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HR environment and regional attraction: An empirical study of industrial clusters in China

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Abstract
This study seeks to explain why talent tends to gravitate to industrial clusters (ICs) and how the human resources (HR) environment affects regional attraction and retention of talent. *Regional attraction* is defined as a region's ability to attract and retain workers and immigrants. Data were collected from four ICs in China. A region's HR environment was measured at five levels. A one-way analysis of variance (ANOVA), hierarchical regression, and the structural equation modeling (SEM) were conducted to analyse the data. The results of the one-way ANOVA showed that there were statistically significant differences in the regional attraction of the four ICs in this study. The results of the hierarchical regression and SEM suggest that elements in the macro-HR environment directly affect talent growth and regional attraction, and talent growth partly mediates the relation between three levels of the HR environment (economic environment, HR policy environment, and the enterprise's HR management) and regional attraction. The results infer that the HR environment in an IC is the ultimate cause of talent concentrating to a given IC. This paper helps us understand why talent clusters to ICs and offers theoretical support for how governments can make policies and programs to attract talent. This study illustrates how the HR environment affects talent growth. It also examines the immediate role of talent growth in the relationship between HR environment and regional attraction. These findings enhance the literature on HR environments, regional attraction, and the concentration of talent.

1 Introduction

Since the early 1990s, there has been a widespread revival of both academic and public policy interest in the link between industrial clusters (ICs), trade, and economic growth, particularly

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within the Organization for Economic Cooperation and Development (OECD) countries (McCann and Shefer, 2005). A number of authors (Marshall, 1920; Porter, 1998; Scott, 1988; Williamson, 1975) have discussed the formation of ICs and their advantages for regional growth.

Three factors are said to lead to the concentration of firms within a geographical area: skill acquisition, the cost of labor, and labor quality (Toulemonde, 2006). In this paper, we argue that ICs having an environment that promotes the growth of talent will be able to attract more skilled workers and firms, which in turn strengthens the advantage of establishing an IC in the first place. A case in point is Silicon Valley, which attracts millions of senior engineers and excellent managers. In China, the development of science and high-technology industrial parks, such as the Beijing Zhongguancun Science Park, suggests that the more favorable the environment for talent growth (TG), the more development an IC is likely to experience.

Little research exists on the role of ICs and TG on regional development. Hu and Weng (2007) have shown that people tend to cluster to the countries and regions that have better social and EEs (economic environments). They use the term *HR environment* to capture the factors in a certain region that can satisfy basic human needs, either directly or indirectly. Their work suggests that talent will gravitate to geographical regions where the environment can satisfy their basic needs. Consequently, the HR environment is related to TG, which in turn affects the regional attraction (RA) of talent.

This article has three purposes. Firstly, we empirically test the assumption that talent concentrates in regions that have better HR environments. Secondly, we examine the hypothesis that TG mediates the relationship between the HR environment and RA. Taking Hu and Weng's (2007) perspective that the HR environment must take into account multiple factors that satisfy human needs requires a broad-based definition of what constitutes the HR environment. To accomplish this, we examine the HR environment of ICs as consisting of five aspects: the EE, the HR policy environment (HRPE), the life-style environment (LSE), the cultural environment (CE), and the HR management environment (HRM). Taking this approach allows us to determine whether the nature of the HR environment is related to RA or whether RA is a by-product of the degree to which these environmental aspects create talent. Finally, we discuss the role of enterprise and public policy in the process of attracting and retaining talented staff. We offer some advice on which policies governments and enterprises should enact in order to promote TG and improve RA.

2 Literature review

2.1 Industrial clusters – economic growth poles

Research on the formation and advantages of ICs has focused on externalities, transaction costs, and innovation. In terms of externalities, three of the primary benefits of firms locating in clusters are access to a pool of specialized labor, access to more specialized input providers, and technology spillovers among competitors (Marshall, 1920). Moreover, as a location gains firms, it also gains useful infrastructure, deeper labor markets, lower recruitment costs for qualified employees, and greater availability of part-time managers and employees.

As a new spatial organizational form, clusters offer more flexibility to companies by positioning them between the arm's-length market on one hand and hierarchies, or vertical integration, on the other. The dividing line between markets and hierarchies was successfully set and explained in transaction cost theory (Williamson, 1975), which suggests that agglomeration economies will improve the competitiveness of participating agents by lowering transaction costs (Scott, 1988).

Lastly, industrial clustering fosters technology transfer and innovation. It is generally acknowledged that the benefits of private research and development (R&D) are not limited to originating firms (Arrow, 1962). The benefits of R&D investments for individual firms, research institutes, and universities are bound to spill over into the public domain. Firms positioned within close proximity of other innovating firms benefit from an increased marginal return on their own R&D investment, because of such spillovers. In summary, companies that locate in ICs have higher productivity because of their access to specialized inputs and employees, access to information, complementarities across products in clusters, and access to institutions and public goods (Porter, 1998).

2.2 Talent and industrial cluster development

Recently, researchers have turned their attention away from the role of externalities toward the role of talent and creative class on the development of clusters by arguing that investment in human capital generates spillover effects and increasing returns (Romer, 1986). The connection between human capital and economic growth has been established not only at the regional level (Black and Henderson, 1999; Glaeser, 1998, 1999; Lucas, 1988; Rauch, 1993), but also at the country (Barro, 1991), regional, and city levels (Lucas, 1988; Simon and Nardinelli, 1996).

Some researchers have argued that talent is the factor behind this relationship between human capital and economic entity growth. That is, companies concentrate in cities to draw on the aggregated pool of talented people who generate innovation and economic growth (Florida, 2002a). This talent argument is particularly relevant to high-technology industries (Florida, 2002b), but questions remain as to why talent accumulates in clusters. Florida's (2002b) suggestion that talent is associated with a diversity index has garnered little support (Storper and Scott, 2009). Support for the talent argument comes from those who argue that clustering results in lower labor costs because it raises labor productivity (Bernat, 1999). Clustering raises labor productivity in two different ways, both of which support the role of talent. Firstly, ICs produce a relatively larger pool of specialized labor, making it easier for firms to find workers with the characteristics they need (Combes and Duranton, 2006). Thus, larger pools increase labor productivity by more closely matching worker skills with job requirements. Secondly, clusters enhance worker skills. An individual's skills will improve faster the more often the individual works with other high-skilled workers. In summary, human capital and the rate of increase in human capital are functions of the density of economic activity (Rauch, 1993).

2.3 Environment and talent growth

Rapid growth of talent requires a favorable environment in order to sustain it, but scholars offer varying opinions on the precise nature of this environment. Cheng (1999) suggested that both the macro- and micro-environments need to support TG, with the macro-environment consisting of the academic, idealistic, policy, public opinion, and institutional environments and the micro-environment including one's work, resources, and psychological environments. Gu (2000) took a similar, yet somewhat simpler tact, conceptualizing the two levels of environment needed to foster TG as the societal environment and the human relationship environment. Finally, Deng Xiaoping's ideology of a TG environment suggests that TG is supported by ever broadening communal layers of environments, including the institutional, competitive, life style, policy, and public opinion environments (Zhang, 2003). While these scholars have identified a variety of environmental contexts that

can support TG, it is surprising that little research exists on how these various environmental factors influence the growth of talent.

2.4 Regional attraction for talent

RA is defined as a region's ability to attract and retain workers. The literature suggests that regions attract talent through two interrelated mechanisms. The traditional view, offered by economists, is that places attract people by matching them to jobs and economic opportunity. The decision to migrate to an area is assumed to be a function of regional differences in wages and employment probabilities (Becker, 1975). It essentially involves an economic trade-off between maximization of income and the cost associated with migrating. The alternative view suggests that places attract people by providing a range of life-style amenities (Gottlieb, 1995). Such amenities are seen as the key to modern cities (Lloyd and Clark, 2001) and as necessary ingredients in attracting highly educated, talented individuals who possess scarce resources and are economically mobile. Both views have merit, as talent attraction is likely to be a function of the interplay of both market and non-market forces (Glaeser, 1999).

Taken in total, this research suggests that there are a number of environmental elements that contribute to the RA of talent. Research needs to consider not only the economic factors associated with regions, but also other macro factors, such as culture, life style, and micro factors, such as firm level and personal variables, in attempting to understand the role of talent in ICs. In this paper we draw upon the work of Hu and Weng (2007) and use their term, HR environment, to capture these multiple dimensions of an environment that is supportive of TG.

3 Hypotheses

Hu and Weng (2007) measure a region's HR environment on both the macro and micro levels. The macro-HR environment was measured by the EE, LSE, CE, and the HRPE, while the micro-HR environment was measured by firm HRM practices. As shown in Figure 1, measures of the macro-HR environment (i.e. EE, LSE, CE, and HRPE) and the micro-HR environment (i.e. HRM) are predicted to be related to both RA and TG.

3.1 Economic environment, talent growth, and regional attraction

The job vacancy (Orsagh and Mooney, 1970) and wage differential (Hicks, 1963) theses both explain the EE's basic role as a determinant of TG and RA. In economically developed regions, such as Shanghai, there are larger labor markets, which provide greater opportunities for workers to find jobs suited to their skills (Combes and Duranton, 2006). However, in less-developed villages, there are few job opportunities. Therefore, people tend to immigrate from less-developed villages to the more developed cities. The presence of ICs, where many firms are concentrated, adds to the generation of new job opportunities. Moreover, income levels also play a role. People move to regions where they can earn more for the same work than at their present location. High incomes mean that workers can afford to further their education and training and that of their children, which leads to an improved and expanded talent pool from which employers can draw. Rauch (1993) found that both wages and housing rents were higher in cities with higher average education levels, while Glaeser et al. (1995) found a strong relationship between human capital and city growth. The presence of ICs enhances the effect of education on income levels, both in more rural and urban labor market areas (Gibbs and Bernat, 1997). Because of spillover effects in the
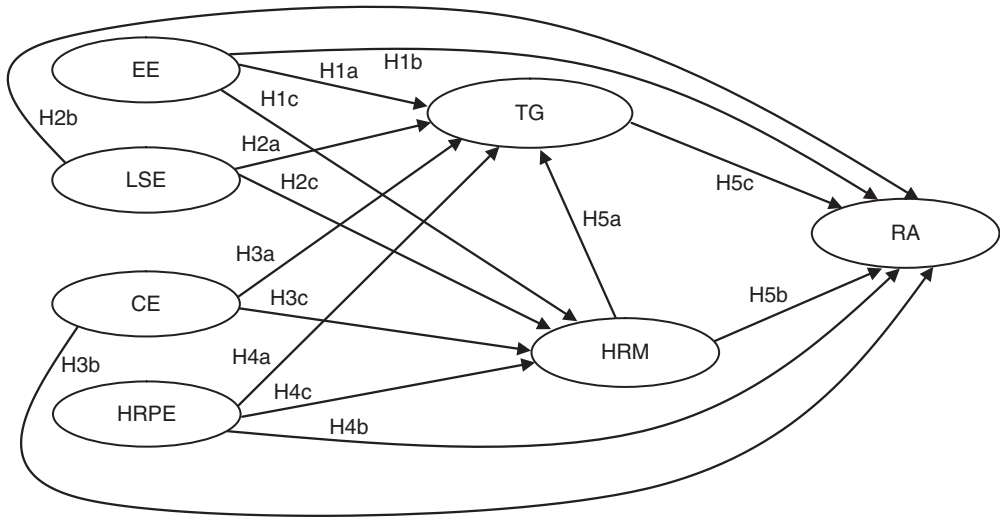
Figure 1. Effects of HR environmental elements on regional attraction. Notes: EE: economic environment, HRPE: HR policy environment, LSE: life-style environment, CE: cultural environment, HRM: HR management, TG: talents growth, RA: regional attraction.

accumulation of human capital, workers are more productive when they locate around others with high levels of human capital (Black and Henderson, 1999). Consequently, the EE is expected to affect both the growth of talent and RA. However, the EE also affects what organizations need to do in order to attract and retain qualified workers. The effect of the EE on TG creates a supply and demand situation for organizations. If the supply of skilled labor exceeds demand, workers are more easily interchangeable, but if the reverse is true, organizations need to implement more sophisticated HR policies in order to retain qualified employees in the face of other job opportunities. Thus, we expect that the EE will also influence the HR management practices. Specifically, we predict the following:

Hypothesis 1a: EE has a positive direct impact on TG.

Hypothesis 1b: EE has a positive direct impact on RA.

Hypothesis 1c: EE has a positive direct impact on the HRM.

3.2 Life-style environment, talent growth, and regional attraction

Households and businesses make decisions on where to locate based on quality-of-life considerations (Wingo, 1973). Quality of life is often used as a promotional tool for city marketing aimed at putting an area 'on the map' (Rogerson, 1999). The LSE is part of the profile of a 'competitive city', one that is successful in attracting capital, and is influential in urban growth and development. High-quality goods and services are important in attracting highly skilled labor in US cities (Florida, 2002b). Moreover, surveys focusing on quality-of-life attributes have found that recreation amenities are important to location decisions, particularly for high technology and information-intensive firms (Monchuk et al., 2006). Quality of life also has

implications for the retention of workers. Retaining talent is not only a function of stimulating their professional interests, but also of providing them facilities that make them feel at home (Hansen et al., 2005). Such amenities can act as side bets that make leaving one's job and moving more costly to the individual (Becker, 1960). This has ramifications for the HR practices of organizations in such regions. High-technology firms, such as the SAS Institute, have achieved a competitive advantage through their HR practices by applying many of the quality-of-life amenities 'in-house'. Workers there work only an average of 35 hours per week and the company provides them with on-site medical, day, and elder care facilities, a fitness center, etc. This company's HR practices are based on the philosophy that the company's employees are their most important assets (O'Reilly and Pfeffer, 2000). Consequently, as with the EE, the LSE has implications for what companies can and must do to be competitive. Specifically, we predicted the following:

Hypothesis 2a: LSE has a positive direct impact on TG.

Hypothesis 2b: LSE has a positive direct impact on RA.

Hypothesis 2c: LSE has a positive direct impact on the HRM.

3.3 Cultural environment, talent growth, and regional attraction

The CE is defined here as the value orientation, ethics of exchange, enterprising spirit, and innovative atmosphere inherent in a region or country. Gross and Schmitt (2003) studied the role of cultural clustering in attracting new immigrants. They found that cultural likeness in the receiving country alleviates costs associated with mobility. Gravity models applied to migration suggest that the cultural distance between the source and destination countries is a proxy for the financial costs, as well as the cultural costs, incurred by migrating (Foot and William, 1984). Moreover, socio-psychological and cultural factors play a major role in making the decision to work abroad, particularly for a longer period. The need to learn another language is typically a great obstacle for many people. A CE that promotes experimentation and innovation, on the other hand, would be attractive to high-talent people, particularly if barriers (e.g. having to learn a new language or skill) to entry were low. Thus, cultural differences are fundamental to an understanding of patterns of uneven regional development (Sadler and Thompson, 2001). This is seen in the contrasting economic performance of Silicon Valley and Route 128 in terms of their differing capacities as milieus for the generation of interfirm trust and collaboration, that is their culturally different contexts (Saxenian, 1994). Because talented individuals exhibit a strong preference for cultural amenities, they are attracted to locations that have a high degree of demographic diversity and relatively low barriers to entry (Florida, 2002b). Highly diverse populations in turn put demands upon organizations to develop HR practices to meet the needs of a diverse workforce. Consequently, we predicted the following:

Hypothesis 3a: CE has a positive direct impact on TG.

Hypothesis 3b: CE has a positive direct impact on RA.

Hypothesis 3c: CE has a positive direct impact on the HRM.

3.4 HR policy environment, talent growth, and regional attraction

The HR policies associated with an IC also affect TG and RA. Favorable HR policies provide channels for talented people to find jobs quickly, and facilitate their ability to start up their own businesses. Loose and favorable HR policies (such as loose household registration policies, the presence of placement agencies, putting a premium on excellent talent, financial and local government support for entrepreneurs, and R&D) will not only attract large numbers of talented people, but also boost the growth of talent within an IC. Canada, for example, attracts higher quality immigrants than does the United States because of its favorable HR policies regarding immigration, which discriminate based on skill (Buckley, 1996). In addition, HR policies can reduce other obstacles to migration, such as the search costs incurred when migrants acquire additional knowledge relevant to specific economic, social, and quality-of-life conditions in the destination region. These costs include monetary outlays required for information acquisition and foregone earnings associated with the acquisition of such information. However, the degree to which an IC establishes a favorable or unfavorable HR environment may affect the specific policies required of individual firms within the IC. Such policies can create a level playing field within the region in which an IC is located or they can necessitate individual firms vigorously competing with one another for scarce talent resources. In either case, the HR policies created within an IC are expected to not only affect TG and RA, but also the HR management practices within firms. Specifically, we predicted the following:

Hypothesis 4a: HRPE has a positive direct impact on TG.

Hypothesis 4b: HRPE has a positive direct impact on RA.

Hypothesis 4c: HRPE has a positive direct impact on the HRM.

3.5 Human resources management environment, talent growth, and regional attraction

HR management within an organization influences TG and RA through a variety of practices, including its compensation system, training and development programs, performance management, promotion system, and team management. The bases for administering compensation (time, behavior, performance outcomes) influence the attraction of the firm to potential employees and the motivation of existing employees. Through training, employees acquire skill and knowledge, which can enhance the talent level of one's workforce. Education and training assistance plans can provide workers with financial support to take credit and degree courses at approved colleges and universities, and pursue other personal and professional development courses. Career counseling services can help employees develop their careers, by building a system for sharing information about career opportunities, career paths, job vacancies, and programs and benefits. Performance management may aid employees in improving weak or even unsatisfactory performance, through feedback and the encouragement of higher performance. Objective, performance-based promotion systems can identify and systematically develop high-potential employees for certain key positions. In addition, effective team management can promote the development of both employees and organizations.

Pfeffer and Veiga (1999) proposed a set of HR practices that they believe lead companies to higher performance. These practices include many of those listed above, including comparatively high compensation based on performance, extensive training, and sharing of information, and also

employment security, selective hiring, self-managed work teams, and the reduction of status differences. While some believe that these practices improve firm performance by affecting employee commitment to the employing organization (McElroy, 2001), the case can also be made that these practices work because they increase the pool from which job candidates are selected. In other words, they attract talent to the organization. Companies that offer employment security, treat employees as equals, recognize and reward performance, provide extensive training, share information, and empower their employees would be expected to attract applicants. Selective hiring practices allow those firms to increase their talent pool, whether that talent is scientific knowledge or a positive attitude. Moreover, the more companies with such practices cluster in a particular region, the more likely people are to want to locate in that area and work for those organizations. Finally, the greater the talent pool within a region, the more attractive that region becomes. Specifically, we predicted the following:

Hypothesis 5a: HRM has a positive direct impact on TG.

Hypothesis 5b: HRM has a positive direct impact on RA.

Hypothesis 5c: TG has a positive direct impact on RA.

4 Methods

4.1 Sample and data collection

Data were collected from four diverse ICs: the Wuhan Optics Valley, the Beijing Zhongguancun Science Park, the Suzhou Industrial Park, and the Dongguan Industrial Park. Figure 2 shows the geographical positioning of the four ICs.

4.1.1 Wuhan Optics Valley. Wuhan Optics Valley is the leader in the information optoelectronics industry in China, specializing in laser technology and laser applications. Located near the Huazhong University of Science and Technology, it is the largest manufacturer of optical fiber and cable in China. It is also produces optoelectronic devices, optical fiber terminals, and optical telecommunication equipment.

4.1.2 Beijing Zhongguancun Science Park. The Zhongguancun Science Park is China's largest science park with a high concentration of scientific and technological institutions and intellectual resources. There are 39 institutions of higher learning (e.g. Beijing University and Tsinghua University), 213 research institutions (e.g. the Chinese Academy of Sciences and the Chinese Academy of Engineering), some 10,000 high-technology enterprises (e.g. Legend, Stone, Founder, Tsinghua Tongfang, Netease), approximately 1500 R&D centers and high-technology companies either established or funded by such renowned transnational companies as IBM, Microsoft, and Mitsubishi, and 40 overseas listed companies located in this area.

4.1.3 Suzhou Industrial Park. The Suzhou Industrial Park is the biggest cooperative project between the governments of China and Singapore. The park is now composed of an information technology (IT) park, an international technology park, a life science park, and a national software park. At present, there are nine universities, 46 schools for adult education, and 63 independent research institutions located there. Its 310,000 professionals are joined every year by around 50,000
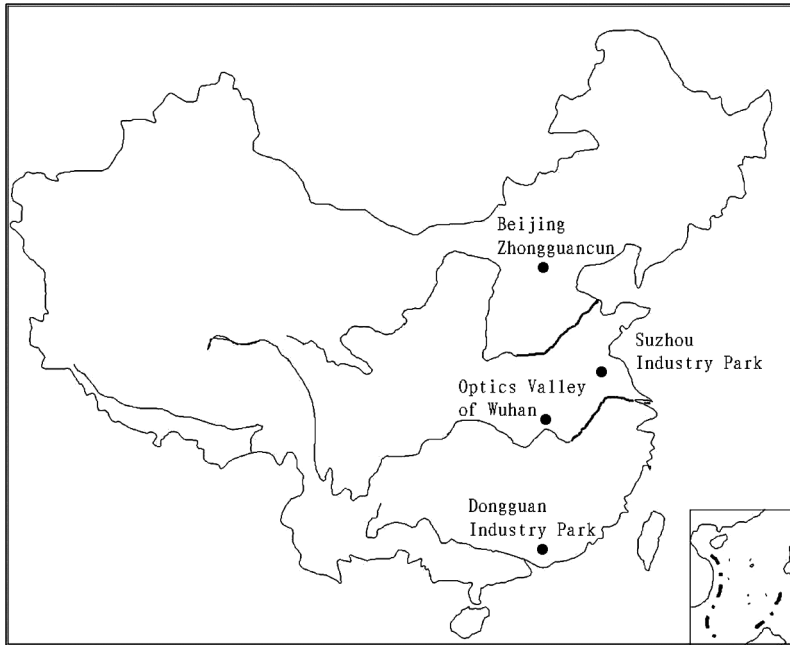
Figure 2. Geographical position of the four industrial clusters.

newcomers with middle and higher education backgrounds and there are now more than 20,000 people working or studying there.

4.1.4 Dongguan Industrial Park. Dongguan is one the fastest-growing cities in China. Since 1979, the average gross domestic product (GDP) growth rate has been over 20%. Dongguan has gone from an agricultural county to an international manufacturing city in just 20 years. The comprehensive economic strength of Dongguan ranked 12th in China and it has received a number of awards, including 'The National Exemplary City for its Vegetation', 'The National Exemplary Sanitation City', 'The National Excellence in Tourism', 'The National Basketball City', 'The Most Charming City of China', and 'The Most Economically Dynamic City in China'.

Data were collected in 215 Chinese enterprises, representing corporations from the four ICs. To increase the return rate, researchers communicated directly with a top executive of each enterprise to solicit support and explain the purpose of the investigation and data security measures. A total of 956 questionnaires were distributed and 721 surveys were returned, with 292 (40%) from Wuhan Optics Valley, 167 (23%) from Zhongguancun Science Park, 134 (19%) from Suzhou Industrial Park, and 128 (18%) from Dongguan Industrial Park.

4.2 Measures

Seven variables were measured: the four macro-HR environment variables (EE, LSE, CE, HRPE), one micro HR environment variable (HRM), TG, and RA. All of the items in the questionnaire employed a five-point Likert scale format (1 = strongly disagree, 5 = strongly agree) unless otherwise indicated.

4.3 Human resources environment, talent growth

Weng's (2008) measures were used to assess the HR environment and TG. Sample items are shown in Table 1. For each scale the Cronbach's α is over 0.7.

4.3.1 Regional attraction. The scale of RA, based on workers' attitudes about continuing to live and work in the region, was developed specifically for this study. Table 1 shows sample items for this measure and the Cronbach's α for this scale of 0.84.

4.4 Data analysis

A one-way analysis of variance (ANOVA) was used to test for differences in RA among the four ICs. The main hypotheses of the study were tested using hierarchical regression analysis and Baron and Kenny's (1986) procedures were used to test for the mediating effects of TG on the relationships between the HR environment and RA.

Table 1. Variables, items, contents of items and Cronbach's α.

Latent variables	Items	Contents of items	Cronbach's α
TG	TG 1	Exaltation of professional skill	0.90
	TG 2	Sense of working achievement	
	TG 3	Exaltation of creativity	
	TG 4	Promotion	
	TG 5	Exaltation of synthetical ability	
	TG 6	Exaltation of compensation	
HRM	HRM 1	Compensation system	0.91
	HRM 2	Training system	
	HRM 3	Performance management	
	HRM 4	Promotion system	
	HRM 5	Team management	
EE	EE 1	Scale of ICs economy	0.74
	EE 2	Type of industry	
	EE 3	Number of foreign enterprises	
	EE 4	Gross of imports and exports	
LSE	LSE 1	Inhabitancy condition	0.83
	LSE 2	Traffic condition	
	LSE 3	Public security condition	
	LSE 4	Diet condition	
CE	CE 1	Ethics of exchange	0.76
	CE 2	Enterprising spirit	
	CE 3	Innovative atmosphere	
HRPE	HRPE 1	Rewarding excellent talent	0.85
	HRPE 2	Supporting enterprisers	
	HRPE 3	Supporting R&D	
	HRPE 4	Policy of going abroad	
RA	RA1	Willing to work in ICs	0.84
	RA2	Willing to settle down in ICs	
	RA3	Do not want to leave ICs	

Notes: EE: economic environment, HRPE: HR policy environment, LSE: life style environment, CE: cultural environment, HRM: HR management, TG: talent growth, RA: regional attraction.

Table 2. Means, standard deviation, and intercorrelations between study variables.

	Mean	SD	1	2	3	4	5	6	7
1.HRPE	3.057	0.650	1						
2.HRM	3.203	0.867	0.495**	1					
3.LSE	2.889	0.786	0.307*	0.324*	1				
4.EE	3.534	0.596	0.462**	0.376**	0.354**	1			
5.CE	3.252	0.797	0.314*	0.495**	0.210*	0.331**	1		
6.TG	3.447	0.646	0.553**	0.543**	0.489**	0.665**	0.647**	1	
7.RA	3.057	0.650	0.456**	0.313**	0.509**	0.456**	0.636**	0.537**	1

Notes: * $p < 0.01$, ** $p < 0.001$.
EE: economic environment, HRPE: HR policy environment, LSE: life style environment, CE: cultural environment, HRM: HR management, TG: talent growth, RA: regional attraction.

To confirm the results of the regression analysis, LISREL 8.7 software with maximum likelihood estimation was used. Cheng (2001) suggested that multiple regression does not take into account the interaction effects among the posited variables. Structural equation modeling (SEM) is advocated because it expands the explanatory ability and statistical efficiency for model testing within a single comprehensive method (Hair et al., 1998). Because chi-squared statistics are sensitive to sample size, the root-mean-square error of approximation (RMSEA), the non-normed fit index (NNFI), and the comparative fit index (CFI) were used to assess model fit (Bentler and Bonette, 1980). Both the NNFI and CFI with values in the upper 0.80s indicate an acceptable fit, while those over 0.90 indicate a good fit (Bryne, 2000). The RMSEA with values under 0.1 represent mediocre fit, values between 0.08 and 0.05 indicate responsible fit, and those under 0.05 show a close fit to the approximation of population (Bryne, 2000).

5 Results

5.1 Spearman correlation between variables

Table 2 shows the mean and standard deviation for each variable, and the Spearman correlation coefficients. As can be seen, the seven variables correlate significantly.

5.2 Analysis of variance analysis

The One-way ANOVA showed a statistically significant difference across the four ICs with respect to RA ($P = 0.048$). As shown in Figure 3 and in the comparisons using least-significant difference (LSD) ANOVA statistical tests, there were significant differences between all four ICs (see Table 3). These results show that the RA of Suzhou Industrial Park was the highest, and the RA of Dongguan Industrial Park was the lowest.

5.3 Regression analysis

Hierarchical regression was used to investigate the effect of HR environment on TG and RA. The results are reported in Tables 4 and 5.
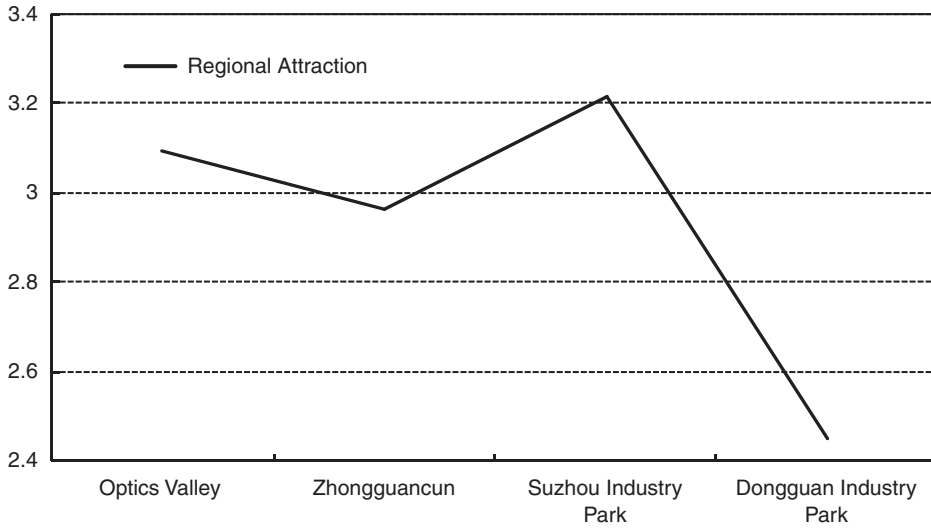
Figure 3. Regional attraction of the four industrial clusters.

Table 3. LSD ANOVA statistical tests.

Dependent variable: regional attraction

(I) region 1	(J) region 2	Mean difference (I − J)	Std. error	Sig.
Wuhan Optics Valley	Beijing Zhongguancun	0.129*	0.148	0.038
	Suzhou Industrial Park	−0.122*	0.234	0.031
	Dongguan Industrial Park	0.646**	0.247	0.009
Beijing Zhongguancun	Suzhou Industrial Park	−0.250*	0.234	0.028
	Dongguan Industrial Park	0.517*	0.248	0.038
Suzhou Industrial Park	Dongguan Industrial Park	0.767*	0.307	0.013

Notes: * $p < 0.05$, ** $p < 0.01$.

Table 4. Results of regression analysis.

Independent variables	Talent growth			HRM
	Model 1	Model 2	Model 3	Model 4
HR environment				
HRPE	0.313*		0.305*	0.299*
LSE	0.195*		0.179*	0.081
EE	0.344*		0.341*	0.018
CE	0.273*		0.214*	0.303*
HRM		0.543*	0.194*	
Model F	82.422	94.562	72.964	27.629
ΔF			14.772	
R^2	0.389*	0.392*	0.413*	0.319*
ΔR^2			0.025*	

Notes: * $p < 0.001$.
ΔF and ΔR^2 of Model 3 reports changes from Model 1.

Table 5. Results of regression analysis.

Independent variables	Regional attraction				
	Model 5	Model 6	Model 7	Model 8	Model 9
HR env.					
HRPE	0.087**		0.091**		0.043*
LSE	0.274***		0.271***		0.289***
EE	0.212***		0.216***		0.141**
CE	0.168***		0.161***		0.162***
HRM		0.301***	0.115**		0.066*
TG				0.519***	0.317***
Model F	30.998	22.520	24.655	83.386	21.638
ΔF	30.998		0.000		4.465
R^2	0.346***	0.087***	0.343***	0.266***	0.433***
ΔR^2			0.000		0.087**

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
ΔF and ΔR^2 of Model 7 report changes from Model 5. ΔF and ΔR^2 of Model 9 report changes from Model 7.

We first examined the relationship between the HR environment and TG as shown in Models 1–3 in Table 4. Each of the factors that comprise the HR environment had a significant effect on TG with the size of these effects ranging from the EE ($\beta = 0.341$, $p = 0.000$) to the LSE ($\beta = 0.179$, $p = 0.000$). Therefore, H1a, H2a, H3a, H4a, and H5a were supported.

We next examined the relationship between the HRM and the macro-HR environment. The results in Model 4 indicate that the HRM was predicted by both the HRPE ($\beta = 0.299$, $p = 0.000$) and the CE ($\beta = 0.303$, $p = 0.000$). The results indicated support for H3c and H4c but failed to support H1c and H2c.

As with TG, each of the five HR environment factors had a significant effect on RA, as shown in Models 5 and 7 in Table 5. Life style had the strongest effect ($\beta = 0.274$, $p = 0.000$), while the HRPE had the smallest effect ($\beta = 0.087$, $p = 0.010$). These results provide support for H1b, H2b, H3b, H4b, and H5b. However, the addition of TG reduced the effect of EE, HRPE, and HRM on RA (Model 9), which indicates that TG partly mediates the relationship between the three HR environment variables of EE, HRPE, and HRM, and RA.

Based on the final adjusted R^2s for each regression model, the HR environment variables explained 61% of the variance in TG and 34% of the variance in RA. TG explained an additional 9% of the variance in RA.

5.4 Structural equation model

Based on the assumptive model (Figure 1) and the results of the above regression analyses, we deleted some insignificant paths and constructed a structural equation model. After deleting the insignificant paths, we modified the model until the chi-square value no longer decreased remarkably. Results of the final model after modification are shown in Figure 4.

The goodness-of-fit (GFI) statistics are shown in Table 6. The values obtained for the GFI (0.89), the adjusted GFI (AGFI) (0.87), and the RMSEA (0.048) for the proposed model (shown in Figure 3) indicate a satisfactory fit. Although the model's chi-square value of 858.57 with *df* of 388 was statistically significant, a significant chi-square value does not, in and of itself, indicate a poor fit because chi-square measures are influenced by the size of the sample (unlike GFI and AGFI) (Bentler and Bonette, 1980).
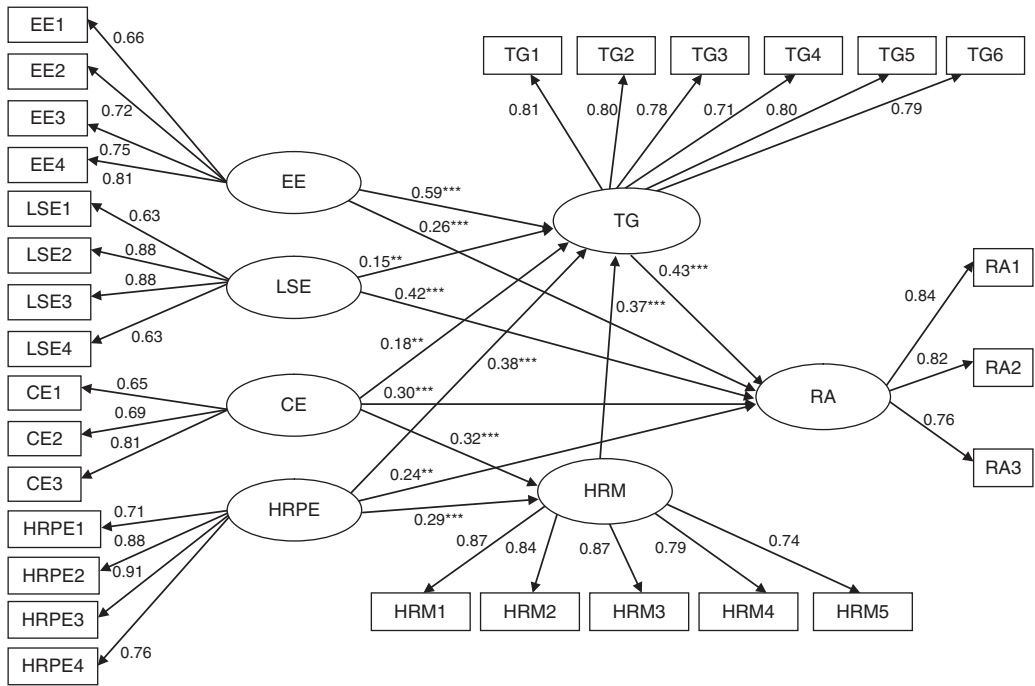
Figure 4. Results of the structural equation model.

Table 6. Goodness of structural equation model.

Goodness index	Parameter	Goodness index	Parameter
χ^2	858.57	PGFI	0.86
df	388	NFI	0.93
χ^2/df	2.21	NNFI	0.97
RMSEA	0.048	PNFI	0.93
GFI	0.89	CFI	0.98
AGFI	0.87	IFI	0.96

Notes: PGFI: parsimony goodness-of-fit index, NFI: normed fit index, NNFI: non-normed fit index, PNFI: parsimony normed fit index, CFI: comparative fit index, IFI: incremental fit index.

The outcomes of the SEM confirmed the results of the regression analyses. Figure 4 shows the path coefficients for this analysis. TG in ICs has a direct, positive effect on RA ($\beta = 0.43$, $p = 0.000$). The results also suggest that TG mediates the relationship between HR environment and RA.

6 Discussion and conclusion

To summarize, our results demonstrate that all five variables that constitute the HR environment are positively related to TG. TG, in turn, is positively related to RA. In addition, all five variables

of the HR environment significantly predict RA but the effects of three of the HR environment variables, HRPE, EE, and HRM, are partially mediated by the role of TG. Our findings have implications for the HR environment, RA, and agglomeration economy literatures.

6.1 Human resources environment

Previous research has demonstrated direct relations between some aspects of the HR environment and TG (Gu, 2000; Luthans and Stajkovic, 2000). The current study is unique in that it provides support for the measurement of the macro and micro aspects of the HR environment using five distinct variables: the EE, HRPE, LSE, CE, and an enterprise's HRM practices. As indicated by the larger parameter estimates, the CE and the HRPE have strong effects on organizational HRM practices. This suggests that organizations need to tailor their HRM practices to fit the cultural and HRPEs in the regions in which they operate. However, neither the economic nor LSEs have a significant effect on an organization's HRM practices. This is somewhat surprising, given recent trends in the US toward the development of HR as a source of competitive advantage (O'Reilly and Pfeffer, 2000). Future research could determine whether this finding is unique to the culture of China.

6.2 Regional attraction

Previous research has demonstrated that RA is influenced by wages, the job market, and economic opportunity (Becker, 1975). Our study confirms the importance of the EE on RA, as the EE was directly and indirectly, through TG, related to RA. The current study extends the research on the determinants of RA by demonstrating that other aspects of the HR environment, beyond economics, are also important determinants of RA. In addition to the EE, the life style, cultural, HR policy and an enterprise's HRMs are all related to RA, although the effects of the economic, HR Policy and HRM practices on regional attractiveness are partially mediated by their effects on TG. Simply put, regions with more favorable HR environments for TG reap stronger RA.

6.3 Talent agglomeration

Why does talent tend to gravitate to ICs? The results of this study suggest that the HR environment of regional clusters attracts talent to them for several reasons.

Firstly, there are the economic considerations. The presence of alternative job opportunities ensures that employees can move from one job to another within an IC without incurring many of the costs associated with job relocation. For example, within the Zhongguancun Science Park there are numerous employment opportunities for IT talent. The cost of searching for a new or related IT job in this IC is lower than it would be in another region. Moreover, the wages in ICs are higher than in other regions. For example, in the US, the wage level in Silicon Valley is 1.5 times higher than the national average wage.

Secondly, the special-talent pools in ICs reduce the cost of organizational recruiting. With new organizations entering an IC, the demand for talent rises, resulting in higher wages. In sum, the clustering of enterprises boosts the concentration of workers, which in turn promotes the clustering of enterprises.

Thirdly, regions that spend resources developing life-style amenities and cultures conducive to TG are more likely to attract talent to that region. Fourthly, companies that develop HRM practices

conducive to TG attract talent. Finally, the concentration of talent within an IC generates synergism. Simply put, talented people working within an IC feed off each other. They share ideas, talents, tacit knowledge, technology, and even job market information. This information exchange results in the development and growth of the existing talent pool with a given IC.

6.4 Implications

The findings of this study have a number of implications for regional development. Talent does not simply show up in a region, rather, certain regional conditions are required to attract talent. Our study sheds light on what these regional conditions are and provides support to Florida's (2002a) contention that perhaps focusing attention on the attraction of talent might be more conducive to regional development than trying to attract firms. The key to attracting and retaining talent is in improving the HR environment.

In China, the government plays a prominent role in the development of ICs. For example, the Zhongguancun Park cluster has successfully attracted a number of high-profile companies (e.g. Agilent, Epson, IBM, Intel, Lenovo, Microsoft, Samsung, etc.). The attraction of these high-quality companies has increased wages in the region along with the number and variety of job opportunities. Increasing the quality of the EE in this region has resulted in an accumulation of talent, which, in turn, makes this region even more attractive to other companies and future employees.

The Chinese government has also assisted the development of clusters by investing in an infrastructure that has resulted in an improved LSE. Suzhou Industrial Park, for example, has become an ecology model zone in China, where there are three lakes, four public parks, six verandas, seven scenic spots, and 12 museums. This industrial park has also become the center of consumption and entertainment within Suzhou city, where there are a variety of restaurants, abundant leisure activities, high-quality educational institutions, and medical services. The highly favorable LSE of this industrial park has increased its concentration of talent and the attractiveness of that region.

The Chinese government has also affected the HRPE as a vehicle for making regions more attractive. Policies affected include convenient household registration, rewarding excellent workers, and providing policy support for entrepreneurs. In Wuhan Optics Valley, for example, the government invests more than 150 million renminbi (RMB) per year through a 'talent special zone' fund, which is used to attract, train, and develop talent. A world class innovative team can receive around 100 million RMB in financial assistance to locate or start their own business in Wuhan Optics Valley. Other high-level talent can get around 5 million RMB in financial aid and can acquire a low-interest loan. The fund also sets up a work team for dealing with attracting and assisting talent, so that such groups can acquire convenient services, such as commercial registration and entry and exit procedures, in addition to project financing. Finally, the Chinese government is playing a major role in the cultural change taking place in that country as it moves from a planned economy to one that nurtures the entrepreneurial spirit and innovation.

The above examples of how the government of China has influenced the economic, life style, HR policy, and CEs can easily be adapted to other political environments. The point being made here is that whether it is done by the national government, local government, private foundations, industrial associations, private enterprise, or the free market system, the key to increasing the attractiveness of a region is to create a positive HR environment in which enterprises thrive and that are attractive to talented people.

6.5 Limitations

A few limitations of this study should be noted. Although our sample of firms is large, we only investigated the RA in four ICs. Future research on RA would benefit from a comparison of more and a greater variety of ICs. A second limitation is that the study only investigates the RA of ICs, but not other regions. In effect, there exists no control group against which to compare IC development. Future research could compare other forms of clusters (e.g. agricultural or service) to ICs, as well as clusters to regions without clusters. Thirdly, the instruments used to measure the study's variables were designed specifically for this research. The development and use of more standardized instruments should be encouraged. Fourthly, this study relies on cross-sectional data and therefore cannot establish causality. We cannot isolate whether the HR environment causes TG or whether HR environments improve because of TG. Moreover, we are unable to ascertain whether talented people self-select to migrate to a particular region or whether those regions attract multitudes of people, some of whom are talented. Finally, future research should investigate the role played by other macro- or micro-environment factors, for example assessing additional properties of institutional 'thickness', such as the interaction among firms in a cluster, whether firms in a cluster share a common agenda (Amin and Thrift, 1995), or corporate governance and organizational attraction (as opposed to RA) in TG and RA. Perhaps talent gravitates to a region or cluster because it is 'known' as a hub for a particular industry or a particularly high-profile company is situated there. In other words, is it the organization per se by virtue of its reputation or how it operates that attracts and keeps a talented workforce in an area, is it the geographical location, or is it the presence of other similar organizations in that area?

This article suggests that those who see the clustering of talent solely as a function of economics have a limited view. These results suggest that economics are indeed important, but they are not the only factors. The HR environment, which includes not only economic factors but also life style, cultural, HR policy factors, and the HR practices of firms are the keys to developing talent and to increasing RA.

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None declared.

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