

**Planning for Improving High-Tech New Towns’
Attraction to Talents
- Case Study of Changsha, China**

**A Thesis Presented to the Faculty of Architecture and Planning
COLUMBIA UNIVERSITY**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Urban Planning**

by

Lingran Meng

[lm3193]

May, 2018

ACKNOWLEDGEMENT

I would like to take this opportunity to express my greatest appreciation towards my thesis advisor, Prof. Kian Tajbakhsh, and my thesis reader, Prof. Katherine Dunham, for their generous guidance and inspiration during my research and thesis jury, providing me with precious advice. This dissertation would not have been completed without their assistance.

I would also like to dedicate my gratefulness to my friends and my family for their endless support and encouragement. Their support is important for me to have courage and motivation to finish my thesis.

ABSTRACT

In 2015, “The Belt and Road Initiative” proposed by the Chinese government contended the target of booming up cities in central and western China and relieving the overpopulation of coastal areas. In this plan, Changsha, a city in the middle part of China is going to play an important role for innovation and high-tech development. Talents are necessary for this step of development. This empirical study used the city of Changsha for case study and identified that apart from the traditional factors like Hukou, job opportunities and salary, talents’ willingness to live and work in Changsha can also be seriously affected by their satisfaction of cultural and recreational activities. Therefore, when crafting policies and plans for the development of second-tier cities in China, local governments and planners could discover and make good use of its own specialties for talent attraction.

LIST OF ILLUSTRATIONS

	LIST OF FIGURES	PAGE
1.1	Map of The Belt and Road Initiative	6
2.1	Distribution of high-tech regions in China	10
2.2	Future high-speed rail system connecting Changsha with the “Belt and Road”	12
2.3	Political boundary of Changsha and Location of the new town	13
2.4	Yuelu Academy starting from Song Dynasty	14
4.1	Outdoor concert in Austin	20
8.1	Fireworks with digital technology in Changsha	53

	LIST OF CHARTS	PAGE
2.1	Industrial structure of Changsha	11
2.2	Percentage of people working in different industries	12
6.1	Frequency of age	30
6.2	Frequency of Year of graduation	31
6.3	Frequency of Household size	31
6.4	Distribution of registered permanent residence	32
6.5	Frequency of job area	33
6.6	Frequency of expected lowest salary	33
6.7	Degree of satisfaction with different aspects of Changsha	34
6.8	Opinions about the TOD project in Changsha	36

	LIST OF TABLES	PAGE
5.1	List of variables	27
6.1	Average degrees of satisfaction	35
6.2	Factors that the talents care most about	35
6.3	Multivariate correlation result	37
6.4	Factors with top five high correlation with “Willingness to work in Changsha”	38
6.5	Chi-Squared Test 1: “Registered permanent residence” and “Willingness to work in Changsha”	40
6.6	Chi-Squared Test 2: “Direct relative outside Hunan” and “Willingness to work in Changsha”	41
6.7	Chi-Squared Test 3: “Expected lowest salary” and “Willingness to work in Changsha”	42
6.8	Chi-Squared Test 4: “Cultural and recreational activities” and “Willingness to work in Changsha”	43
6.9	Chi-Squared Test 5: “Climate” and “Willingness to work in Changsha”	44
6.10	Regression Test: “Lowest salary expected/1000” and “Willingness to work in Changsha”	45
6.11	Comparison between factors participants with and without Hukou of Hunan care about	46

TABLE OF CONTENTS

1. INTRODUCTION	7
2. BACKGROUND INFORMATION	10
2.1 High-Tech Region	10
2.2 The City of Changsha.....	12
3. PROBLEM STATEMENT.....	16
3.1 Problems of High-Tech New Town Planning in China	16
3.2 Questions to be Solved.....	17
4. LITERATURE REVIEW	18
5. METHODOLOGY AND DATA COLLECTION.....	24
5.1 Organization of Research	24
5.2 Research Methods	26
6. PRIMARY DATA RESULTS AND DATA ANALYSIS	30
6.1 Descriptive Statistics	30
6.2 Further Survey.....	35
6.3 Correlation Analysis.....	37
6.4 Cross Tabulation and Chi-Square Test.....	39
6.5 Regression Analysis	44
6.6 Comparison between Participants with and without the Hukou of Hunan	45
7. RESULT DISCUSSION.....	47
8. CONCLUSION AND RECOMMENDATIONS	50
8.1 Suggestions for Changsha	50
8.2 Limitations and Recommendations	52
REFERENCES	54
APPENDIX.....	56

Changsha is a second-tier city in the middle part of China. In this paper, I am going to use Changsha as a case study to find out how the cities in central China could attract relevant talents. Firstly, I will introduce the background of high-tech regions and the industry structure of Changsha. Secondly, I am going to look into literature reviews about factors that influence the decision of knowledge workers in choosing a location to live and work. And then, researches will be generated on Changsha in order to get the key factors that attract knowledge workers to high-tech regions. Finally, a series of advice for crafting policies will be provided to Hunan government to achieve those factors in China.

The research can be divided into eight chapters.

Chapter 1 Introduction: This chapter generally introduced the idea and objective of this research.

Chapter 2 Background Information: This chapter provides the background information about the development of high-tech regions in China and around the world. It also introduced the city of Changsha as well as its significant position for the “Belt and Road” plan of China.

Chapter 3 Problem Statement: This chapter is going to mention the problems Chinese government have when planning for the development of high-tech new towns, especially the difficulties of attracting local universities graduates to live and work. The research question of this study is stated.

Chapter 4 Literature Review: The proper studies which can be used to form the theoretical basis of the research is going to be mentioned including the ‘Job versus People’ debate, some previous studies about “factors that influence the decision of knowledge workers in choosing a location to

live and work” and the successful experience of Austin in the United States.

Chapter 5 Methodology and Data Collection: The methodology of the research in this research is going to be discussed in details in this chapter. In addition, the range and method of data collection for this study is introduced and the reasons are explained.

Chapter 6 Research Findings and Data analysis: The constitution and categories of participants are generally mentioned. And then, the result acquired from the Regression Model including Correlation, Chi2-test, R2, F-test and T-test are presented and the exact relationship between different variables and knowledge workers’ decisions to work in Changsha is analyzed.

Chapter 7 Result Discussion: The findings from the data analysis, which reflected the situation of Changsha is compared with that of Austin. The discussions about whether the policies for attracting creative class in Austin can be useful for the development of Changsha as well as many other developing cities in China are generated.

Chapter 8 Conclusion and Recommendations: The findings in this research are concluded. Moreover, limitations and recommendation of the research are provided for further study.

2. BACKGROUND INFORMATION

2.1 High-Tech Region

The United Nation categorized industries into three levels, primary industry, secondary industry and tertiary industry. Primary industry includes agriculture, forestry, animal husbandry and fishery; secondary industry includes manufacturing, excavation, construction works, energy and resources, and medical care; tertiary industry includes business, finance, transportation, communication, education, services and other non-material production sectors.

According to the Ministry of Science and Technology of China (2017), high-tech industry is an industry based on high and new technology. The enterprises of high-tech industry engage in the research, development, production and technical services of one or more high and new technology as well as their product. The dominant technology of the product must belong to the identified high technology field, and it must include the technological breakthrough in the field of high technology. High-tech industry is a knowledge-intensive and technology-intensive industry, different from the traditional labor-intensive industry. It mainly includes three fields: information technology, biotechnology and new material technology. High-tech industry could largely change the industrial structure of society. With the development of it, there is going to be more people working for tertiary industry while less people working for secondary industry.

After the Second World War, countries around the world devoted themselves to industrial development such as timber and steel manufacturing and processing. Cities and metropolitan regions were also formed and developed basing on the location of large-scale industries. Until the 1970s, with the structural transformation of the economy, traditional industries were gradually

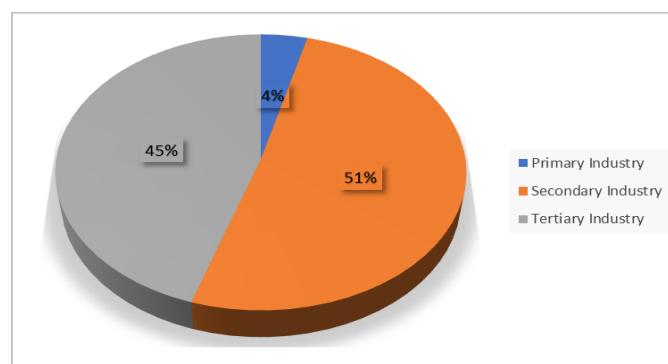
These high-tech regions are making significant contributions to the GDP of China, especially those in first-tier cities like Shenzhen and Chongqing. (According to South China Morning Post (2013), China has 613 cities which are usually divided into four tiers. All first-tier cities have a GDP over \$US300 billion. Most of them are in coastal areas of China. The second tier includes cities with GDP between US\$68 billion and US\$299 billion.) In the “Belt and Road” initiative carried out in 2015, the Chinese government emphasized the importance of developing second-tier cities in central and western China. They hope that high-tech new towns could be built in these cities basing on high-tech regions and high-speed-rail lines.

2.2 The City of Changsha

One of these target cities is Changsha, the capital of Hunan province. Geographically, Changsha is located in Central and Southern China. It occupies 12,000km² and with a population of 7.6 million.

Currently in Changsha, secondary industry and tertiary industry are the main driven force for development. The industrial structure of Changsha is shown in *Chart 2.1*.

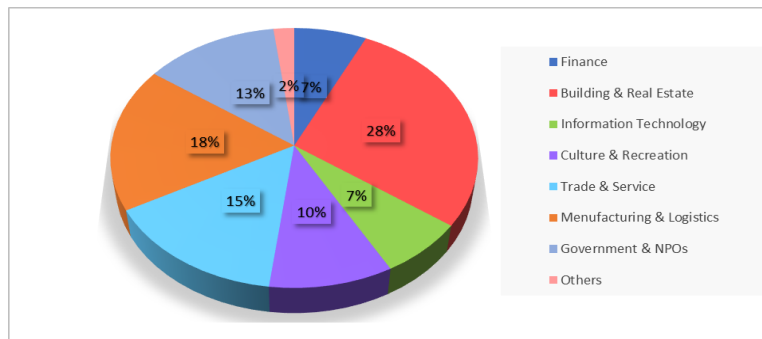
Chart 2.1 Industrial structure of Changsha



(Changsha Bureau of Statistics, 2015)

Until the end of 2015, there are 847,560 people working in Changsha. Their average annual income is 71,452 RMB. Percentage of people working for different industries is presented in *Chart 2.2*.

Chart 2.2 Percentage of people working in different industries



(Changsha Bureau of Statistics, 2015)

Different from coastal cities, Changsha has no advantages to get access to large-scale import and export trades. Until in the “Belt and Road” initiative, the central government pointed out the new role Changsha is going to play. There is going to be a high-speed rail line connecting Changsha with Chongqing, a significant city of “The Silk Road Economic Belt”, and Xiamen, a harbor of “21st-Century Maritime Silk Road” (*Figure 2.2*).

The new high-speed rail station to carry this line is being built in west Changsha and a transit-oriented new town is going to be developed around this station (*Figure 2.3*). According to the General Planning Text of Changsha, Changsha is going to play an important role for innovation and high-tech development in China. Therefore, the Hunan government plans to make high-tech and financial industries the main industries to drive the development of this new town and to make this new town a high-tech region. The development of this region will be based on the high-tech zone originally set up in Changsha early in the 1990s.

Figure 2.2 Future high-speed rail system connecting Changsha with the “Belt and Road”



(CMA CGM LOG, 2017)

Figure 2.3 Political boundary of Changsha (blue) and Location of the new town (yellow)



(REDNET, 2017)

With the up-scaling of high-tech zone, more knowledge workers for tertiary industry will be required. Therefore, talents will be important for the future economic development of this new town as well as the whole city. Because of Changsha’s position as a transit hub of central and western China in the future, the transportation between it and the first-tier cities in China’s South-

East coastal areas will be more convenient. As every coin has two sides, there is going to be two possible results because of the convenient transportation. Either more talents will immigrate to Changsha, or talents now living in Changsha choose to immigrate to coastal areas for high salary and better job opportunities. At the same time, many other cities in the middle part of China are trying to use high-tech industry to attract talents. Changsha has to find its advantage to compete with these cities.

The Yuelu Academy set up early in Song Dynasty was the earliest public education academy in the history of China (*Figure 2.4*). Ever since then, Changsha has been a city famous for higher education. Currently in Changsha, there are 51 universities with totally 590 thousand students pursuing their degrees. 55 thousand of these students are graduate students. Every year, students from different parts of China come to Changsha for education. If some of these students choose to live and work in Changsha after graduation, they could possibly become a good source of talents for the development of this city.

Figure 2.4 Yuelu Academy starting from Song Dynasty



(WikiVisually, 2014)

3. PROBLEM STATEMENT

3.1 Problems of High-Tech New Town Planning in China

Site selection, related government policies as well as zoning are probably of equal importance as the high-tech industry itself for the development of these high-tech regions. These factors also decided whether this region could become attractive to the relevant talents. For example, if there is no land for the rental housing development around, it will be difficult for most young working class to afford the living.

Today, the Chinese government and private enterprises are developing a large number of high-tech new towns. In the process of urban and regional planning in China, the central government is responsible for carrying out general development strategies while local authorities are responsible for the implementation of strategies. They cooperate with design institutions and private contractors to make detailed designs according to the instruction from the central government. The problem is that the development plans for the high-tech new towns carried out by China's National Development and Reform Commission, which is part of the central government, are lack of assistance studies about detailed strategies from the citizens' perspectives. Sometimes, the Chinese government just let the design institutions handle the plans and try to pick the most visually impressive one.

Therefore, the research question is "What are the key factors that attract knowledge workers to high-tech regions and the feasibility of crafting policy to use these factors in China?" The hypothesis is that apart from Hukou, high salary, and good job opportunities, talents also care about the abundant cultural and recreational activities.

In China, Hukou is a household registration record officially identifies a person as a resident of an area. It is also called registered permanent residence. Only with the Hukou of an area can people be permitted to get access to local social welfares including education for children, medical insurance, and public housing, etc. Therefore, it is a factor largely limiting people's decisions on where to work and live (Project partner, 2018).

3.2 Questions to be Solved

In order to arrive at a better understanding of what governments need to know when they are planning for new high-tech regions in second-tier cities and striving to attract talents, this thesis reached the following questions.

1. Is there any successful case of human resource development in U.S. cities?
2. What policies and plans did this city carry out to attract knowledge workers?
3. Why do knowledge works stay in or leave Changsha?
4. What are the factors knowledge workers care most about Changsha?
5. Are these factors similar to or different from that of the U.S. city?
6. Is it possible for China to learn from the policies and plans helpful for human resource development in the U.S. city?
7. What policy and plans should the Chinese government craft to help with the human resource development in Changsha?

4. LITERATURE REVIEW

High salary and better job opportunities are probably not always the only factors for cities and regions to attract high-tech talents. In the United States, Silicon Valley is the largest and the most well-known high-tech region with the longest history. It has been attracting knowledge workers and making great contributions to the development of science and technology around the world. However, recent years, some phenomenon reflected that the development of Silicon Valley is now facing problems. With the tremendous development in high-tech industries, most of the other industries are shrinking. Cities like San Francisco is losing artists, teachers, and the energetic culture. At the same time, due to the crucial increase in property price, a large number of IT talents are trying to move away from the Bay Area. The rent of a studio in San Francisco can be as high as 3,500 dollars per month.

Comparing to the Silicon Valley, a number of newly developed high-tech regions are trying to avoid these problems during its development. According to Forbes (2017), two thirds of the talents in the Silicon Valley believe that it is not necessary for them to continue to work in the Silicon Valley and they have the willing to move to other cities. Forbes (2017) also mentioned that five other cities in the United States are having the tendency to replace the Silicon Valley and become new high-tech centers. The five cities are Salt Lake City, Denver, Atlanta, Portland and Seattle.

It seems that comparing with Silicon Valley, most of these newly developed high-tech regions have lower housing price and better cultural environment. At the same time, due to the increasing job opportunities, important traffic location and pleasant climate, these cities are successfully attracting high-tech talents.

Among these five cities, Salt Lake City was recently ranked by Entrepreneur as the top city to start up business other than San Francisco or New York City. Vaughn Aust, EVP of marketing and product at MarketStar, believed that his company's success should be attributed to its superior relocation in the suburb of Salt Lake City. Aust also praised the city's "stable workforce, top-ranking tech universities, low cost of living, attractive climate, low crime rate, and family-friendly atmosphere" (Fatemi, 2017).

Drawn by expanding tech workplaces and dozens of growing startups, nearly half of California high-tech workers planned to immigrate to places like Denver, according to a survey of 100 participants (ABODO, 2016). Scott Heimes, the chief marketing officer of SendGrid in Denver, hold the opinion that the city's other unique qualities, including its vivid landscape, activities and outdoorsy culture also contributed to its attraction.

The phenomenon in Silicon Valley reminded me of the debate on "job versus people", which is a question about whether people bring jobs to a city or job opportunities attract people to a city. Richard Florida (2003) held the opinion that "highly educated individuals were drawn to places that were inclusive and diverse" and it should be these highly educated individuals that promote "combinations of resources and ideas" and spur economic growth. Thus, as Florida (2003) concluded, "Places that are home to large concentrations of the creative class tend to rank highly as centers of innovation and high-tech industry".

When Michael Storper et al. (2015) tried to examine how differences in the labor markets of metropolitan Los Angeles and San Francisco contribute to their wage divergence, he got a different

conclusion. He draws on a wide range of hypotheses from urban economics, labor economics, regional science, and other fields and discovered that more motivated and productive workers are attracted to the bay area due to the perceived opportunities in the New Economy. Amenities are probably nowhere strong enough to affect migration patterns. However, he also mentioned that differences in wages cannot be the only force causing the divergence.

Based on this debate, Mohan Thite (2011) provided a theoretical framework to look for factors that affect the decision of knowledge workers when choosing a location to live and work. He identified “Quality of place and life”, “Regional sustainability” and “Learning cities” are main factors attracting knowledge workers to a place. “Regional sustainability” depends on social and cultural infrastructure that solve problems and promote the economic and social well-being, which in China can generally be guaranteed by the government. “Learning cities” means areas in which firms are clustered together around related products and ideas, which will be achieved within high-tech new towns. “Quality of place and life” includes community safety, affordable housing, public transportation and lifestyle amenities etc. Both “on- and off-the-job factors” are influencing talent attraction. When looking into the reason for those five cities to have the tendency to replace Silicon Valley, the factors mentioned by Thite can also be identified.

A good example of the booming of high-tech cities is Austin in Texas, the U.S. Similar to Changsha in China, Austin is the capital of Texas located in the middle part of the United States. There are also significant transit lines passing through this city connecting the eastern and western parts of the country. The booming up of this city was quite impressive. Austin successfully transformed from a manufacture of cotton and livestock to a high-tech-based city and ranked third

in the “2002 World Knowledge Competitiveness Index – a study 300 cities around the world” (Michaud and Tcheremenska, 2003). Its advantages in risk investment and human resource development made it even more attractive than cities like New York and San Francisco. U.S News & World Report (2016) mentioned that within the past five years, the population of Austin increased by about 9%.

As a city whose pillar industry was technology and computer science, the development of Austin benefited a lot from knowledge workers graduated from University of Texas. Realizing the importance of the “creative class”, the city carried out the “Austin 2010 Plan” to develop its urban and cultural life in ways that would attract and retain knowledge workers. It started to consider the “people climate” and one of its initiatives was the promotion of its legacy of music.

Figure 4.1 Outdoor concert in Austin



(Visit Austin, 2018)

Austin also improved the quality of place in the provision of “stylish built environment(s), extensive city parklands, conservation of natural surroundings, a rich variety of cultural institutions, quality affordable housing, hospitals, schools and universities and an efficient traffic system”. Benefiting from the pleasant climate of the city, Austin also promote human activities like outdoor recreation opportunities and vibrant nightlife (*Figure 4.1*). (Yigitcanlar, 2007)

The example of Austin can possibly be relevant for China because the economy scales of these two countries are of similar scale and the population of China and the US are both increasing. A more important reason is that similar to Austin, most of the development plans for high-tech new towns in China are at the transportation hubs in the central part of China instead of coastal areas. The Chinese government expects that the development of these high-tech new towns could drive immigration to these regions, and thus help with the carrying out of the “Belt and Road” plan. Moreover, both Changsha and Austin have high-quality universities, students of which are from all over the country. These universities are the main source of high-tech talents for the city.

I hope that this study could find out the factors knowledge workers currently care about in Chinese second-tier cities, learn from the high-tech region development in Austin and make improvements during the planning of these new towns in China, so that these planned high-tech regions could successfully attract talents and relieve the pressure of those metropolitan areas in Coastal Areas of China.

On the basis of the data derived from “China's 2005 1% population sample survey”, Liu and Shen (2014) examines regional and personal factors that shape location choices of China's “interprovincial skilled migrants”. Their conclusion of China seems to be different from that concluded from the booming high-tech cities in the United States. The findings suggest that within the first half of 2000s, China's skilled workers make their immigration decisions based on salary more than amenity-related issues of the location. At the same time, institutional arrangement (Hukou) continue to affect interregional movements of skilled labor in China.

However, Liu and Shen (2014) also pointed out that China's skilled migrants might place more importance on amenity-related issues after the 2010s, partly because of the increasingly wealthy of professional and managerial staff and change in people's values about work-life balance. They believed that further studies could be carried out to examine whether amenities play an increasing role in shaping skilled migrants' destination choices by using the upcoming 2010 census data.

Additionally, in their study, “interprovincial skilled migrants” are defined as “those who have a tertiary education qualification and whose current province of residence is different from 5 years ago”. These years, China is transforming its pillar industry from manufacturing industry to high-tech industries. As the idea gradually changed from “made in China” to “created in China”, “high-tech knowledge workers” are taking the place of “skilled migrants” and becoming the main driving force for science and economic development. This group of talents are usually even more highly educated and their requirements could possibly be different.

In this paper, the study bases on the basic theories from the “job versus people” debate and use the theoretical framework of “factors that influence the decision of knowledge workers in choosing a location to live and work” provided by Thite. Liu and Shen’s study told us the factors that shape location choices of China's interprovincial skilled migrants and mentioned the possibility of change in the following years. They also indicated the requirement of further research to find out the change in the role of amenities. The cases of Austin in the United States could tell what policies and plans the United States government have carried out to improve those particular factors and lead the further analysis on whether similar policies and plans can be effective in the urban planning in China.

5. METHODOLOGY AND DATA COLLECTION

5.1 Organization of Research

After looking into the background information of Changsha and the successful case in Austin in terms of plans and policies related to housing affordability, amenity related issues and income level that benefited talent attraction in Austin. I am going to focus on the case of transit oriented new town development in Changsha, China, to discuss about what policies the Chinese government should carry out and what planners can do in order to attract talents to help with the development of this city. I will also discuss whether Changsha could learn something from examples in the United States when carrying out policies and plans that could be helpful with knowledge worker attraction.

In order to accomplish such a study, I firstly selected the main factors in high-tech regions that have impacts on the attraction to knowledge workers. And then I carried out a qualitative research about Changsha. To achieve the qualitative research, I sent out online questionnaires to ask the newly graduate students and the students who are going to graduate about what are the factors attracting them to work in this city and what is not. For example, I asked a final year master's degree student learning computer science in Changsha whether he is going to work in Changsha and the reasons. The sample is going to be a hundred graduate students from two top universities governed by the Ministry of Education of the People's Republic of China in Changsha. This sample size could possibly avoid contingency be enough for a correlation test. The sampling method is stratified sampling, making sure that students from different provinces and different majors are included.

In Liu and Shen's former study, the variables are in three aspects - income levels, amenity-related issues and Hukou. The variables used by Liu and Shen (2014) include "Average wage", "Unemployment rate", "Temperature severity index", "Average annual precipitation", "Average relative humidity", "Number of university students", "Number of qualified doctors", "Number of museums, public libraries, cultural centers, and performance venues", "Areas of public green lands", "Share of state-owned and State-controlled enterprises", "Foreign direct investment", "Share of living expenditure in disposable income" and "Hukou".

In this study, however, the research method changes from quantitative to qualitative and the research objects change from the provinces of China to individuals. Therefore, while continue to focus on the three aspects mentioned by Liu and Shen (2014), the variables are adjusted to Hukou, Job type, Family reasons, High-tech and financial development, Salary level, Housing affordability, Daily life affordability, Education for children, Recreational facilities and activities, Parks and open space, Climate and Air quality. The main factors related to the successful human resource development of Austin are also included in these variables. In the questionnaires, the questions are generated in order to get these variables mentioned. Questions are mainly multiple choices. Participants can make their choice from the scale 1 to 3 to show their evaluation of a particular factor in Changsha. They also need to tell the area of their majors and information about their household registration on the questionnaires. Data is collected from their answer to the questions.

5.2 Research Methods

This report aims to observe factors that affect the young talents' decisions on whether to live and work in Changsha after graduating from a university in Changsha. The unit of analysis is an individual. The following variables are chosen to explain their decisions. Besides demographic variables, ten other variables were chosen as listed in the table below. The research is going to find out whether the demographic characteristics of age, year of graduation, gender, household size, registered permanent residence (Hukou), whether have direct relatives outside Hunan province, expected job area, lowest salary expected, education level and admission status to jobs would affect the individual's decision to work in Changsha after graduation.

This study is also going to discover whether a university graduate student with higher degree of satisfaction of Changsha in terms of "High-tech industries", "Financial industries", "Salary level", "Housing affordability", "Daily life affordability", "Education for children", "Cultural and Recreational activities", "Parks and open space", "Climate" and "Air quality" may tend to work there after graduation. These factors could potentially affect their decisions to work in Changsha because after graduating from a university in Changsha, a person could choose to work and live in this city if he is satisfied with several particular aspects of the city. The result of research may be affected by human factors but it would generally reflect the tendency of university students in Changsha. Their impressions of each of these variables were reflected in the scale of three levels of satisfaction from dissatisfy to satisfy, which is easier for the participants of the survey to make their choice.

Table 5.1 List of variables

#	Variable Name	Description	Variable Type	Unit of Analysis
1	Willingness to Work in Changsha (dependent)	Yes or no	Dichotomous	0 or 1
2	Age	Years alive	Continuous	Years
3	Gender	Whether the participant is female	Dichotomous	0 or 1
4	Year of Graduation	The year in which the participant graduated or expected to graduate	Continuous	Year
5	Household Size	Family members	Continuous	Number
6	Registered Permanent Residence	The Province where the participant's Hukou is	Categorical	NA
7	Direct Relative outside Hunan Province	Direct relatives including parents, (future) spouse, offspring and siblings	Dichotomous	0 or 1
8	Education Level	Whether the participant has graduate or professional degree	Dichotomous	0 or 1
9	Job Area	(Expected) Job area of the participant	Categorical	NA
10	Lowest Salary Expected	Participant's lowest expected income per month (thousand RMB)	Scale	Number
11	Admission to a Job	Whether the participant has already been admitted to a job	Dichotomous	0 or 1
12	Target Province for Work	The province in which the participant is willingness to work and live	Categorical	NA

13	High-tech industry (A)	Participants rate for these aspects of Changsha basing on their own impression of the city.	Scale	1, 2 or 3
14	Financial industry (B)			
15	Salary level (C)			
16	Housing affordability (D)			
17	Daily life affordability (E)			
18	Education for children (F)			
19	Cultural and recreational activities (G)			
20	Parks and open space (H)			
21	Climate (I)			
22	Air quality (J)			
23	Transformed registered permanent residence	Whether the Hukou of participant is within Hunan province	Binary	0 or 1
24	Transformed lowest salary expected	The lowest monthly salary expected comparing to 10,000 RMB	Binary	< or >=

As the dependent variable is a dichotomous variable, which only has the answer of “Yes” or “No”, two of the independent variables are transformed into binary type, which only has two types of response, in order to make data analysis more convenient.

A survey was created to collection primary data. It was issued to individuals who have graduated in recent years or will graduate in the following years from top universities in Changsha online through the Tencent Questionnaire Platform on Thursday, January 11, 2018 11am Beijing time.

And the collection period was from January 11 to February 20, 2018. Since the target participants were all Chinese people, a Chinese version of the questionnaire was created. The questionnaire formats in both languages are shown in Appendix I.

In total, within the period of reclamation, 130 survey samples were collected. This primary data was then transcribed, and discrepancies and nonresponse errors in the results were cleaned using the following methodology. Samples in which the participant's university was not in the city Changsha (some respondents misunderstood the recruitment statement of the questionnaire, in which the experience of pursuing a university degree in Changsha is a necessary requirement) were removed from the sample population. In addition, samples with no response to survey questions were also excluded. Some respondents, who included answers out of the target range of data analysis, were also removed from the sample. For example, the age of some respondents was under sixteen or over thirty. Some of them were graduated before 2014 or after 2023. In these cases, the exact result of the variable could not be acquired, making it impossible for accurate statistics. After the data was cleaned, the resulting sample population consisted of 116 surveys. All the variables can be used in data analysis due to sufficient number of responses. The average time for these 116 questionnaires to be finished was 4 minutes and 25 seconds, which was within the estimation of 5 minutes.

6. PRIMARY DATA RESULTS AND DATA ANALYSIS

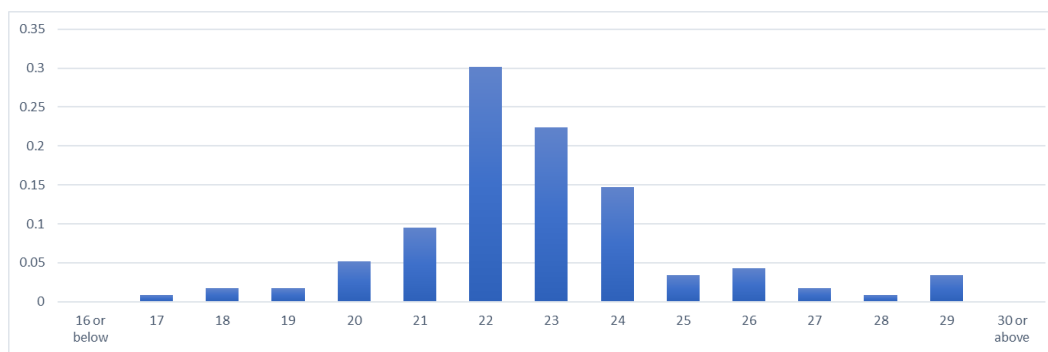
6.1 Descriptive Statistics

Descriptive statistics were generated to look at the following independent variables: “age”, “year of graduation”, “household size”, “registered permanent residence”, “direct relative outside Hunan province”, “education level”, “job area”, “lowest salary expected”, “admission to a job”.

After inputting the data into Excel for preliminary analysis, results were obtained as following. The sample has an average age of 22.81, an average year of graduation in 2018.24, an average household size of 3.72, and an average lowest salary expectation of 11.36. 43% of the participants were male while 57% were female.

Chart 6.1 showed the distribution of “age”, which is between 17 and 29. It is apparent that the variable of “age” is a normal bell curve skewing slightly to the right. The majority of the participants were between 21 and 24.

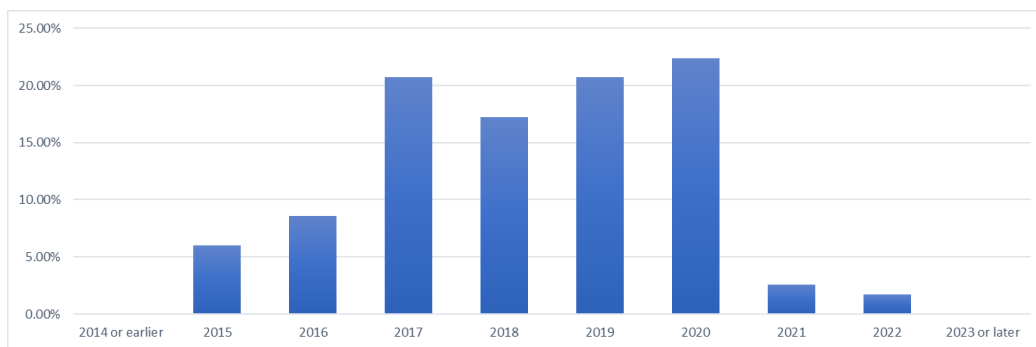
Chart 6.1 Frequency of age



As all the participants have entered universities in Changsha, the education level was only separated into two groups, undergraduate and graduate. The result showed that 40% of are pursuing or have obtained graduate degree.

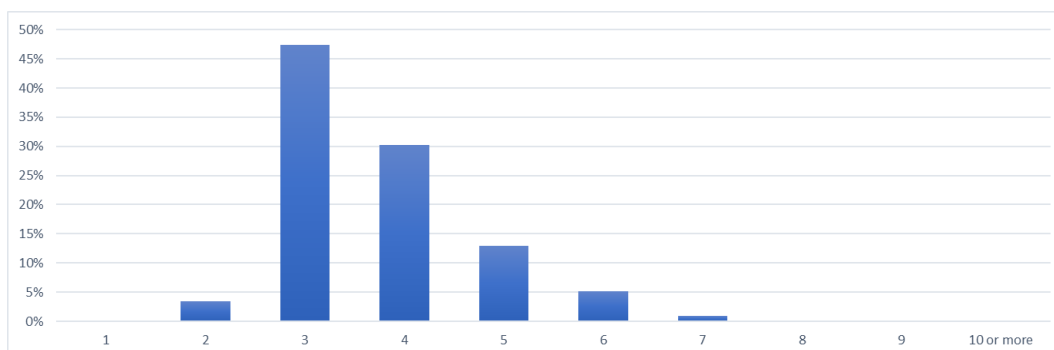
The year of graduation varied from 2015 to 2022, and it almost evenly distributed between year 2017 and 2020 (*Chart 6.2*). This frequency of graduation year reflected the fact that some of the participants have graduated for less than three years while others will graduate within 4 years. Participants have not graduated are facing the decision of where to work and live. Participant that have graduated and worked for less than three years are possibly still changing their decisions.

Chart 6.2 Frequency of Year of graduation



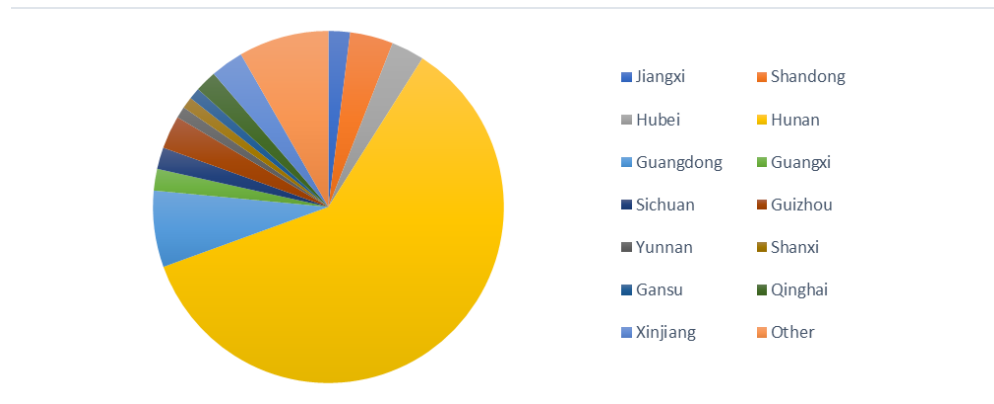
In *Chart 6.3* depicting the frequency of household size, the variable varied between 2 and 7. Due to the “one child policy”, “household size” became the most skewed variable and about half of the participants have a household size of three. For the families with more than three households, some of them may have more than one children, some of them are probably living together with grandparents.

Chart 6.3 Frequency of Household size



The registered permanent residence of the participants is shown in *Chart 6.4*. About 20 different provinces and direct-controlled municipalities are included. It is obvious that over half of the participants' household registration were within Hunan province. The result of data also showed that 54 percent of the participants have direct relative outside Hunan province.

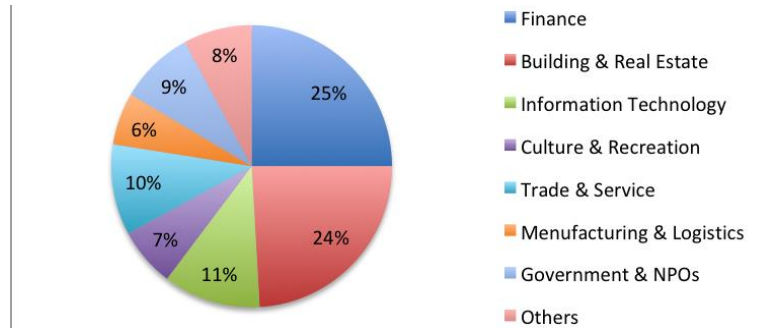
Chart 6.4 Distribution of registered permanent residence



The frequency of “job area” is presented in *Chart 6.5*. According to the chart, the sample includes participants working in various fields of industry including architecture & real estate, finance industry, trade & service, information technology, culture & recreation, government & non-profit organizations, and manufacturing & logistics, and others. Among all these fields, finance, building & real estate, and information technology, have the most participants, occupying 60% of the sample in total, which is also the same as the career choice situation of current university students in China. Each of the other fields also occupied 5-10% of the sample.

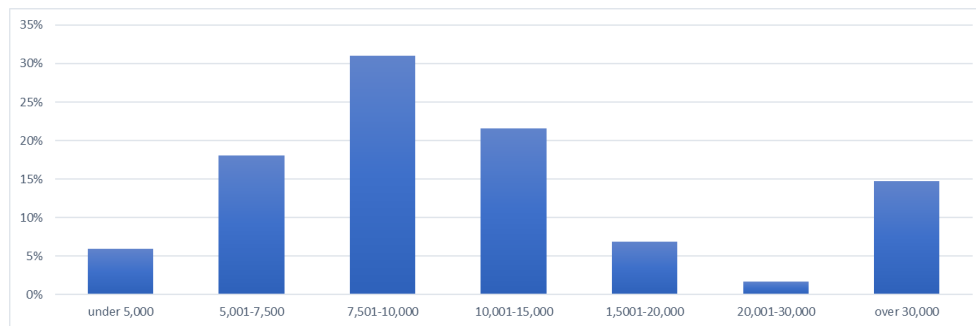
As the participants of the sample were not limited to a particular field, the sample could possibly represent the talents from universities in Changsha well.

Chart 6.5 Frequency of job area



In Chart 6.6 depicting the frequency of lowest salary expected by the participants, there is a curve skewing to the right. It also indicated a widely varied monthly salary expected varying between as low as 2.5 thousand RMB and 30 thousand RMB. It is quite interesting that there is an outlier at 30 thousand RMB a month, which might be related to the salary gap between different industries.

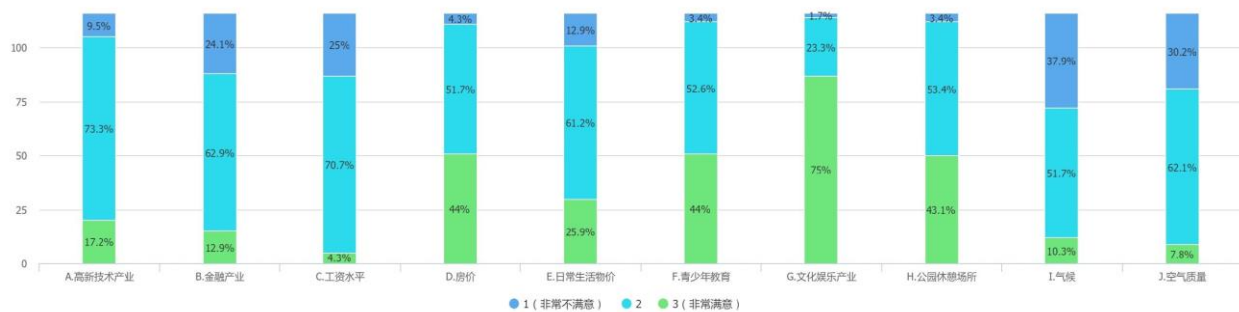
Chart 6.6 Frequency of expected lowest salary (RMB/month)



Among the 116 effective surveys, 45 participants have already got their job offers while 71 of them have not. 46 participants are willingness to work and live in Changsha while the other 70 participants are going to choose other provinces. As this is a case study focusing on Changsha, I am not going to mention the details of cities participants are going to work in.

Participants graded the ten aspects of Changsha with “1, 2, 3” to reflect their level of satisfaction. “1” means the least satisfied while “3” means the most satisfied. Referring to the following histogram, talents from universities in Changsha are generally satisfied with “Housing affordability”, “Daily life affordability”, “Education for children”, “Cultural and recreational activities”, and “Parks and open space”, while dissatisfied with “High-tech industry”, “Finance industry”, “Salary level”, “Climate”, and “Air quality”.

Chart 6.7 Degree of satisfaction with different aspects of Changsha



- A. High-tech industry
- B. Financial industry
- C. Salary level
- D. Housing affordability

- E. Daily life affordability
- F. Education for children
- G. Cultural and recreational activities

- H. Parks and open space
- I. Climate
- J. Air quality

According to *Chart 6.7*, cultural and recreational activities got the most “3” (75%) and the least “1” (1.7%). Salary level in Changsha got the least “3” (4.3%) while climate got the most “1” (37.9%).

The average degrees of satisfaction with the ten aspects of Changsha mentioned in the questionnaire are presented in the *Table 6.1*. “Cultural and recreational activities” got the highest grade while “Climate” got the lowest grade.

Table 6.1 Average degrees of satisfaction

A	B	C	D	E	F	G	H	I	J
2.08	1.89	2.16	2.15	2.26	2.31	2.59	2.40	1.72	1.78

- A. High-tech industry
- B. Financial industry
- C. Salary level
- D. Housing affordability

- E. Daily life affordability
- F. Education for children
- G. Cultural and recreational activities

- H. Parks and open space
- I. Climate
- J. Air quality

6.2 Further Survey

Some further surveys were carried out to let the participants prioritize the three objective factors they care most about. The frequency for them to prioritize the factors as first, second, and third important is listed in *Table 6.2*.

Table 6.2 Factors that the talents care most about

	A	B	C	D	E	F	G	H	I	J
1	24	9	38	16	6	3	4	0	7	9
2	3	9	25	25	17	8	8	1	9	11
3	4	2	11	19	16	21	14	0	11	18
Total	31	20	74	60	39	32	26	1	27	38

- A. High-tech industry
- B. Financial industry
- C. Salary level
- D. Housing affordability

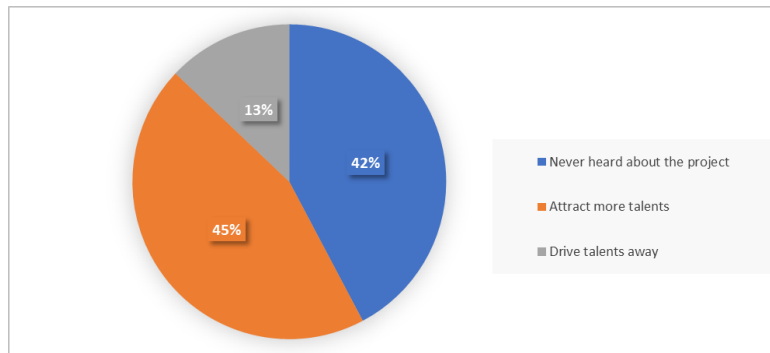
- E. Daily life affordability
- F. Education for children
- G. Cultural and recreational activities

- H. Parks and open space
- I. Climate
- J. Air quality

According to the result, salary level and housing affordability are the factors talents care most about when choosing a city to work and live. Next to these two factors, daily life affordability, air quality, education for children and high-tech industry are of similar importance. And it seems that they do not care much about the access to parks and open spaces in a city at current stage.

Participants were also inquired about their opinion about the High-Speed Rail Station in west Changsha that is going to become the connection point of the Belt and the Road as well as the transit-oriented project around it. The result (*Chart 6.8*) shows that 42.2% of the participants have never heard about the project. Within the 57.8% participants who have already known about the project, over three quarters showed a positive attitude. They believed that this project could help attracting more talents to Changsha.

Chart 6.8 Opinions about the TOD project in Changsha



At the end of the survey, there was an open question asking the participants about their personal advice to the development of Changsha. Thirteen of the participants gave out quite feasible advice. One participant firstly praised the education of Changsha, and then stated that Changsha does not have enough job opportunities for talents with university degrees. Three other responses advised that Changsha should invite more investment for various large-scale industries in order to provide more job opportunities. Two participants believed that Changsha should put more effort to the planning of road transportation and sidewalk beautification in order to make the appearance of the city more attractive. Five of the responses pointed out the importance of stabilizing housing price, commodity price as well as social welfares. Five other responses mentioned that instead of following the steps of first-tier cities, as a second-tier city, Changsha should try to be more

localization and make art, sports, and entertainment its cultural specialty.

6.3 Correlation Analysis

In order to preliminarily discover the degree of relationship between “Willingness to work in Changsha” and other variables, correlation analysis is carried out. The larger absolute value correlation coefficient between two variables has, the higher degree of correlation exists.

Table 6.3 Multivariate correlation result

	work_c~a	age	gender	hshld_~e	hshld_~n	relati~n	edu_le~l	year_g~d	salary~p	job_al~y
work_chang~a	1.0000									
age	0.0722	1.0000								
gender	-0.0417	-0.1511	1.0000							
hshld_size	0.0922	-0.1010	-0.0756	1.0000						
hshld_reg_~n	0.5363	0.2462	0.0649	0.1255	1.0000					
relative_h~n	-0.2117	-0.1711	-0.0295	-0.0370	-0.3666	1.0000				
edu_level	-0.0229	0.3952	-0.0617	-0.2281	0.1648	0.0167	1.0000			
year_grad	-0.1167	-0.4650	0.1245	0.0124	-0.1258	0.2015	0.3339	1.0000		
salary_exp	-0.1925	0.0131	-0.0771	-0.0511	-0.1783	0.0996	0.1374	0.1938	1.0000	
job_already	0.0418	0.3867	-0.2002	0.0874	0.0964	-0.1222	-0.2246	-0.7262	-0.2324	1.0000
a	0.0149	-0.0182	0.0981	0.1312	-0.0896	0.0377	-0.0566	0.1381	-0.1867	-0.0170
b	0.0635	-0.0843	0.1279	0.0637	0.0785	-0.0272	-0.1095	0.0077	-0.1850	0.0308
c	-0.1267	-0.1507	0.0429	-0.1350	-0.1041	0.0297	0.0420	0.0492	-0.1496	-0.0986
d	0.1270	0.1317	-0.0198	-0.0475	0.1228	-0.0947	0.0330	0.0016	-0.0065	0.0720
e	-0.0262	-0.0759	0.0557	-0.1538	-0.0148	0.0203	-0.0045	0.0860	-0.0422	-0.1946
f	0.0809	-0.0763	0.0152	0.1381	0.1855	-0.0453	-0.0470	0.1271	-0.0601	0.0010
g	0.2690	0.0992	0.0433	0.0901	0.2566	-0.1621	0.0150	0.0169	-0.2756	0.0881
h	0.1193	-0.0531	0.0887	0.1451	0.1307	0.0317	0.0115	0.1063	-0.1833	-0.0588
i	0.2401	-0.0576	0.0056	0.1654	0.2584	-0.0440	0.0541	0.0330	-0.1317	0.1225
j	0.1324	-0.1407	0.0544	0.0248	0.1037	-0.0265	0.0776	0.2009	-0.2085	-0.1515
	a	b	c	d	e	f	g	h	i	j
a	1.0000									
b	0.5076	1.0000								
c	0.1559	0.1617	1.0000							
d	0.1907	-0.0023	-0.2172	1.0000						
e	0.0467	0.1519	0.3468	0.0629	1.0000					
f	0.2049	0.2437	-0.0729	0.2883	0.2333	1.0000				
g	0.1193	0.1265	-0.1043	0.3058	0.1198	0.4112	1.0000			
h	0.2257	0.3154	0.0622	0.0331	0.1570	0.4377	0.4140	1.0000		
i	0.1715	0.3482	-0.0953	0.1302	-0.0610	0.2947	0.2763	0.3333	1.0000	
j	0.1769	0.2533	0.1690	0.2240	0.0678	0.3817	0.2638	0.3873	0.5615	1.0000

- A. High-tech industry
- B. Financial industry
- C. Salary level
- D. Housing affordability

- E. Daily life affordability
- F. Education for children
- G. Cultural and recreational activities

- H. Parks and open space
- I. Climate
- J. Air quality

According to the multivariate correlation test result (*Table 6.3*), variable “Willingness to work in Changsha” had the highest positive correlation coefficient with “Transformed registered permanent residence”. “Cultural and recreational activities (G)” had the second highest positive correlation coefficient with “Willingness to work in Changsha” while “Climate (I)” had the third highest correlation. “Direct relative outside Hunan province”, and “Lowest salary expected” are ranked after it with negative relationships to “Willingness to work in Changsha”.

“Willingness to work in Changsha” has a low correlation with “Age”, “Gender”, “Household size”, “Education level”, “Admission to a Job”, “High-tech industry (A)”, “Financial industry (B)”, “Daily life affordability (E)”, and “Education for children (F)”. Detailed correlation coefficients are presented in the table below. The low correlation between “Willingness to work in Changsha” and “Admission to a job” tell us that even if some of the participants had already found a job in Changsha, they are still changing their decisions and will possibly leave Changsha.

Table 6.4 Factors with top five high correlation with “Willingness to work in Changsha”

1	2	3	4	5
Registered permanent residence	Cultural and recreational activities	Climate	Direct relative outside Hunan province	Lowest salary expected

However, the correlation coefficient between “Transformed registered permanent residence” and “Direct relative outside Hunan province”, the correlation coefficient between “Transformed registered permanent residence” and “Cultural and recreational activities (G)”, the correlation coefficient between “Transformed registered permanent residence” and “Climate (I)”, and the

correlation coefficient between “Cultural and recreational activities (G)” and “Climate (I)” were also relatively high. Among all these variables, “Age” had the lowest correlation coefficient with all the other variables.

6.4 Cross Tabulation and Chi-Square Tests

After discovering the independent variables that have the highest correlation with “Willingness to work in Changsha” through a general comparison, a criterion is required to judge whether it is statistically significant that there is any association between each pair of variables.

The chi-squared test (Chi²) could determine whether there is a statistical significant difference between the expected frequencies and the observed frequencies in one or more categories. In this study, the confidential level is set at 95%. In each chi-squared test, the null hypothesis is that there is no association between two variables. If the test result shows a “P value” smaller than 0.05 in this study, they null hypothesis could e rejected and the relationship between two variables could be proved as statistically significant.

In order to conduct chi-square tests to observe a relationship between variables, continuous variables which have high correlation coefficients with the dependent variable were transformed into binary variables for cross-tabulation. The variables transformed were already listed in *Table 5.1*. The first variable transformed was the registered permanent residence. From the primary data, we can observe that Hunan is where the city of Changsha is as well as the main registered permanent residence of the participants, therefore, the sample’s “Registered permanent residence” can be divided into two categories basing on whether the participant was from Hunan province

and transformed into a binary variable.

The second variable “Lowest salary expected” was labeled as “0” for below ten thousand per month and “1” for at or above ten thousand per month. The variable was then labeled as “Below 10” and “at or above 10”. The reason is that the median of participants’ lowest monthly salary expected is 7.5 thousand, which is the category just below 10.

Chi-Squared Test 1: “Registered permanent residence” and “Willingness to work in Changsha”

In order to examine the relationship between the willingness to work and live in Changsha and registered permanent residence, we first converted the category variable (registered permanent residence) into a binary one and then ran the chi square test with the hypothesis:

H_0 : There is no association between willingness to work and live in Changsha and registered permanent residence.

H_1 : There is an association between willingness to work and live in Changsha and registered permanent residence.

Table 6.5 Result of Chi-Squared Test 1

Willing to Work in Changsha	Registered Permanent Residence within Hunan Province		Total
	No	Yes	
No	49	21	70
Yes	7	39	46
Total	56	60	116

Pearson chi2(1) = 33.3626 Pr = 0.000

According to the result of this Chi2 test, among the 116 participants, 60 of them have the Hukou

of Hunan province while 56 of them do not have. Within the 60 participants with the Hukou of Hunan, 39 of them are willing to work and live in Changsha in the future. In contrast, only 7 of the participants without the Hukou of Hunan plan to stay in Changsha. The Chi2 statistic value of this test is equal to 33.36, larger than the critical value of 3.84 (at $\alpha = 0.05$, $DF=1$. $P\text{-value} = 0.00 < \alpha = 0.05$). Therefore, the null hypothesis could be rejected. It is statistically significant that there is an association between willingness to work and live in Changsha and registered permanent residence. A participant is less likely to work in Changsha if his Hukou is outside Hunan.

Chi-Squared Test 2: "Direct relative outside Hunan" and "Willingness to work in Changsha"

Direct relative outside Hunan province is a critical indicator. This variable is divided into two categories: have direct relative outside Hunan province and have no direct relative outside Hunan province. The hypothesis is:

H_0 : There is no association between willingness to work and live in Changsha and direct relative outside Hunan province.

H_1 : There is an association between willingness to work and live in Changsha and direct relative outside Hunan province.

Table 6.6 Result of Chi-Squared Test 2

Willing to Work in Changsha	Direct Relative outside Hunan Province		Total
	No	Yes	
No	26	44	70
Yes	27	19	46
Total	53	63	116

Pearson $\chi^2(1) = 5.1964$ Pr = 0.023

The result shows that the chi square value is 5.20 (larger than the critical value for 0.05 probability at DF=1). Therefore, the null hypothesis could be rejected. It is statistically significant that there is an association between willingness to work and live in Changsha and direct relative outside Hunan province. People prefer to work in the provinces where they have direct relatives.

Chi-Squared Test 3: “Expected lowest salary” and “Willingness to work in Changsha”

To explore the relationship between willingness to work and live in Changsha and lowest salary expected, hypothesized:

H₀: There is no association between willingness to work and live in Changsha and lowest salary expected.

H₁: There is an association between willingness to work and live in Changsha and lowest salary expected.

Table 6.7 Result of Chi-squared Test 3

Willing to Work in Changsha	Expected Salary Compared to Average		Total
	below 10	at or abo	
No	32	38	70
Yes	32	14	46
Total	64	52	116

$$\text{Pearson } \chi^2(1) = 6.3847 \quad \text{Pr} = 0.012$$

The result shows that the chi square value is 6.38 (larger than the critical value for 0.05 probability at DF=1). Therefore, the null hypothesis could be rejected. It is statistically significant that there is an association between willingness to work and live in Changsha and lowest salary expected.

As the participants’ degree of satisfaction with the ten aspects of Changsha were reflected in three

levels, the relationship between these variables and the willingness to work and live in Changsha can also be discovered through Chi2 test.

Chi-Squared Test 4: “Cultural and recreational activities” and “Willingness to work in Changsha”

The satisfaction of cultural and recreational activities is a significant indicator. The travel purpose is divided into three categories basing on participants’ degree of satisfaction with this aspect of Changsha. The hypothesis is:

H₀: There is no association between the willingness to work and live in Changsha and the satisfaction of cultural and recreational activities.

H₁: There is an association between the willingness to work and live in Changsha and the satisfaction of cultural and recreational activities.

Table 6.8 Result of Chi-Squared test 4

Willing to Work in Changsha	Cultural and Recreational Industry			Total
	1	2	3	
No	2	33	35	70
Yes	0	11	35	46
Total	2	44	70	116

$$\text{Pearson chi2(2)} = 8.3938 \quad \text{Pr} = 0.015$$

The result indicates that the chi square statistic value is 8.39 (larger than the critical value of 5.99 at $\alpha = 0.05$, DF=2. P-value = 0.014 < $\alpha = 0.05$). The null hypothesis could be rejected and the conclusion is that there is an association between the willingness to work and live in Changsha and the satisfaction of cultural and recreational activities.

Chi-Squared Test 5: “Climate” and “Willingness to work in Changsha”

The satisfaction of climate is another key factor that should be considered. Samples were divided into three groups basing on participants’ degree of satisfaction with this aspect of Changsha. The hypothesis is:

H₀: There is no association between willingness to work and live in Changsha and the satisfaction of climate.

H₁: There is an association between willingness to work and live in Changsha and the satisfaction of climate.

Table 6.9 Result of Chi-Squared Test 5

Willing to Work in Changsha	Climate			Total
	1	2	3	
No	34	30	6	70
Yes	10	30	6	46
Total	44	60	12	116

Pearson chi2(2) = 8.4888 Pr = 0.014

The result shows that the chi square statistic value is 8.49 (larger than the critical value for 0.05 probability at DF=2). Therefore, the null hypothesis was successfully reject. It is statistically significant that there is an association between willingness to work in Changsha and the climate.

6.5 Regression Analysis

Regression model could find out the quantitative relationship between continuous dependent variable (number stands for quantity) and independent variable. As the “Lowest salary expected” is a continuous variable, in order to find out the accurate quantitative relationship between it and “Willingness to work in Changsha”, I used STATA to do regression analysis.

Regression Test: “Lowest salary expected/1000” and “Willingness to work in Changsha”

Table 6.10 Result of regression test

Source	SS	df	MS	Number of obs	=	116
Model	1.02854996	1	1.02854996	F(1, 114)	=	4.39
Residual	26.7300707	114	.234474305	Prob > F	=	0.0384
				R-squared	=	0.0371
				Adj R-squared	=	0.0286
Total	27.7586207	115	.24137931	Root MSE	=	.48423

work_chang~a	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
salary_exp	-.0111195	.0053091	-2.09	0.038	-.0216367 -.0006022
_cons	.5216456	.0747573	6.98	0.000	.373552 .6697392

Based on the output from the bivariate regression model (*Table 6.10*), the relation between “Lowest salary expected” and “Willingness to work in Changsha” can be model by the equation: Willingness to work in Changsha = -0.11(Lowest salary expected/1000) + 0.522. When all other variables are held constant, if the lowest monthly salary a talent expected increased by 1,000 RMB, their willingness to work and live in Changsha will decrease by 0.11. This model can account for 4% of the talents from the top universities in Changsha (R-squared = 0.0371).

As $P < \alpha = 0.05$, the coefficient is statistically significant.

6.6 Comparison between Participants with and without the Hukou of Hunan

According to previous analysis result from regression test, the correlation coefficient between “Registered permanent residence” and “Willingness to work in Changsha” is much higher than the correlation coefficient between “Willingness to work in Changsha” and other variables. Therefore, the sample can be separated into two groups for further analysis about the top three factors they care most about when deciding whether to live and work in Changsha. Participants in Group 1 do not have the Hukou of Hunan while participants in Group 2 have it.

The result (*Table 6.11*) reflected that both groups care most about salary level and housing affordability and do not care much about parks and open space. Two groups of participants also both care about high-tech industry, daily life affordability, cultural and recreational activities, climate, and air quality while they hold different attitude towards the importance of financial industry and education for children.

Table 6.11 Comparison between factors participants with and without Hukou of Hunan care about

Group 1:

	A	B	C	D	E	F	G	H	I	J
1	12	6	20	9	1	0	2	0	4	2
2	0	6	9	11	12	2	4	1	6	5
3	2	1	5	10	8	7	8	0	6	9
Total	14	13	34	30	21	9	14	1	16	16

Group 2:

	A	B	C	D	E	F	G	H	I	J
1	12	3	18	7	5	3	2	0	3	7
2	3	3	16	14	5	6	4	0	3	6
3	2	1	6	9	8	14	6	0	5	9
Total	17	7	40	30	18	23	12	0	11	22

- A. High-tech industry
- B. Financial industry
- C. Salary level
- D. Housing affordability
- E. Daily life affordability

- F. Education for children
- G. Cultural and recreational activities
- H. Parks and open space
- I. Climate
- J. Air quality

7. RESULT DISCUSSION

The results obtained from the chi-square test and regression analysis were strong enough to identify the independent variables that have significant impacts on the dependent variable. In other words, “Registered Permanent Residence”, “Direct Relative outside Hunan Province”, “Lowest salary expected”, “the satisfaction of Cultural and Recreational activities” and “the satisfaction of Climate” were found out to have significant impacts on the talents’ willingness to work and live in Changsha. It was not statistically significant that variables like “Age”, “Gender”, “Household size”, “Education level” and the satisfaction of other aspects of Changsha had any association with the talents’ decision to work and live in Changsha. Therefore, these analysis results were not taken into consideration for the research conclusion.

According to the result of data analysis, there was a positive relationship between “Transformed registered permanent residence” and “Willingness to work in Changsha”. This could in some degree indicate that registered permanent residence is still an important factor to decide where a talent is going to work after graduation. The possible reason is that with the registered permanent residence of Hunan province, they could enjoy more of the local welfares in terms of housing and medical care according to the law in China. In order to attract talents from other provinces around China, one possible suggestion for the local government of Changsha is to consider weakening the importance of registered permanent residence by providing all university graduates with the same standard of allowance. For example, university graduates may also be permitted to purchase their apartments in Changsha without paying extra tax. Alternatively, the local government of Changsha could also create an easier path for talents to get the Hukou of Changsha. For example, the government could announce that university graduates could get the Hukou of Changsha as long as

they work and pay tax in Changsha for 3 years.

Due to the large correlation coefficient between “Registered permanent residence” and “Direct relative outside Hunan Province”, the negative relationship between “Direct relative outside Hunan Province” and “Willingness to work in Changsha” could also be attributed to the effect of registered permanent residence. Another possible reason is that many people prefer staying closer to their relatives.

The negative relationship between “Expected lowest salary” and “Willingness to work in Changsha” showed that high salary is still one of the most important factors potentially attracting talents to a city. Considering that salary level got the least satisfaction (4.3%) in the survey, Changsha still has a long way to go for its economic development. With the implementation of transit-oriented development in this city, the increasing supplements of job opportunities will possibly lead to an increase in salary level.

In the data analysis result from Stata, the correlation between “Satisfaction of cultural and recreational activities” and “Willingness to work and live in Changsha” is even stronger than the correlation between “Lowest salary expected” and “Willingness to work and live in Changsha”. This result is to some degree contradictory with our common sense, in which young people usually care more about salary level. The possible reason is that when filling questionnaires, the expected salary level participants filled in might be a little bit different from what they actually expected. However, the result could still indicate that “Cultural and recreational activities” is a crucial factor affecting talents’ decision to work and live in Changsha.

The association between “Satisfaction of cultural and recreational activities” and “Willingness to work and live in Changsha” strongly supported the hypothesis that what the creative class care about is not only high salary and good job opportunities but also the abundant cultural and recreation activities. To make it simple, when two cities have similar salary level and job opportunities, if the talents do not have the Hukou of any of the cities, they can possibly be attracted to the city with abundant cultural life. Due to the fact that a large portion of talents are currently quite satisfied with the cultural and recreational life in Changsha, local government could make good use of this superiority and consolidate its position as a characteristic advanced industry. Considering that the climate in Changsha is not of great satisfactory and the climate is not a controllable factor, more indoor activities could be considered instead of outdoor ones.

8. CONCLUSION AND RECOMMENDATIONS

8.1 Suggestions for Changsha

In China's "The Belt and Road" plan, Changsha, a second-tier city in the middle area of China is going to play an important role for innovation and high-tech development. The attraction for talents seems quite important for this step of development.

Among the newly developed high-tech city in the United States, the booming history of the city of Austin set up a good example of benefiting from talents graduated from University of Texas Austin. These talents chose to live and work in Austin probably due to its cultural activities, urban environment and social welfare.

After using the variables identified from the case of Austin as well as some previous studies about factors attracting talents to a city, an online survey was carried out using the Tencent Questionnaire platform. Questionnaires were issued to several hundreds of people from the top universities in Changsha in order to find out the exact factors leading to their decision of staying in or leaving Changsha. Their answers were entered into excel and Stata was used for data analysis.

According to the data analysis result of the survey, apart from the traditional factors like "registered permanent residence" and "lowest salary expected", similar to Austin, the participants' willingness to live and work in Changsha can also be seriously affected by their satisfaction level of the cultural and recreational activities of the city as well as the climate. The survey results also indicated that the cultural and recreational activities in Changsha is currently receiving a high level of satisfaction, which means that Changsha has its original advantage in cultural life development.

The result of survey also reflected that different between talents in Austin, talents in Changsha do not care much about natural surroundings like parks and open space, which could probably be attributed to the terrible climate in Changsha.

Therefore, it is possible for Changsha to learn from the development plans and policies in Austin in terms of urban and cultural life development. Due to the lack of pleasant climate, Changsha could possible use more indoor cultural activities to replace the outdoor ones. Focusing on steady economic development and making good use of its own cultural resources at the same time, Changsha could possibly attract more talents and boom up in high-tech city development.

During Changsha's three thousand years of history, it has created splendid culture and has been the hometown of a great number of celebrities. Therefore, local government can make good use of these resources and put more effort to the publicizing of the historical museums and former residence of celebrities.

Apart from history and culture, recent years Changsha also has its advantages in media art. After the UNESCO Creative Cities Network was created in 2004, Changsha was the first city in China to become the City of Media Art. Media art is a form of contemporary art, which mainly refers to the artistic works that focus on the use of modern technology, new media forms and new vision methods to express the theme of the works. For example, digital technology could help fireworks to become more visually impressive (*Figure 8.1*). These years, with the development in information technology, 3d printing, and biological science and technology, there is an increasing

space for Changsha to have further development in this area. It would also be possible for local government to cooperate with high-tech companies and held some interactive activities related to media art.

Figure 8.1 Fireworks with digital technology in Changsha



(changsha.cn, 2017)

The case study of Changsha also told that what today's talents in China care about is not only material life but also spiritual satisfaction and cultural life. When crafting policies and plans for the development of second-tier cities in China, instead of completely learning from first-tier developed cities like Beijing, Shanghai and Shenzhen, local city governments and planners should discover and make good use of its own specialties for talent attraction.

8.2 Limitations and Recommendations

One of the limitations of this study is the size of the sample. As there were only 130 participants in this survey, with 116 answers possible for data analysis, the sample may not be representative enough for the talents from universities in Changsha.

Another limitation is that as most of the questions in the questionnaire were multiple choice, most variables acquired from the responses are dummy variables instead of continuous variables. As a consequence, it is hard to build a multi-regression model for accurate quantitative analysis.

Moreover, this paper did not look deep into the historical and cultural traditions of Austin as well as the detailed data reflecting the effect of specific methods Austin used to improve its cultural life. Therefore, it is hard to say how much of the creative environment of Austin was spontaneous and how much was fostered by policies and strategies.

Last but not least, due to the limitation in access permission, the study only focused on university students and graduates. There was no interview of officials or planners in this study and the opinions about the next step development of Changsha from these professionals could not be acquired.

In order to have a deeper study of factors attracting talents to live and work in the city of Changsha, it would be better to carry out a more detailed research with the use of a larger sample. Besides, in order to find out the specific policy and plans that works in attracting talents in Austin, a deeper research into the development of cultural life in Austin is also required. In addition, the opinions from experts could be more helpful for the discussion of feasible policies that can possibly be carried out in terms of these factors.

REFERENCES

- Academy of China Hi-tech Industry Economy (ACHIE). Retrieved from <http://www.achie.org/>
- Agenda Invest. (2017). China's New Silk Road. Retrieved from <https://www.agendainvest.com/2017/07/31/chinas-new-silk-road/>
- Belt and Road Portal. Retrieved from <https://www.yidaiyilu.gov.cn/>
- Changsha Bureau of Statistics. (2016). *Changsha Statistical Yearbook 2015*. China Statistics Press.
- Changsha Evening Newspaper. (2017). <http://www.changsha.cn/>
- CMA CGM LOG. (2017). Silk Road: A New Asian Transport Dynamic. Retrieved from <http://www.cmacgm-log.com/en/products/silk-road>
- Florida, R. (2005). *Cities and the creative class*. Routledge.
- Fatemi, F. (2017). 5 U.S. Cities Poised To Become Tomorrow's Tech Meccas. *Forbes*. <https://www.forbes.com/sites/falonfatemi/2017/03/23/5-u-s-cities-poised-to-become-tomorrows-tech-meccas/#6a0180d52132>
- Liu, Y., & Shen, J. (2014). Jobs or amenities? Location choices of interprovincial skilled migrants in China, 2000–2005. *Population, Space and Place*, 20(7), 592-605.
- Michaud, P. and Tcheremenska, A. (2003). Montreal knowledge city. Montreal Knowledge City Advisory Committee. November 2003, Montreal.
- Ministry of Science and Technology of the People's Republic of China. <http://www.most.gov.cn/gxjscykfq/index.htm>
- National Bureau of Statistics of the People's Republic of China. Retrieved from <http://www.stats.gov.cn/>
- Project partner. (2018). Hukou System Explained: China's Internal Passport. Retrieved from

<https://projectpartner.org/poverty/hukou-system-explained-chinas-internal-passport/>

South China Morning Post. (2016). Urban legend: China's tiered city system explained. Retrieved

from <http://multimedia.scmp.com/2016/cities/>

Storper, M., Kemeny, T., Makarem, N., & Osman, T. (2015). *The rise and fall of urban economies: Lessons from San Francisco and Los Angeles*. Stanford University Press.

Storper, M., & Scott, A. J. (2009). Rethinking human capital, creativity and urban growth. *Journal of economic geography*, 9(2), 147-167.

Thite, M. (2011). Smart cities: implications of urban planning for human resource development. *Human Resource Development International*, 14(5), 623-631.

Yigitcanlar, T. A. (2007). The making of urban spaces for the knowledge economy: global practices.

APPENDIX**Appendix 1: Questionnaire in English**

1. What is your age?
2. What is your gender? M F
3. What is your family size?
4. Where is your Registered Permanent Residence?
5. Do(will) you have direct relative outside Hunan province?
 - a. Yes b. No
6. What is your highest level of education?
 - a. Bachelor b. Master or above
7. In which year will(did) you graduate?
 - a. 2016 c. 2018 e. 2020
 - b. 2017 d. 2019 f. Others_____
8. What is the area of the job you are going to do?
 - a. Building & Real Estate e. Finance
 - b. Information Technology f. Culture & Recreation
 - c. Trade & Service g. Manufacturing & Logistics
 - d. Government & NPOs h. Others
9. What is the lowest monthly salary you expected?
 - a. 2,500 b. 5,000 c. 7,500 d. 10,000
 - e. 15,000 d. 20,000 e. 30,000
10. Have you already been admitted to a job?
 - a. Yes b. No

11. Where are you going to work after graduation?

12. Could you please rate the following perspectives of Changsha?

- | | | | | |
|----|--|---|---|---|
| a. | High-tech industry | 1 | 2 | 3 |
| b. | Financial industry | 1 | 2 | 3 |
| c. | Salary level | 1 | 2 | 3 |
| d. | Housing affordability | 1 | 2 | 3 |
| e. | Daily life affordability | 1 | 2 | 3 |
| f. | Education for children | 1 | 2 | 3 |
| g. | Recreational facilities and activities | 1 | 2 | 3 |
| h. | Parks and open space | 1 | 2 | 3 |
| i. | Climate | 1 | 2 | 3 |
| j. | Air quality | 1 | 2 | 3 |

13. Which three of the factors above do you care most? (Prioritize them)

- | | | |
|---|---|---|
| 1 | 2 | 3 |
|---|---|---|

14. A new High-Speed Rail Station in west Changsha is going to connect the Belt and Road.

What do you think about the impact of it?

- | | | | |
|----|---------------------------------------|----|-----------------|
| a. | Drive people away | b. | Bring people in |
| c. | I have never heard about this project | | |

15. Any advice to the development of Changsha? (Optional)

