Education Dividends' Strategies Based on Urban Competitiveness Demand

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Abstract: In response to the increasingly disappearing issue of population dividend, this paper proposes the concept of education dividend, which means improving the quality of the population through educational mode, thereby promoting urban competition. This article quantitatively analyzes the education data from seven sample cities in 2020 based on the Grey Relation Analysis (GRA). The research has found that: (1) There is a correlation between educational indicators and urban competitiveness. Among many educational indicators, an indicator of educational years has the strongest correlation with urban competitiveness. (2) In the seven sample cities, the correlation between various educational indicators and urban competitiveness doesn't change with the degree of urban development. (3) For more developed cities, the impact of higher education indicators on urban competitiveness is generally larger than the impact of basic education on urban competitiveness or secondary education on urban competitiveness. The paper demonstrates that urban competitiveness can be enhanced through educational dividends, and it provides a reference paradigm for other cities.

Keywords: Educational Dividend; Urban Competitiveness; Sample Cities; GRA; Correlation

1. Introduction

With the deepening of reform and opening up, China's economy has developed rapidly, which is currently the second largest economy in the world. The demographic dividend provides momentum for economic growth, and sufficient labor plays a crucial role on China's economic development. However, with the development, the current population age structure has undergone significant changes. The population reproduction in China has completely shifted to a modern model of "low birth rate, low mortality rate, and low natural growth rate", following by the issues such as aging population, rising dependency ratio, and fewer working residents. How to deal with labor shortage is an urgent problem. Some scholars believe that education dividends can enhance the overall quality of the population, improve labor efficiency, promote urban economic development and accelerate the speed of urban economic operation. This paper uses a model — GRA — to demonstrate a correlation between education indicators and urban competitiveness, which could prove that improving education indicators can promote urban competition.

2. Evolving from "Population Dividend" to "Talent Dividend"

The so-called population dividend, known as the first demographic dividend, mainly comes from the transformation of the population age structure, which is conducive to economic growth. The demographic dividend also refers to the formation of an age structure in the process of population transformation, which leads to more abundant labor force and lower population burden coefficient that are conducive to economic development [1]. Some scholars believe that the demographic dividend in China began in 1990. As the dependency ratio shifts from decreasing to increasing, the demographic dividend reached a turning point in 2010; Faced with an aging and childless society, China will lose its demographic dividend around 2030 [2].

The talent dividend, also known as the second population dividend, population quality dividend, or labor quality dividend, is different from the economic benefits

obtained by simple labor input. It refers that a talent is fully exploited and utilized, promoting economic growth by improving the quality of labor. The early concept of talent dividends can be traced back to the theory of human capital. Schultz believes that material capital, labor force, and human capital are all beneficial to economic growth (The role of human capital is greater than that of other factors). Subsequently, Marshall once again emphasized the importance of human investment. What's more Romer's knowledge advancement and Lucas' human capital model both had inherited and developed the "human capital theory". In addition to the early theories of human capital abroad, in recent years, many scholars in China have also brought up talent dividends. Ni PengFei proposes the famous model "bow and arrow", which puts talents in the first place of urban hard competitiveness, and he believes that human capital is a direct input factor [3]. Lian Yuming considers that investment in human capital is effective in promoting economic growth rate. In addition, the decrease in population growth rate, the popularization of primary education, and improving the comprehensive effect can increase the growth rate of per capita GDP [4]. Zhang Xuemei proposes that under the background of a reduction in working-age population and deepening aging in China, improving the quality of the labor force through education to form a new "talent dividend" is the main way to cope with the downward pressure of China's economy [5]. Cai Fang, Hu AnGang, and other scholars point out that education can deepen the improvement of labor productivity, expand the accumulation of labor resources and human capital during the aging period, and offset the negative impact of the disappearance of future population dividends [6, 7].

Overall, facing with the worsening aging population and the shortage of labor, China must transform from an investment-led economy to a talent-led economy in the future and shift from a demographic dividend to a talent dividend. At the same time, China should give full play to the quality advantages of talents and promote the development of cities by improving talents' education level, innovation ability and technology.

3. The Concept and Role of Education Dividend

The author in this paper believes that the education dividend is an extension of the talent dividend. Thus, the article explains the meaning of talent dividend above, and then complements the concept of education dividend through demonstrating the correlation between education dividend and talent dividend. Some scholars consider that the concept of talent dividend is similar to that of education dividend, and the concept of educational dividend originates from human capital. Wei Jifei and Zhang Xuemin believe that the education dividend is achieved by increasing human capital. "Through the transformation mechanism of the educational improvement rate, the illiterate population can be transformed into educational human capital. When the educational human capital is participated in work domain and forms a direct force on the economy, the educational human capital will eventually be transformed into the human capital of employees, forming the education dividend in the true sense. [8]" Zhou Zhonggao maintains that the education dividend is to bring favorable human resources to the social economy. And he presumes that during the education dividend period, the proportion of educated workers (especially higher educated workers) in the total population has increased rapidly, thereby creating favorable human resource conditions for social development [9]. Hu Angang doesn't directly discuss the relationship between education dividends and talent dividends, but he believes that the spillover effect of education can bring education dividends and human resource dividends, and human resource dividends include human capital dividends, education dividends, employment structure dividends, and total employment dividends [10]. Other scholars also consider that the education dividend is equivalent to the talent dividend. Yuan Xin and Liu Huiru think that education dividends can be understood as human capital dividends and talent dividends [11]. Guan Peijun mentioned that the education dividend is the talent dividend [12].

Based on the viewpoints of the scholars mentioned above, we can roughly view

education dividends as talent dividends, and in other words the concept of education dividends belongs to the concept of talent dividends. Education dividend is beneficial to urban competitiveness. It refers to, through some educational means — — increasing years of education, improving the quality of labor force, enhancing the level of education for workers and so on, which stimulate the production efficiency of urban, enhance technological innovation ability and expand employment scale of cities.

The academic community deems that the role of education dividends includes several aspects: firstly, education dividends can enhance the education level of the population that can largely determine a country's technological innovation ability [13]. Secondly, education promotes economy through technological progress. Human capital drives economic growth by means of technological imitation and diffusion [14]. Thirdly, the improvement of human capital can alleviate the adverse effects of population decline or even offset the negative impact [15, 16]. Fourthly, the improvement of education level can not only increase employment participation rate, but also improve the overall quality of the labor force. Fifthly, the direct benefit of educational development is the improvement of the national education level.

4. The Connotation of Urban Competitiveness

Urban competitiveness is a concept that has a clear and intuitive meaning, but it is difficult to accurately grasp. Although there have been many beneficial explorations in the academic community at home and abroad, a consistent framework has not yet been formed to define urban competitiveness [17]. Foreign scholars mainly define urban competitiveness from two perspectives: firstly, applying the concept of national competitiveness to urban competitiveness; Secondly, from the perspective of enterprise competitiveness, urban competitiveness is viewed as a micro-economic environment that affects Industrial competition. In general, the cost advantage theory, institutional advantage theory, and innovation advantage theory of enterprises constitute the main concepts of modern urban competitiveness.

The research on urban competitiveness in China began at the end of the 20th century. Xu Kangning believes that urban competitiveness mainly refers to the ability of gathering production factors, creating wealth, and developing shelves. His definition emphasizes the connection between cities and regions [18]. Professor Hao holds that urban competitiveness refers to compared to other cities, the target city has an ability that creates regional or social wealth. What's more, urban competitiveness reflects the city of production capacity, residential level, comprehensive social progress, etc [19]. The Shanghai Academy of Social Sciences thinks that urban competitiveness refers to the ability of gathering resources, providing products and offering services within a certain area, and it also refers to a concentrated reflection of urban economy, society, technology, and environment. Professor Ning Yuemin considers that urban competitiveness is the ability of optimizing resources in its large region, with creating and maintaining demands under the comprehensive influence of multiple factors such as society, economic structure, values, culture, and institutional policies [20]. Professor Ni PengFei pointed out that urban competitiveness refers to the ability of attracting, competing, owning, controlling, and transforming resources; the capacities of competing, occupying, and controlling social market; the power of creating value and providing welfare for its residents, compared to other cities.

Based on research, the definition of urban competitiveness is summarized as follows: The main definition of urban competitiveness is the ability of attracting, fighting for, owning, controlling, and transforming resources within a certain development and competitive environment. What's more, a city use these resources to produce products, gather production factors, provide services, create wealth, and provide welfare, which will promote the sustainable development of the city.

5. Empirical Analysis of Education Dividend and Urban Competitiveness

Many scholars have demonstrated the correlation between education indicators and economic development through empirical analysis, but they have rarely studied the correlation between education indicators and

urban competitiveness. Whether there is a clear correlation between education indicators and urban competitiveness, and whether the differences in education conditions and resources will affect the correlation degree between education indicators and urban competitiveness. All of these require us to explore results through empirical analysis. The paper adopts the mode of GRA to study the correlation between education indicators and urban competitiveness, and analyze the strong and the weak of the relations between factors based on the ranking of correlation degree. Secondly, by comparing the correlation between first tier cities and new first tier cities, we will observe whether there are differences in the correlation between various education indicators and urban competitiveness under the different levels of urban development.

5.1 Research Design

5.1.1 Selection of sample cities

In order to make the research questions more typical and the research content clearer, we select representative cities from the eastern, central and western regions of China respectively, and analyzes the data of these cities. What's more, in order to prevent the impact of educational unfairness (some poverty-stricken areas have insufficient educational resources and products), the author have selected the top ten cities in terms of comprehensive competitiveness, and doesn't select cities with relatively backward educational resources. Neoclassical economist deems that the fundamental reason for labor mobility is the difference in economic gains [21]. Therefore, the ranking of cities with net talent inflows can also provide some consideration for the selection of urban samples. According to Ni Pengfei's "China Urban Competitiveness Report No.16", the top five cities in terms of net talent inflow rate from the fourth quarter of 2016 to the first quarter of 2018 were Hangzhou, Changsha, Chengdu, Wuhan, and Shenzhen. As of the end of 2021, the net talent inflow rate of these five cities is still among the top ten in our country. Thus, this study selected these five cities as sample cities.

In addition, the study also included Beijing and Shanghai as sample cities. Firstly, as two international metropolis, Beijing and Shanghai have always been at the forefront of modern cities in China, and they are also the main cities for talent influx in China. Secondly, as first tier developed cities, data from Beijing, Shanghai, and Shenzhen can be compared with data from new first tier cities such as Hangzhou, Chengdu, Changsha, and Wuhan. By comparison, we will observe whether the correlation between education indicators and urban competition varies depending on the level of urban development.

5.1.2 Research assumptions

The development of cities is carried by humans, and urban labor is the key to urban development and innovation. The quality and level of labor directly affect the production efficiency, economic efficiency, and sustainable development momentum, which will strengthen urban competitiveness. Therefore, the study assumes that there is a correlation between education related indicators and urban competitiveness. We can enhance the quality and level of urban labor by releasing education dividend, which will boost urban competitiveness.

5.2 Research Process

5.2.1 Indicator establishment and data processing

(1) Model Selection

Grey Relational Analysis (GRA) is a method of describing the strength, size, and order of relationships between factors using the Grey Relational Order (GRO). Its basic idea is to use mathematical methods to study the geometric correspondence between factors based on their data columns [22]. Generally, conducting GRA will determine a comparison term X0 and numerous reference terms X_1, X_2, X_3, etc. According to SPSS software, the correlation degree (r_1, r_2, r_3, ...) ranging from 0 to 1 will be obtained by studying the correlation between comparative terms and numerous reference terms. The closer a value is to 1, the stronger the correlation.

(2)Selection of educational indicators

Based on some researches and education data published by various cities, the author has determined the following Table 1 (reference items of urban competitiveness).

(3)Sources of Education Indicator Data

According to the 2021 Statistical Yearbook of each city, the 2020 National Economic and Social Development Statistical Bulletin, the 2021 China Urban Statistical Yearbook, the

7th Population Census Bulletin of each province and city, the education yearbooks publicly available in some cities, and the public data from various education bureaus, the education indicator data of each city in 2020 are now collected as follows (Table 2):

(4)Sources of Urban Competitiveness Data

According to the 2020 China Urban Competitiveness Report Blue Book, the comprehensive economic competitiveness and sustainable competitiveness of a city are reference indicators for measuring whether a city has a strong competitiveness. Therefore, the study considers comprehensive economic competitiveness and sustainable competitiveness as urban competitiveness. When calculating, comprehensive economic competitiveness and sustainable competitiveness are respectively brought into GRA model twice. The correlation degrees between comprehensive economic competitiveness and educational indicators (r_1, r_2, r_3...) are obtained; The correlation degrees($r_{1'}$, $r_{2'}$, $r_{3'}$)between urban sustainable competitiveness and educational indicators are also obtained. Based on the comprehensive analysis and evaluation of the two results, we can analyze some correlations between urban competitiveness and education indicators.

According to Ni Pengfei's 2020 "China Urban Competitiveness Report NO.18", which shows comprehensive economic competitiveness index and ranking table of 291 cities in 2020, and the sustainable competitiveness index and ranking table of 291 cities in China in 2020. Finally, the comparison items for the comprehensive economic competitiveness (X_0) and sustainable competitiveness ($X_{0'}$) of each city in 2020 are determined as follows (Table 3).

Table 1. Education Indicators

Educational resources	X_1 is the number of higher education institutions X_2 is the number of ordinary junior high schools X_3 is the number of regular high school schools X_4 is the number of secondary vocational schools X_{14} is the number of full-time teachers in higher education institutions X_{15} is the number of full-time teachers in ordinary junior high schools X_{16} is the number of full-time teachers in ordinary high schools X_{17} is the number of full-time teachers in secondary vocational schools
Educational investment	X_{18} is the percentage of education expenditure in general public budget expenditure
Educational scale	X_5 is the number of students in higher education institutions X_6 is the number of regular junior high school students on campus X_7 is the number of students enrolled in regular high schools X_8 is the number of graduate students enrolled X_9 is the number of students enrolled in secondary vocational colleges
Educational efficiency	X_{10} is the number of graduates from higher education institutions X_{11} is the number of ordinary junior high school graduates X_{12} is the number of ordinary high school graduates X_{13} represents the number of graduate students graduating X_{23} is the illiteracy rate X_{24} is the number of students taught by per teacher in higher education institutions X_{25} is the number of students taught by each teacher in ordinary junior high schools X_{26} is the number of students taught by each teacher in ordinary high schools X_{27} is the number of students taught by per teacher in secondary vocational schools
Quality of education	X_{19} is the degree of university education (college or above) X_{20} is the level of high school education (including technical secondary school) X_{21} is the level of junior high school education X_{22} is the average number of education years for the population aged 15 and above
Educational output	X_{28} is gross enrolment ratio in higher education

Note: indicators from scholars' papers

Table 2. The Education Data of Each City

Cities	Chengdu	Wuhan	Hangzhou	Shenzhen	Changsha	Beijing	Shanghai
X_1	57	83	40	14	52	92	63
X_2	473	290	280	347	296	335	588
X_3	162	94	91	88	98	321	262

X_4	87	99	42	15	84	84	89
X_5	927111	1067206	550608	169334	697407	590335	540693
X_6	450374	243818	249434	367341	281679	330478	468100
X_7	663943	119598	124563	150289	159841	160152	166400
X_8	112513	164811	110093	26198	17099	278117	215900
X_9	179032	80438	81592	39134	141840	46376	104770
X_{10}	230490	269088	134221	39358	177151	147556	135600
X_{11}	129667	72247	80451	99669	84384	88151	96016
X_{12}	65168	35898	37697	42286	45856	52094	52293
X_{13}	28334	41969	23743	5694	17099	83361	52202
X_{14}	52348	61599	32801	8248	53524	70645	47700
X_{15}	36527	21314	22525	28763	21646	24273	44700
X_{16}	19491	11976	11684	12791	12730	49442	19000
X_{17}	8897	4450	5197	2888	6491	5765	7991
X_{18}	0.1518	0.1217	0.1953	0.2036	0.1539	0.16	0.123
X_{19}	5356300	4174602	10970312	5065927	8132245	9190783	8424214
X_{20}	3389000	2427046	9397637	3634058	11810958	3851750	4730359
X_{21}	5930400	3123761	21117295	5482194	23678162	5098789	7196422
X_{22}	10.85	11.96	10.41	11.86	11.52	12.6	11.8
X_{23}	0.0196	0.021	0.0272		0.0171	0.008	0.0161
X_{24}	17.7	17.33	17.87	20.53	13.03	16.47	16.25
X_{25}	12.33	11.44	11.07	7.83	13.01	8.68	10.47
X_{26}	11.9	9.99	10.66	8.51	12.56	7.62	8.74
X_{27}	20.1	18.08	15.67	13.55	21.85	8.04	13.11
X_{28}	0.5418	0.719	0.7004	0.578	0.7502	0.59	0.6034

Note: The illiteracy rate in Shenzhen was not publicly disclosed in 2020. When using GRA to calculate, 0 is used as a substitute. Moreover, data are sourced from the education yearbooks and various education bureaus.

Table 3. Urban Competitiveness

Reference items	X_0(Urban Comprehensive Economic Competitiveness Index)	$X_{0'}$(Urban Sustainable Competitiveness Index)
Chengdu	0.67	0.54
Wuhan	0.704	0.601
Hangzhou	0.685	0.568
Shenzhen	1	0.901
Changsha	0.639	0.513
Beijing	0.894	0.727
Shanghai	0.975	0.765

Note: Data from Ni Pengfei's 2020 "China Urban Competitiveness Report NO.18"

(5)Data processing

A. Determining reference sequence and comparison sequence

Reference sequence X_0 and comparison sequence X_i (or reference sequence $X_{0'}$ and comparative sequence $X_{i'}$)

B. Dimensionless processing of raw data

Due to the inconsistency in the dimensions (units, properties) of the raw data for each sequence, the conclusions drawn during analysis are inaccurate. Therefore, the article adopts the mean method to perform dimensionless processing on the raw data, and the mean formula is as follows:

$$Xi = \sum_{i=0}^{n} Xi / n \left(i = 1, 2, ...m\right) \quad (1)$$

C. Calculating absolute D-value

D. Calculating the absolute D-value between the reference sequence and the comparison sequence during the same period

$$/X0\left(K\right) - Xi\left(K\right)/ \quad (2)$$

E. Finding the maximum and minimum values

The minimum value:

$$\min_{i=1}^{n} \min_{k=1}^{m} / X0(K) - Xi(K) / \quad (3)$$

The maximum value:

$$\max_{i=1}^{n} \max_{k=1}^{m} / X0(K) - Xi(K) / \quad (4)$$

F. Calculating the grey relational coefficient between the reference sequence and the comparison sequence

$$\xi Oi = \frac{\min_i \min_k / X0(K) - Xi(K) / + \rho * \max_i \max_k / X0(K) - Xi(K) /}{/X0(K) - Xi(K) / + \rho * \max_i \max_k / X0(K) - Xi(K) /} (K = 1, 2, ...m) \quad (5)$$

ρ is a resolution coefficient, ranging from 0 to 1. But it is 0.5 based on the research results of some scholars.

G. Calculating Grey Correlation Degree

The final grey relational degree is denoted as:

$$ri = \frac{1}{m} \sum_{k=1}^{m} \xi Oi \quad (6)$$

5.2.2 Result analysis

(1) The correlation degrees between various education indicators and economic competitiveness of cities are as follows (Table 4):

According to Table 4, the ranking of relationship degrees can be obtained as follows: $r_7<r_{21}<r_9<r_{20}<r_8<r_{13}<r_{16}<r_{17}<r_{11}<r_{10}<r_5<r_{12}<r_6<r_3<r_{23}<r_{15}<r_{27}<r_2<r_{19}<r_{26}<r_4<r_1<r_{25}<r_{14}<r_{28}<r_{18}<r_{24}<r_{22}$

(2) The correlation degrees between educational factors and urban sustainable competitiveness

We will bring $X_{1'}$-$X_{28'}$ into the software, and calculate the correlation degrees between education indicators and comparison item $X_{0'}$(urban sustainable competitiveness). Then we will obtain table 5:

The ranking of various correlation degrees is as follows:

$r_{7'}<r_{21'}<r_{9'}<r_{20'}<r_{8'}<r_{13'}<r_{16'}<r_{17'}<r_{11'}<r_{12'}<r_{10'}<r_{6'}<r_{5'}<r_{3'}<r_{27'}<r_{15'}<r_{19'}<r_{23'}<r_{2'}<r_{26'}<r_{25'}<r_{4'}<r_{1'}<r_{28'}<r_{14'}<r_{18'}<r_{24'}<r_{22'}$

Table 4. The Correlation Degrees between Education Indicators and Economic Competitiveness

r_1	0.82788341	0.82788341	0.82788341	0.82788341	0.82788341	0.82788341	0.82788341
r_2	0.80439207	0.80439207	0.80439207	0.80439207	0.80439207	0.80439207	0.80439207
r_3	0.79494744	0.79494744	0.79494744	0.79494744	0.79494744	0.79494744	0.79494744
r_4	0.82775554	0.82775554	0.82775554	0.82775554	0.82775554	0.82775554	0.82775554
r_5	0.77982124	0.77982124	0.77982124	0.77982124	0.77982124	0.77982124	0.77982124
r_6	0.78988995	0.78988995	0.78988995	0.78988995	0.78988995	0.78988995	0.78988995
r_7	0.66380554	0.66380554	0.66380554	0.66380554	0.66380554	0.66380554	0.66380554
r_8	0.75673915	0.75673915	0.75673915	0.75673915	0.75673915	0.75673915	0.75673915
r_9	0.73059538	0.73059538	0.73059538	0.73059538	0.73059538	0.73059538	0.73059538
r_{10}	0.77905919	0.77905919	0.77905919	0.77905919	0.77905919	0.77905919	0.77905919
r_{11}	0.77653338	0.77653338	0.77653338	0.77653338	0.77653338	0.77653338	0.77653338
r_{12}	0.7810168	0.7810168	0.7810168	0.7810168	0.7810168	0.7810168	0.7810168
r_{13}	0.75814806	0.75814806	0.75814806	0.75814806	0.75814806	0.75814806	0.75814806
r_{14}	0.84746953	0.84746953	0.84746953	0.84746953	0.84746953	0.84746953	0.84746953
r_{15}	0.80099211	0.80099211	0.80099211	0.80099211	0.80099211	0.80099211	0.80099211
r_{16}	0.76529377	0.76529377	0.76529377	0.76529377	0.76529377	0.76529377	0.76529377
r_{17}	0.76679898	0.76679898	0.76679898	0.76679898	0.76679898	0.76679898	0.76679898
r_{18}	0.87553511	0.87553511	0.87553511	0.87553511	0.87553511	0.87553511	0.87553511
r_{19}	0.80535053	0.80535053	0.80535053	0.80535053	0.80535053	0.80535053	0.80535053
r_{20}	0.75569154	0.75569154	0.75569154	0.75569154	0.75569154	0.75569154	0.75569154
r_{21}	0.68627997	0.68627997	0.68627997	0.68627997	0.68627997	0.68627997	0.68627997
r_{22}	0.90797232	0.90797232	0.90797232	0.90797232	0.90797232	0.90797232	0.90797232
r_{23}	0.7961968	0.7961968	0.7961968	0.7961968	0.7961968	0.7961968	0.7961968
r_{24}	0.88151777	0.88151777	0.88151777	0.88151777	0.88151777	0.88151777	0.88151777
r_{25}	0.83538646	0.83538646	0.83538646	0.83538646	0.83538646	0.83538646	0.83538646
r_{26}	0.82350753	0.82350753	0.82350753	0.82350753	0.82350753	0.82350753	0.82350753
r_{27}	0.80206468	0.80206468	0.80206468	0.80206468	0.80206468	0.80206468	0.80206468
r_{28}	0.84753491	0.84753491	0.84753491	0.84753491	0.84753491	0.84753491	0.84753491

Note: The correlation degrees (r_1-r_{28}) are obtained after being brought into GRA.

Table 5. The Correlation Degrees between Education Indicators and Sustainable Competitiveness

$r_{1'}$	0.82883254	0.82883254	0.82883254	0.82883254	0.82883254	0.82883254	0.82883254
$r_{2'}$	0.79520141	0.79520141	0.79520141	0.79520141	0.79520141	0.79520141	0.79520141
$r_{3'}$	0.78226789	0.78226789	0.78226789	0.78226789	0.78226789	0.78226789	0.78226789
$r_{4'}$	0.82856269	0.82856269	0.82856269	0.82856269	0.82856269	0.82856269	0.82856269
$r_{5'}$	0.78043207	0.78043207	0.78043207	0.78043207	0.78043207	0.78043207	0.78043207
$r_{6'}$	0.77992068	0.77992068	0.77992068	0.77992068	0.77992068	0.77992068	0.77992068
$r_{7'}$	0.65690889	0.65690889	0.65690889	0.65690889	0.65690889	0.65690889	0.65690889
$r_{8'}$	0.75187813	0.75187813	0.75187813	0.75187813	0.75187813	0.75187813	0.75187813
$r_{9'}$	0.72323129	0.72323129	0.72323129	0.72323129	0.72323129	0.72323129	0.72323129
$r_{10'}$	0.77962818	0.77962818	0.77962818	0.77962818	0.77962818	0.77962818	0.77962818
$r_{11'}$	0.76616403	0.76616403	0.76616403	0.76616403	0.76616403	0.76616403	0.76616403
$r_{12'}$	0.77145551	0.77145551	0.77145551	0.77145551	0.77145551	0.77145551	0.77145551

$r_{13'}$	0.75353476	0.75353476	0.75353476	0.75353476	0.75353476	0.75353476	0.75353476
$r_{14'}$	0.84943619	0.84943619	0.84943619	0.84943619	0.84943619	0.84943619	0.84943619
$r_{15'}$	0.79148997	0.79148997	0.79148997	0.79148997	0.79148997	0.79148997	0.79148997
$r_{16'}$	0.75673156	0.75673156	0.75673156	0.75673156	0.75673156	0.75673156	0.75673156
$r_{17'}$	0.75904633	0.75904633	0.75904633	0.75904633	0.75904633	0.75904633	0.75904633
$r_{18'}$	0.86186267	0.86186267	0.86186267	0.86186267	0.86186267	0.86186267	0.86186267
$r_{19'}$	0.79170347	0.79170347	0.79170347	0.79170347	0.79170347	0.79170347	0.79170347
$r_{20'}$	0.74587267	0.74587267	0.74587267	0.74587267	0.74587267	0.74587267	0.74587267
$r_{21'}$	0.6777233	0.6777233	0.6777233	0.6777233	0.6777233	0.6777233	0.6777233
$r_{22'}$	0.90094838	0.90094838	0.90094838	0.90094838	0.90094838	0.90094838	0.90094838
$r_{23'}$	0.79404654	0.79404654	0.79404654	0.79404654	0.79404654	0.79404654	0.79404654
$r_{24'}$	0.86526108	0.86526108	0.86526108	0.86526108	0.86526108	0.86526108	0.86526108
$r_{25'}$	0.82311897	0.82311897	0.82311897	0.82311897	0.82311897	0.82311897	0.82311897
$r_{26'}$	0.81113803	0.81113803	0.81113803	0.81113803	0.81113803	0.81113803	0.81113803
$r_{27'}$	0.78990462	0.78990462	0.78990462	0.78990462	0.78990462	0.78990462	0.78990462
$r_{28'}$	0.84622325	0.84622325	0.84622325	0.84622325	0.84622325	0.84622325	0.84622325

Note: The correlation degrees ($r_{1'}$-$r_{28'}$) are obtained after being brought into GRA

6. Conclusion and Policy Recommendations

Education is the foundation of a country with several functions such as talent cultivation, technological innovation, and social services. It plays a leading, global, and fundamental role in economic development, and it also plays a very important role in promoting productivity improvement and economic growth. Moreover, it is closely related to politics, economy, culture, and other aspects, which has a critical impact on the survival and development of a country. The education dividend can bring rich educational resources and advanced talents to a city, not only delivering a large number of high-quality labor force, but also providing educational products, elements, welfare for urban residents, and so on.

Through empirical analysis, it can be concluded that education is correlated with urban development. In the future development, the role of education is very significant. What's more, education dividends should be released to promote urban competitiveness through various educational indicators. Based on the analysis of the above model, the policy recommendations compiled by the author are as follows:

6.1 Increasing the Average Years of Education and Improving the Education Level of Urban Population

According to the ranking of the correlation degree, we know that the average education years of the population aged 15 and above have the strongest correlation with the urban competitiveness, with a correlation degree of 0.90797232. This indicates that among the numerous selected education indicators, years of education is the key of educational dividend. In 2020, the average years of education for people aged 15 and above in China was 9.91 years, which is not enough for a city to meet the national average standard. National research indicates that a city's average education years around 11 years will obviously play an advantageous role.

According to the seventh national census bulletin, only Beijing, Shanghai, and Tianjin have reached the standard. This phenomenon not only requires the government to improve education policies and regulations, but also to implement the relevant provisions on 11 years compulsory education as soon as possible. We also need to increase educational publicity efforts, enhance the awareness of various families about education, and ensure that students can smoothly be admitted to high school or secondary vocational education after the end of the compulsory education stage.

6.2 Promoting Higher Education as well as Driving Talent Gathering and Scientific Researches

According to the data, the correlation values of higher education indicators are generally greater than those of basic education indicators. The result indicates that higher education has a more significant impact on urban competitiveness compared to basic education. Perhaps, the result due to the selected sample cities are relatively developed.

In the early stages of urban development, primary or secondary education plays a more significant role. With the improvement of urban industrialization level and the lagging

effect of education, the short-term role of primary or secondary education is difficult to demonstrate. Therefore, higher education has a more significant impact on urban competitiveness.

In relatively developed cities, in order to enhance the competitiveness of the city, it is necessary to develop urban industries and gather urban talents through the teaching team and research environment in the college. Firstly, universities should optimize the resources of higher education faculty, enhance the quality of university teachers and researchers, and utilize the talent aggregation effect of higher education institutions. The gathering of high-level (knowledge structure and intellectual level) talents will stimulate competition and specialization in corresponding scientific research education. Secondly, university science park should be regarded as an important national base for comprehensive scientific research and technological innovation, a base for the incubation and construction of high-tech enterprises, a base for the gathering of innovative and entrepreneurial technical talents and postgraduate training, and a demonstration base for the integration of industry, academia, and research. University science and technology parks and university towns should be used to drive the sustained and healthy development of the regional real economy.

In underdeveloped cities, the improvement of basic education is more important than the development of higher education. The strategy of surpassing in underdeveloped areas must start with basic education, which is achieving educational catching up. The country promotes basic education in impoverished cities by means of resource allocation, educational subsidies, and improvements in educational facilities, which provide qualified workers for modern industry.

6.3 Improving Vocational Education Models and Meeting the Needs of Urban Industries

The correlation between vocational education indicators and urban economic competitiveness ranges from 0.73 to 0.83. Vocational education is considered an important tool for economic transformation and industrial upgrading.

According to Chinese experts and scholars, there are currently problems in China's secondary vocational education, such as excessive reliance on government leadership, low compatibility between vocational education and industrial development, and low social recognition of vocational education. Vocational education is most closely related to market demand, but the government led secondary vocational education cannot meet the requirements of urban industries. The solutions to this phenomenon are as follows:

Firstly, China need to improve the adaptability of vocational education and the industry. Taking the integration of industry and education as a breakthrough point, we could have a connection with an innovation chain, an industry chain, an education chain, a talent chain, and a value chain, which forms a new ecosystem for cultivating applied talents. What's more, we realize precise cooperation between industry and school, and implement comprehensive integration such as "profession + industry", "cultivation + employment", and "scientific research + production".

Secondly, the development of vocational education requires the support and participation of various public resources. The development of vocational education is not only the responsibility of the government, but also the responsibility of other diverse stakeholders. Vocational education can organically combine with various resources, and it build an effective bridge that integrates innovation, cost, market and competitiveness with information technology, information industry, productive and service industries.

Thirdly, we are required to improve the training skills of vocational education. Cities need to focus on modern industries, promote the cultivation of highly skilled talents, and increase their responsiveness to the job market. The strategy can provide first-rate employment opportunities for cities, attract more talents to enter the city, and bring technological and entrepreneurial innovation forces to the economy, thereby enhancing the competitiveness of the city.

6.4 Adjusting Urban Talent Policies and Ensuring a Continuous Inflow of Young Talents

According to the previous text, Shenzhen's higher education resources are not as abundant as those of cities such as Wuhan, Hangzhou, and Chengdu. However, Shenzhen ranks top

among all cities in terms of economic and sustainable competitiveness. This phenomenon is related to the population migration rate and educational externalities in Shenzhen. Although some cities do not have sufficient higher education resources, their external effects and abundant resources such as facilities, welfare and employment platforms will inevitably attract a mass of alien workers. In the light of the 2019 Shenzhen Statistical Bulletin, the permanent population of Shenzhen at the end of the year reached 13.4388 million, an increase of 412200 people compared to the end of the previous year. The permanent registered residence population was 4.9478 million, an increase of 8.8%, accounting for 36.8% of the permanent population; The permanent non-registered residence population was 8.491 million, up 0.1%, accounting for 63.2%, and the net inflow population of 7.9317 million ranked second in China.

On the one hand, enhancing graduates' identity and belonging sense through several forms such as urban cultural attraction, value identification, and atmosphere integration. On the other hand, according to the professional structure of local higher education, we could ensure the supply of employment opportunities and enhance the possibility of employment conversion. Moreover, we should enhance the quality of urban talents, and ensure that talents can be fully utilized. Not only that, local governments should also fully examine the current situation of urban development and implement policies based on the specific situation of the city. In addition, the government should coordinate its relationship with the market, and urban cities are supposed to adopt a pattern of "market as the main body, government as the leading". Under the premise of government regulation, we should respect the development laws of the market and organically combine economic development with talent attraction, with creating a "talent chain" by means of the "industrial chain" and achieving the goal of "attracting talents through the industry and gathering talents for the industry".

In addition, it is necessary to establish a working mechanism for "policy recruitment and intangible certification" of young talents, comprehensively sort out the information on subsidy distribution for young talents, establish a youth talent information database, and send policy information to young talents. These will help young talents understand policies as soon as possible, ensuring timely and comprehensive policy promotion.

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