |
| Development Effect (A5) | Per capita telecom business volume (1,000 yuan/person) | B12 |
| | Information technology service income per capita (yuan) | B13 |

The indicator of economic development level is GDP. This paper uses real GDP as a proxy variable for regional economic development. Taking 1998 as the base period, the GDP index disclosed in the "China Statistical Yearbook" is used for deflator. The CCD analysis is carried out on the deflated GDP and the informatization level calculated by the EWM. All the above indicators and related data come from the "China Statistical Yearbook" over the years.

## 4. Analysis Results

In this paper, the EWM is used to calculate the weights of the indicators in level (A) and level (B) of the information technology system. The results are shown in table 2. For level (A), the top 3 indicators are development effect, industrial technology level, and talent support level, with scores of 0.335, 0.243, and 0.184, respectively. Obviously, these three factors have the greatest impact on the level of information technology systems. For level (B), the top 5 indicators are the per capita information technology service income, the number of domestic invention patent applications per 10,000 people, the proportion of employed persons (10,000 people), the per capita telecommunications business volume, as well as the per capita R&D funds, with scores of 0.239, 0.165, 0.112, 0.096 and 0.078, respectively. The results show that the income of the information technology industry, the investment of talents and the R&D funds have important influence on the level of information technology system.

**Table 2. Results of entropy weight method**

| Level(A) | Level(B) | Information entropy | Utility values | Weight |
|---|---|---|---|---|
| A1(0.136) | B1 | 0.985 | 0.015 | 0.017 |
| | B2 | 0.944 | 0.056 | 0.063 |
| | B3 | 0.965 | 0.035 | 0.039 |
| | B4 | 0.984 | 0.016 | 0.017 |
| A2(0.243) | B5 | 0.931 | 0.069 | 0.078 |
| | B6 | 0.853 | 0.147 | 0.165 |
| A3(0.102) | B7 | 0.958 | 0.042 | 0.047 |
| | B8 | 0.951 | 0.049 | 0.055 |
| A4(0.184) | B9 | 0.961 | 0.039 | 0.044 |
| | B10 | 0.975 | 0.025 | 0.028 |
| | B11 | 0.900 | 0.100 | 0.112 |
| A5(0.335) | B12 | 0.914 | 0.086 | 0.096 |
| | B13 | 0.786 | 0.214 | 0.239 |

To analyze the coupling and coordination relationship between the information industry technology system and the economic development system, we use the EWM to determine the comprehensive index the information technology level in each province from 2015 to 2020. Then, the coupling degree and the coordination degree of the two systems are measured respectively through the coupling coordination model.

According to the actual research, this paper divides the coupling degree and coordination degree into four levels. Assuming that the coupling degree is C, when $0<C\leq 0.3$, the two systems are in the low-level coupling stage; when $0.3<C\leq 0.5$, they are in the antagonism stage; when $0.5<C\leq 0.8$, they are in the running-in stage; when $0.8<C\leq 1$, they are in the high-level coupling stage. Assuming that the coordination degree is D, when $0<D\leq 0.3$, the two systems are in a low coordination stage; when $0.3<D\leq 0.5$, they are in a moderate

coordination stage; when 0.5<D≤0.8, they are in a high coordination stage; when 0.8<D≤1, they are in the extreme coordination stage. Table 3 shows the coupling degree between the information technology system and the economic development system in each province in China from 2015 to 2020. The average value of the whole period from 2015 to 2020 shows that the coupling degree of 16 provincial-level regions such as Shanghai and Tianjin is greater than 0.8, indicating that the information technology system and the economic development system in these regions are in a high-level coupling stage. 15 provincial-level regions such as Fujian and Sichuan are between 0.5 and 0.8, so the two systems in these regions are in the running-in stage. China's information technology industry and economic development have a high coupling relationship because the rapid development of the information technology industry strongly supports the economy. Therefore, the coupling relationship between the two system in China is deepening at the provincial level.

**Table 3. Coupling degree of 31 provinces in China from 2015 to 2020**

| Regions | Provinces | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Average | Rank |
|---|---|---|---|---|---|---|---|---|---|
| Eastern Region | Beijing | 0.940 | 0.941 | 0.916 | 0.903 | 0.863 | 0.783 | 0.891 | 9 |
| | Fujian | 0.738 | 0.721 | 0.742 | 0.795 | 0.818 | 0.836 | 0.775 | 18 |
| | Guangdong | 0.607 | 0.595 | 0.622 | 0.660 | 0.681 | 0.714 | 0.647 | 29 |
| | Hainan | 0.820 | 0.837 | 0.921 | 0.998 | 0.993 | 0.977 | 0.924 | 5 |
| | Hebei | 0.606 | 0.624 | 0.712 | 0.780 | 0.862 | 0.881 | 0.744 | 20 |
| | Jiangsu | 0.597 | 0.601 | 0.609 | 0.677 | 0.716 | 0.743 | 0.657 | 28 |
| | Liaoning | 0.928 | 0.903 | 0.928 | 0.934 | 0.974 | 0.988 | 0.943 | 3 |
| | Shandong | 0.497 | 0.531 | 0.565 | 0.586 | 0.599 | 0.639 | 0.570 | 30 |
| | Shanghai | 0.987 | 0.982 | 0.992 | 0.999 | 0.999 | 0.987 | 0.991 | 1 |
| | Tianjin | 0.998 | 0.997 | 0.996 | 0.961 | 0.945 | 0.867 | 0.961 | 2 |
| | Zhejiang | 0.795 | 0.779 | 0.826 | 0.861 | 0.888 | 0.921 | 0.845 | 12 |
| Central Region | Anhui | 0.606 | 0.637 | 0.665 | 0.720 | 0.780 | 0.847 | 0.709 | 23 |
| | Henan | 0.454 | 0.495 | 0.520 | 0.572 | 0.617 | 0.697 | 0.559 | 31 |
| | Heilongjiang | 0.814 | 0.829 | 0.915 | 0.947 | 0.977 | 0.999 | 0.914 | 6 |
| | Hubei | 0.579 | 0.583 | 0.602 | 0.671 | 0.737 | 0.801 | 0.662 | 27 |
| | Hunan | 0.527 | 0.545 | 0.639 | 0.705 | 0.772 | 0.817 | 0.667 | 26 |
| | Jilin | 0.870 | 0.897 | 0.920 | 0.973 | 0.995 | 0.999 | 0.942 | 4 |
| | Jiangxi | 0.546 | 0.542 | 0.700 | 0.776 | 0.873 | 0.923 | 0.727 | 22 |
| | Shanxi | 0.766 | 0.794 | 0.856 | 0.887 | 0.952 | 0.982 | 0.873 | 11 |
| Western Region | Gansu | 0.619 | 0.651 | 0.792 | 0.921 | 0.974 | 0.997 | 0.826 | 16 |
| | Guangxi | 0.554 | 0.601 | 0.746 | 0.861 | 0.931 | 0.977 | 0.779 | 17 |
| | Guizhou | 0.509 | 0.547 | 0.655 | 0.841 | 0.926 | 0.969 | 0.741 | 21 |
| | Inner Mongolia | 0.707 | 0.720 | 0.791 | 0.871 | 0.942 | 0.975 | 0.834 | 14 |
| | Ningxia | 0.735 | 0.815 | 0.926 | 0.996 | 0.991 | 0.969 | 0.905 | 7 |
| | Qinghai | 0.577 | 0.620 | 0.816 | 0.987 | 0.998 | 0.977 | 0.829 | 15 |
| | Shaanxi | 0.814 | 0.826 | 0.849 | 0.921 | 0.960 | 0.988 | 0.893 | 8 |
| | Sichuan | 0.690 | 0.702 | 0.736 | 0.776 | 0.819 | 0.858 | 0.763 | 19 |
| | Tibet | 0.340 | 0.432 | 0.538 | 0.744 | 0.989 | 0.970 | 0.669 | 25 |
| | Xinjiang | 0.703 | 0.736 | 0.757 | 0.874 | 0.950 | 0.993 | 0.836 | 13 |
| | Yunnan | 0.498 | 0.514 | 0.602 | 0.752 | 0.865 | 0.919 | 0.691 | 24 |
| | Chongqing | 0.761 | 0.791 | 0.859 | 0.905 | 0.969 | 0.982 | 0.878 | 10 |

Figure 1 shows the change trend of the coupling degree in the eastern, central, and western regions in China from 2015 to 2020. The eastern region has the highest coupling level, with a “stable-slowly-stable” trend. During the period of 2015-2016, the coupling degree of the two systems did not change significantly, which increased slowly from 2016 to 2019 and remain relatively stable from 2019 to 2020. The coupling level in the central region is on the rise, rising slowly from 2015 to 2016 and rapidly from 2016 to 2020, with a high coupling level after 2019. The western region shows the most significantly changing characteristics with an overall trend of “stable rise-rapid rise-stable rise”. By and large, coupling degree in the central and western regions increase higher than the eastern region, and there may be three main reasons. First, the rising strategy of central China and the western development strategy have played an important role in the local information technology industry and economy. Second, information technology industry in the eastern coastal areas has produced certain "spillover effects" and "diffusion effects" on the inland one. Third, the trade friction between China and the United States has led to the relocation of the information technology industry in China's eastern coastal areas to the interior.

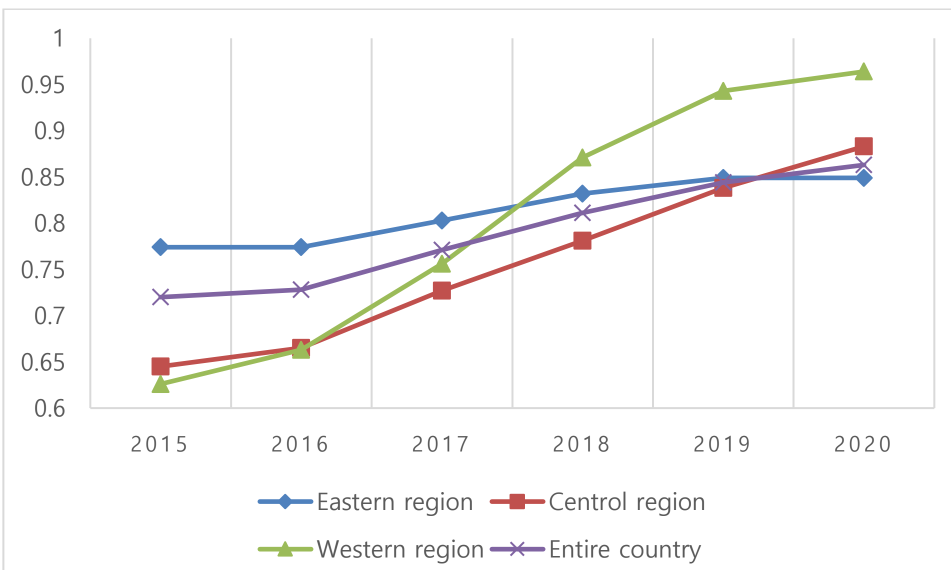


**Figure 1. Coupling degree of various regions in China from 2015 to 2020**

Table 4 shows the results of coordination between the two systems in each provincial-level region from 2015 to 2020. It is shown that the top 5 regions are Beijing, Guangdong, Jiangsu, Zhejiang and Shanghai, with values between 0.5 and 0.8, which are in a high coordination stage. 24 regions such as Shandong and Sichuan are between 0.3 and 0.5, which are in the moderate coordination stage. Qinghai and Tibet are 0.285 and 0.232 respectively, which are in a low coordination stage. Overall, the coordination degree between the information technology system and the economic development system in China's provincial regions is relatively low, and 83.9% of the regions are in the medium-low coordination stage. Combining the above, the information technology industry has made a certain contribution to China's economic development. However, the economic development of the region has not effectively fed back its information technology industry. The degree of coordination between the information technology system and the economic development system needs to be further improved.

**Table 4. Coupling coordination degree of 31 provinces in China from 2015 to 2020**

| Regions | Provinces | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Average | Rank |
|---|---|---|---|---|---|---|---|---|---|
| Eastern Region | Beijing | 0.579 | 0.597 | 0.624 | 0.649 | 0.671 | 0.678 | 0.633 | 1 |
| | Fujian | 0.409 | 0.417 | 0.447 | 0.495 | 0.523 | 0.540 | 0.472 | 9 |
| | Guangdong | 0.539 | 0.555 | 0.600 | 0.648 | 0.685 | 0.716 | 0.624 | 2 |
| | Hainan | 0.277 | 0.285 | 0.314 | 0.357 | 0.377 | 0.387 | 0.333 | 27 |
| | Hebei | 0.356 | 0.373 | 0.418 | 0.456 | 0.507 | 0.524 | 0.439 | 12 |
| | Jiangsu | 0.523 | 0.544 | 0.574 | 0.638 | 0.680 | 0.712 | 0.612 | 3 |
| | Liaoning | 0.448 | 0.437 | 0.458 | 0.474 | 0.508 | 0.522 | 0.475 | 8 |
| | Shandong | 0.419 | 0.448 | 0.479 | 0.502 | 0.522 | 0.553 | 0.487 | 6 |
| | Shanghai | 0.534 | 0.550 | 0.581 | 0.615 | 0.640 | 0.663 | 0.597 | 5 |
| | Tianjin | 0.432 | 0.439 | 0.449 | 0.474 | 0.484 | 0.493 | 0.462 | 10 |
| | Zhejiang | 0.518 | 0.527 | 0.575 | 0.620 | 0.657 | 0.691 | 0.598 | 4 |
| Central Region | Anhui | 0.344 | 0.367 | 0.395 | 0.438 | 0.478 | 0.520 | 0.424 | 16 |
| | Henan | 0.338 | 0.368 | 0.395 | 0.438 | 0.474 | 0.519 | 0.422 | 17 |
| | Heilongjiang | 0.341 | 0.347 | 0.382 | 0.400 | 0.423 | 0.447 | 0.390 | 19 |
| | Hubei | 0.364 | 0.378 | 0.403 | 0.453 | 0.498 | 0.521 | 0.436 | 13 |
| | Hunan | 0.335 | 0.353 | 0.403 | 0.443 | 0.489 | 0.520 | 0.424 | 15 |
| | Jilin | 0.346 | 0.359 | 0.372 | 0.400 | 0.422 | 0.444 | 0.391 | 18 |
| | Jiangxi | 0.288 | 0.295 | 0.358 | 0.400 | 0.452 | 0.482 | 0.379 | 23 |
| | Shanxi | 0.327 | 0.336 | 0.376 | 0.399 | 0.436 | 0.460 | 0.389 | 20 |
| Western Region | Gansu | 0.248 | 0.259 | 0.300 | 0.348 | 0.378 | 0.398 | 0.322 | 28 |
| | Guangxi | 0.280 | 0.302 | 0.360 | 0.414 | 0.456 | 0.491 | 0.384 | 21 |
| | Guizhou | 0.243 | 0.261 | 0.304 | 0.377 | 0.421 | 0.453 | 0.343 | 26 |
| | Inner Mongolia | 0.316 | 0.326 | 0.356 | 0.394 | 0.433 | 0.453 | 0.379 | 22 |
| | Ningxia | 0.245 | 0.266 | 0.302 | 0.339 | 0.360 | 0.370 | 0.314 | 29 |
| | Qinghai | 0.204 | 0.216 | 0.264 | 0.322 | 0.345 | 0.356 | 0.285 | 30 |
| | Shaanxi | 0.384 | 0.396 | 0.421 | 0.470 | 0.505 | 0.530 | 0.451 | 11 |
| | Sichuan | 0.408 | 0.426 | 0.464 | 0.506 | 0.543 | 0.575 | 0.487 | 7 |
| | Tibet | 0.144 | 0.166 | 0.191 | 0.238 | 0.311 | 0.344 | 0.232 | 31 |
| | Xinjiang | 0.290 | 0.302 | 0.319 | 0.370 | 0.408 | 0.438 | 0.354 | 25 |
| | Yunnan | 0.263 | 0.275 | 0.315 | 0.380 | 0.439 | 0.473 | 0.358 | 24 |
| | Chongqing | 0.354 | 0.377 | 0.416 | 0.446 | 0.496 | 0.516 | 0.434 | 14 |

The results show that: among the three major regions, the eastern region is with the highest coordination degree, followed by the central region, and the western region is the lowest; the overall coordination degree of the two systems is in the medium-low coordination stage, showing a slow upward trend from 2015 to 2020 (Shown in figure 2). Combined with the analysis of the change trend of the coupling degree above, it can be found that during the period of 2015-2020, the information technology industry has obviously promoted economic development, but in the process of rapid economic development, the two systems have not been effectively coordinated. Under the premise of rapid economic development, relevant resources should be further divided to effectively guide the development of the information technology industry. It is necessary to further optimize relevant policies, reform relevant systems, and improve the coordination degree between the information technology system and the economic development system, so that the two system can develop in harmony.

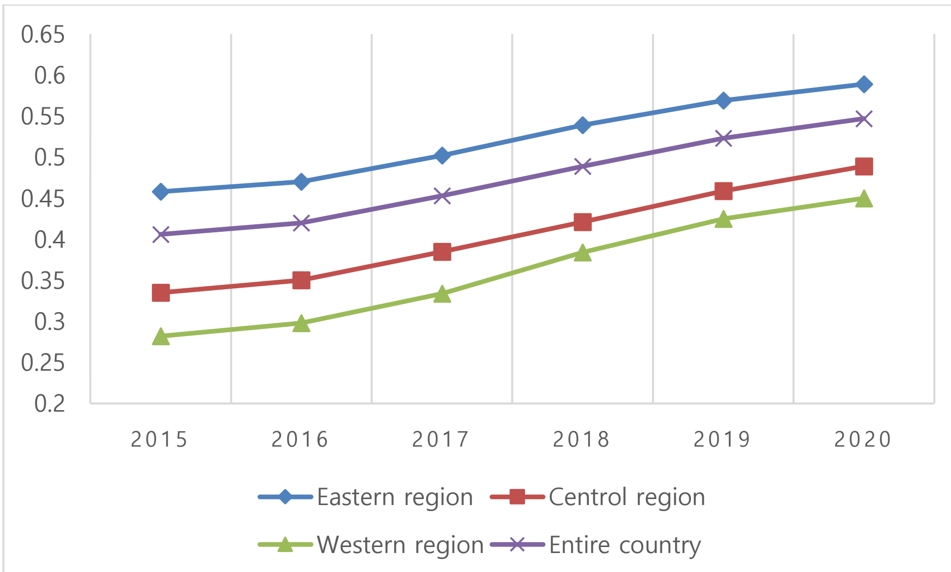


**Figure 2. Coupling coordination degree of various regions in China from 2015 to 2020**

## 5. Conclusions

Today, with the rapid development of science and technology, new technologies such as the Internet, Internet of Things, big data, cloud computing and artificial intelligence have emerged in the information technology industry, which have greatly promoted economic development. It is of great practical significance to study the coupling and coordination relationship between the information technology system and the economic development system. In this paper we take China's provincial-level regions as a research sample, conducts a comprehensive evaluation of the information technology system through the EWM, and uses the CCD model to analyze the influence mechanism between the two systems. As a result, we found that the income of the information technology industry, the investment of talents and the investment of scientific research funds have an important influence on the level of the information technology system. China's information technology industry and economic development are highly coupled, and the rapid development of the information technology industry has supported its rapid economic development. At the provincial level, the degree of coupling between China's information technology industry and its economic development has been deepening year by year. The coordination degree of the two systems is relatively low, and 83.9% of the regions are in the medium-low coordination stage, showing a slow upward trend as a whole from 2015 to 2020.

The research sample of this study is not sufficient, and it should be extended to the comparison of South Korea, Japan and other East Asian countries, the comparison of developed countries, the comparison of emerging economies and so on. The future research direction is to analyze the coupling and coordination relationship between the information technology industry and economic development in different economies.

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