Innovations

# A Quantitative Analysis on the Satisfaction of Residents on the Integration and Development of the Chengdu-Chongqing Economic Circle

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***Abstract***
*The developments regarding circular economy during the past decades introduced the economic model called "Economic Circle" or "Circular Economy". This model seeks to change the direction of the economic landscape from an expendable system to a more sustainable and regenerative one. In this study, a rising economic circle around the cities of Chengdu and Chongqing were examined. Particularly, this study aimed to answer, "What is the satisfaction level of Chengdu and Chongqing residents along economic, societal, technological and innovation, and environmental factors that influence the integration and development of the Chengdu-Chongqing economic circle?". Descriptive research design was used to identify the aforementioned factors and a 58-item questionnaire was distributed to a total of 210 respondents along these areas. It was found in the study that the residents are generally satisfied with the progress and initiatives related to these factors. While residents are satisfied overall, it is important to maintain a balanced approach to development. This means ensuring that economic growth is accompanied by measures that promote societal well-being, technological advancements, and environmental sustainability.*

***Keywords:*** *economic circle, circular economy, Chinese economy, satisfaction, sustainability*

## Introduction

The concept of the circular economy can be traced back to the 1930s when economist Nicholas Georgescu-Roegen introduced the idea of a "closed system" economy in which resources were used and reused in a cyclical manner (Reid, 2013). However, it was not until the 1970s and 1980s that the concept of the circular economy began to gain attraction as a potential solution to the growing environmental and resource challenges facing the world. In the 1970s, the Club of Rome – an international think tank – published the influential book "The Limits to Growth, " highlighting the need for a more sustainable economic model (Gomez-Baggethun & Naredo, 2015). Shortly after, the German Federal Environment Agency developed the concept of the "closed loop economy" (Milios, 2018) and the Dutch government published a report on the "circular economy" both in the 1980s (Van Buren et al., 2016). In the 1990s, the

European Union (EU) began to develop policies and strategies to promote a circular economy, such as the "Thematic Strategy on the Prevention and Recycling of Waste" (European Commission, as cited in Sala et al., 2021). In the 2000s, the EU launched the "Resource Efficiency Roadmap" (Bahn-Walkowiak & Wilts, 2017) which aimed to promote the efficient use of resources and reduce waste.

With these developments, the economic circle or circular economy was introduced. This refers to an economic model in which resources are used, reused, and recycled in a closed loop, with minimal waste and pollution (Moraga et al., 2019; De Angelis, 2018). The goal of the circular economy is to shift from the traditional linear model of expendable system to a more sustainable and regenerative system. According to Govindan and Hasaganic (2018), there are certain advantages in adapting a circular economy for individuals, communities, and countries. For example, companies can save money on raw materials and reduce their environmental impact by designing products and processes to be more easily reused and recycled. Consumers can also benefit from the circular economy by having access to more sustainable and durable products.

Economic circles can also have a wide array of effects on the country's economic growth and development; it can help create new business opportunities and jobs particularly, in the areas of recycling, refurbishment, and product design (World Economic Forum, as cited in Corvellec et al., 2020). It can also help to promote innovation and competitiveness as companies are encouraged to find new ways to use resources more efficiently (Kadam, 2019); it can help promote more sustainable and equitable economic growth by reducing dependence on finite resources, reducing pollution and waste, and improving the resilience of local communities (Wu et al., 2020); and, it can help address the problem of income inequality, as it can create jobs and economic opportunities in low-income communities, which can help reduce poverty and improve living standards (Ormazabal et al., 2018).

In recent years, the concept of the circular economy has gained increasing attention and momentum as a potential solution to global environmental and resource challenges. The Ellen MacArthur Foundation, a UK-based think tank, has been a major proponent of the circular economy and has worked to promote the concept globally (Flynn & Hacking, 2019). In the early 2000s, other European countries began to develop their own circular economy policies and strategies. For example, France launched the "National Plan for the Circular Economy" in 2013 (French Ministry of Ecological and Inclusive Transition, 2013) and the Netherlands developed the "Circular Economy Agenda" in 2016 (Golsteijn & Martinez, 2017).

In the United States, the circular economy concept has been mainly led by the private sector and non-profit organizations (Berry et al., 2022). The private sector has implemented circular economy business models, such as product-as-a-service and closed-loop supply chains. In Japan, the government has implemented a number of policies and programs to promote the circular economy, such as the "3Rs" which aims to promote the efficient use of resources and reduce waste by promoting recycling and the use of recycled materials (Ministry of Economy, Trade and Industry, 2020). The private sector in Japan has also been actively promoting circular economy business models, such as product-as-a-service and closed-loop supply chains. In South Korea, the government has also implemented policies and programs to promote the circular economy, such as the "Framework Act on Resource Circulation 2016" and the "Green Car Roadmap" which aims to promote the use of electric vehicles and other sustainable transportation options (Kee et al., 2021). The private sector in South Korea has also been actively promoting circular economy business models, such as closed-loop supply chains and the sharing economy.

Hence, it is along this relevant literature on the topic that this study has been conceptualized to understand how the economic growth and development within the Chengdu-Chongqing Economic Circle in China has impacted the level of satisfaction among its residents and consumers. Also, this study is conducted to assess the extent to which economic, societal, technological and innovation, and

environmental factors shape residents'/consumers' experiences within the Chengdu-Chongqing Economic Circle. These four factors are discussed below (Filkins et al., as cited in Kolodinsky et al., 2013):

***Economic Factors***
These refer to economic activities involving job opportunities, access to credit facilities, and social welfare programs to improve the standards of living of the residents.

***Societal Factors***
These refer to economic activities involving social cohesion, sense of connectedness, and solidarity among the residents.

***Technological and Innovation Factors***
These refer to economic activities involving technology adoption, economic innovation, and the impact of productivity and efficiency towards the residents.

***Environmental Factors***
These refer to economic activities involving the quality of air, water, and food and its impact on the health and well-being of the residents.

**Statement of the Problem**

In China, the government has implemented a number of policies and programs to promote the circular economy. The Chinese government has set a target to develop a circular economy by 2020, and it has established a number of policies and plans to achieve this goal. The Chinese government has also established the National Development and Reform Commission (NDRC) and the Ministry of Environmental Protection (MEP) to coordinate and implement circular economy policies (Fan & Fang, 2020). The private sector in China has also been actively promoting circular economy business models, such as closed-loop supply chains, product-as-a-service, and the sharing economy (Islam & Iyer-Raniga, 2022).

One of the key initiatives China has implemented to promote the circular economy is the "Resource Conservation and Circular Economy Promotion Law" enacted in 2008. This law aims to promote the efficient use of resources and reduce waste by promoting recycling and the use of recycled materials (Fan & Fang, 2020). The Chinese government also established the National Development and Reform Commission (NDRC) and the Ministry of Environmental Protection (MEP) to coordinate and implement circular economy policies. The NDRC and the MEP have jointly developed a number of circular economy action plans, such as the "Circular Economy Promotion Plan" and the "Circular Economy Industrial Development Plan" (Zhao, 2018). In addition to the government's efforts, the private sector in China has also been actively promoting circular economy business models, such as closed-loop supply chains, product-as-a-service, and the sharing economy.

One of the country's most well-known economic circles is the Chengdu-Chongqing Economic Circle which is centered around the cities of Chengdu and Chongqing and includes the surrounding regions of Sichuan, Chongqing, and parts of Yunnan, Guizhou, and Hunan provinces. It was conceptualized in the 1990s as part of the Chinese government's "Go West" policy, which aimed to promote economic development and reduce regional disparities in the western part of the country (Zhao, 2018). The Chengdu-Chongqing Economic Circle is a regional economic development initiative that aims to promote economic growth and development in China's Sichuan and Chongqing regions. The policy specifically, (1) aims to develop the Chengdu-Chongqing Economic Circle into a major economic, technological, and innovation hub, focusing on high-tech, advanced manufacturing, and modern service industries. (2) This initiative focuses on promoting sustainable economic growth and development in the region by developing key industries,

improving transportation and logistics infrastructure to support economic growth, and (3) promoting cooperation and collaboration between regions in order to facilitate the flow of goods, services, and people (Zheng & He, 2022).

In later years, several studies were conducted to concretize the idea of an economic circle. For example, a study by Zhang (2015) focused on the role of economic circles in promoting economic development in rural China. The study found that economic circles played an important role in promoting economic growth and improving the livelihoods of rural residents. The study also found that economic circles effectively promoted the development of small and medium-sized enterprises and provided training and support for rural entrepreneurs. There are also several extent literatures conducted within the study's parameters. For example, the National Development and Reform Commission (as cited in Hong Kong Trade Development Council, 2022) found that the Chengdu-Chongqing Economic Circle has a high potential for economic development and has become an important center for advanced manufacturing, information technology, and modern services industries. Similarly, research by the Academy of Macroeconomic Research (as cited in Wang, 2022) found that the Chengdu-Chongqing Economic Circle has a relatively high level of economic integration and that the coordinated development of the region's transportation and logistics industries has played an important role in promoting regional economic development.

Given these discussions, getting into the innermost stands of the residents'/consumers' level of satisfaction in the Chengdu-Chongqing Economic Circle will provide a benchmark for future evaluations and help identify areas that need improvement. In addition, it could also provide a way to track the progress of the Economic Circle over time and determine if the policies and actions taken to improve the Economic Circle have been effective. Particularly, this study aimed to answer, “What is the satisfaction level of Chengdu and Chongqing residents along economic, societal, technological and innovation, and environmental factors that influence the integration and development of the Chengdu-Chongqing economic circle?”.

## Methodology

***Research Design, Population, and Locale***

The study used descriptive research design to describe the satisfaction level of Chengdu and Chongqing residents along economic, societal, technological and innovation, and environmental factors that influence the integration and development of the Chengdu-Chongqing economic circle. Through stratified random sampling technique, the study included a total of 210 respondents, with 104 residents from Chengdu and 106 residents from Chongqing, China. The inclusion criteria for the study include residents aged 18 years (who have at least worked for a year) and above and have been living in the area for at least one year. In contrast, the exclusion criterion includes residents who refused or withheld their participation in the study.

***Data Gathering Tool***

The data gathering instrument for this study was a self-administered questionnaire based on the readings and literature review that were used as bases for the questionnaire items. Thus, the questionnaire can be considered a self-made questionnaire with items coming from related literature review and readings. By using this method, the researchers were able to gather relevant data for the study and provide an accurate picture of the participants' satisfaction levels. Validity and reliability tests were conducted in the study to ensure the accuracy and dependability of the results.

It focused on the participants' satisfaction levels with regard to the economic, societal, technological and innovation, and environmental conditions in the Chengdu-Chongqing economic circle. This consists of 58

item questions (economic (13); societal (17); technology and innovation (17); and environmental (11)), allowing the researchers to gather detailed and specific information on the participants' perceptions and experiences. Each item was rated on a 4-point Likert scale, with options ranging from "very satisfied" to "very dissatisfied" for satisfaction and a scale of “Very influential”, “Influential”, “Slightly influential” and “Not influential” was used for the influence. This scale has been chosen as it provides a clear and easy-to-understand measure of the participants' satisfaction levels.

***Data Gathering Procedure***

The following procedures have been carefully designed to ensure that the data collected for this study is of the highest quality and relevance to the research undertaking. Prior to initiating the study, ethical clearance was obtained from the local research ethics committee. Then, a letter of permission was obtained from the Deputy Secretaries of Chengdu Municipal Party Committee in Chengdu, China. Once the permission was obtained, the researchers approached the residents explaining the importance and purpose of the study before floating the questionnaire. Lastly, the data collected were tallied, analyzed, and interpreted.

***Data Treatment***

General weighted mean was used to treat the data. Table 1 presents the level of satisfaction of Chengdu and Chongqing residents along economic, societal, technological and innovation, and environmental factors that influence the integration and development of the Chengdu-Chongqing economic circle.

**Table 1.Level of Satisfaction**

| Relative Value | Statistical Limits | Description | Interpretation |
|---|---|---|---|
| 4 | 3.25 – 4.00 | Very Satisfied (VS) | Residents have a strong positive perception and are highly satisfied with the factors being measured in the Chengdu-Chongqing Economic Circle. They also consider that the level of development in these areas is better compared to other regions. |
| 3 | 2.50 – 3.24 | Satisfied (S) | Residents have a positive perception and are satisfied with the factors being measured, but they have some slight concerns or areas they believe need improvement, but overall they believe the development in these areas is sufficient. |
| 2 | 1.75 – 2.49 | Dissatisfied (D) | Residents have a negative perception and are not satisfied with the factors being measured in the Chengdu-Chongqing Economic Circle. They also consider that the level of development in these areas is not sufficient and that improvements are needed. |
| 1 | 1.00 – 1.74 | Very Dissatisfied (VD) | Residents have a strong negative perception and are highly unsatisfied with the factors being measured. They also consider that the level of development in these areas is very poor and that significant improvements are needed. |

**Results and Discussion**

This section presents the quantitative analysis of data on the satisfaction of residents on the integration and development of the Chengdu-Chongqing economic circle. The general mean satisfaction level of Chengdu and Chongqing residents regarding the integration and development of the Chengdu-Chongqing Economic Circle is 2.95 which means that the residents have a strong positive perception and are highly satisfied with the factors being measured in the Chengdu-Chongqing Economic Circle. They also consider that the level of development in these areas is better compared to other regions.

***Satisfaction Level on Economic Factors***

The overall mean satisfaction level of Chengdu and Chongqing residents regarding the integration and development of the Chengdu-Chongqing Economic Circle is 2.89, indicating a generally satisfactory sentiment among the population. This mean score is derived from the ratings given to various factors related to economic development, job opportunities, infrastructure, education, investment, and overall economic situation.

**Table 2 Level of Satisfaction on Economic Factors**

| ECONOMIC FACTORS | WEIGHTED MEAN | DESCRIPTION |
|---|---|---|
| 1. Current economic development for high-tech industries | 3.00 | Satisfied |
| 2. Availability of job and employment opportunities | 2.92 | Satisfied |
| 3. Level of economic growth in the logistics and transportation industries | 2.75 | Satisfied |
| 4. Level of income and wages in the manufacturing sector | 2.72 | Satisfied |
| 5. Cost of living standards | 2.93 | Satisfied |
| 6. Government support for small and medium-sized enterprises | 3.00 | Satisfied |
| 7. Level of infrastructure development in the energy sector | 3.21 | Satisfied |
| 8. Level of transportation development in the public transportation sector | 2.90 | Satisfied |
| 9. Level of educational opportunities in vocational and technical education | 2.81 | Satisfied |
| 10. Level of training opportunities in digital skills | 3.01 | Satisfied |
| 11. Level of local investment in the tourism industry | 2.74 | Satisfied |
| 12. Level of foreign investment in the financial sector | 2.78 | Satisfied |
| 13. Rate the overall economic situation | 2.85 | Satisfied |
| **OVERALL MEAN** | **2.89** | **Satisfied** |

Overall, the residents of Chengdu and Chongqing express a generally satisfactory sentiment regarding the integration and development of the Chengdu-Chongqing Economic Circle. The high satisfaction levels in factors such as infrastructure development in the energy sector and government support for SMEs demonstrate the positive impact of the economic circle on sustainable development and entrepreneurship (Zheng & He, 2022). However, the lower satisfaction levels in factors such as income and wages in the manufacturing sector and local investment in the tourism industry indicate areas that require further attention and improvement. Addressing these challenges will be crucial in ensuring the long-term success and satisfaction of residents within the economic circle.

***Satisfaction Level on Societal Factors***

The overall mean satisfaction level of 2.95 indicates that Chengdu and Chongqing residents are generally satisfied with the integration and development of the Chengdu-Chongqing Economic Circle. This mean score is derived from the ratings given to various factors related to healthcare services, education, housing, public services, social cohesion, and stability.

**Table 3 Level of Satisfaction on Societal Factors**

| SOCIETAL FACTOR | WEIGHTED MEAN | DESCRIPTION |
|---|---|---|
| 1. Availability of healthcare services | 2.89 | Satisfied |
| 2. Quality of healthcare services | 3.13 | Satisfied |
| 3. Public safety and security | 2.83 | Satisfied |
| 4. Effectiveness of the educational system | 2.84 | Satisfied |
| 5. Availability of recreational activities | 2.95 | Satisfied |
| 6. Availability of cultural activities | 2.80 | Satisfied |
| 7. Availability of educational activities | 2.84 | Satisfied |
| 8. Availability of housing program | 2.92 | Satisfied |
| 9. Accessibility of housing | 2.94 | Satisfied |
| 10. Availability of public services | 3.02 | Satisfied |
| 11. Quality of public services | 2.90 | Satisfied |
| 12. Level of community engagement and participation | 3.00 | Satisfied |
| 13. Level of social cohesion and integration | 3.08 | Satisfied |
| 14. Level of social stability | 3.07 | Satisfied |
| 15. Level of political stability | 3.00 | Satisfied |
| 16. level of inclusivity | 3.04 | Satisfied |
| 17. Level of diversity | 2.99 | Satisfied |
| **OVERALL MEAN** | **2.95** | **Satisfied** |

In essence, the satisfaction level of Chengdu and Chongqing residents regarding the integration and development of the Chengdu-Chongqing Economic Circle is 2.95, indicating a generally satisfied sentiment among the population. The high satisfaction levels in factors such as healthcare services and social cohesion demonstrate the positive impact of the economic circle (Flynn & Hacking, 2019). However, attention should be given to areas such as cultural activities and public safety, where there is room for improvement. Addressing these concerns will contribute to the long-term success and satisfaction of residents within the economic circle.

***Satisfaction Level on Technology and Innovation Factors***

The overall mean satisfaction level of 2.95 indicates that Chengdu and Chongqing residents are generally satisfied with the integration and development of the Chengdu-Chongqing Economic Circle in terms of technology and innovation. This mean score is derived from the ratings given to various factors related to accessibility to technology, internet quality, transportation system advancements, support for startups, educational opportunities, and government support.

**Table 4. Level of Satisfaction on Technology and Innovation Factors**

| TECHNOLOGY AND INNOVATION FACTORS | WEIGHTED MEAN | INTERPRETATION |
|---|---|---|
| 1. Accessibility to the latest technology and innovative products | 3.03 | Satisfied |
| 2. Availability of the latest technology and innovative product | 2.89 | Satisfied |
| 3. Quality of internet connectivity | 2.92 | Satisfied |
| 4. Quality of internet speed | 3.01 | Satisfied |
| 5. Level of technological advancement in the city's transportation system | 3.04 | Satisfied |
| 6. Level of technological innovation in the city's transportation system | 2.96 | Satisfied |
| 7. Availability of support for technology and innovation startups | 2.91 | Satisfied |

| | | |
|---|---|---|
| 8. Level of resources available for technology and innovation startups | 2.87 | Satisfied |
| 9. Availability of educational opportunities for technology and innovation | 2.89 | Satisfied |
| 10. Sufficiency of training opportunities for technology and innovation | 2.87 | Satisfied |
| 11. Level of partnership opportunities between local businesses and technology and innovation companies | 2.91 | Satisfied |
| 12. Government support for technology and innovation | 2.96 | Satisfied |
| 13. Government regulations for technology and innovation | 2.96 | Satisfied |
| 14. Access to technology and innovation resources | 2.97 | Satisfied |
| 15. Rate the overall level of technological innovation | 2.93 | Satisfied |
| **OVERALL MEAN** | **2.95** | **Satisfied** |

With this result, the high level of satisfaction (2.95) of the residents suggest that the residents value being able to access and utilize the latest technologies and innovative products within the economic circle. To further support the integration and development of technology and innovation, it is crucial to provide adequate training programs and initiatives. These opportunities can equip individuals with the necessary skills and knowledge to fully utilize and benefit from technological advancements (Moraga et al., 2019; Ormazabal et al., 2018). Increasing training opportunities can empower residents and contribute to their satisfaction in this aspect.

***Satisfaction Level on Environmental Factors***

The overall mean satisfaction level of Chengdu and Chongqing residents regarding the integration and development of the Chengdu-Chongqing Economic Circle in terms of the environmental factor is 3.01, indicating a generally satisfied sentiment among the population. This mean score is derived from the ratings given to various factors related to air quality, water quality, waste management practices, availability of green spaces, government efforts to address climate change, wildlife protection, biological diversity, pollution reduction measures, promotion of sustainable development, and overall environmental conditions.

**Table 5. Level of Satisfaction on Environmental Factors**

| ENVIRONMENTAL FACTORS | WEIGHTED MEAN | INTERPRETATION |
|---|---|---|
| 1. Air quality | 2.80 | Satisfied |
| 2. Water quality | 2.81 | Satisfied |
| 3. Waste management practices | 2.81 | Satisfied |
| 4. Availability of green spaces | 3.10 | Satisfied |
| 5. Government's efforts to address climate change | 2.94 | Satisfied |
| 6. Government's efforts to protect wildlife | 3.03 | Satisfied |
| 7. Government's efforts to protect biological diversity | 3.84 | Satisfied |
| 8. Measures to reduce pollution | 2.94 | Satisfied |
| 9. Government's efforts to promote sustainable development | 2.99 | Satisfied |
| 10. Government's efforts to improve overall environmental conditions | 2.95 | Satisfied |
| 11. Rate the overall environmental conditions | 2.97 | Satisfied |
| **OVERALL MEAN** | **3.01** | **Satisfied** |

Overall, the satisfaction level of Chengdu and Chongqing residents regarding the integration and development of the Chengdu-Chongqing Economic Circle in terms of the environmental factor is positive.

The high satisfaction levels in factors such as government efforts to protect biological diversity and the availability of green spaces demonstrate the significance of environmental preservation and access to nature (Golsteijn & Martinez, 2017). However, further attention and action should be directed toward improving air and water quality to ensure a healthier and more sustainable environment for residents within the economic circle.

**Conclusion**

Generally, residents are generally satisfied with the progress and initiatives related to these factors. The satisfaction levels reflect the positive impact of economic growth, societal well-being, technological advancements, and environmental sustainability on the residents' overall experience within the economic circle. While residents are satisfied overall, it is important to maintain a balanced approach to development. This means ensuring that economic growth is accompanied by measures that promote societal well-being, technological advancements, and environmental sustainability. Efforts should be made to address any potential disparities or challenges that may arise in these areas to sustain the residents' satisfaction.

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