Assessment Research on the Quality of Government Wechat Subscription Service under the Perspective of Low-Carbon Government

Libin Xie
Fuzhou University of International Studies and Trade, Fuzhou 350202, Fujian, China

Abstract. WeChat has already become an indispensible social application for Chinese people nowadays. The usage of government WeChat Subscription is beneficial for the convenience of citizens to receive services from the government, which will endow a great promotion on the construction of low-carbon government and the reduction of administrative costs. This article makes use of the analytic hierarchy process to determine the key impact indicators and construct the assessment model for the quality of government WeChat subscription service under the perspective of low-carbon government.

1. Introduction
Since 2017, Chinese governments have confirmed development concepts of “innovation, coordination, green and sharing” that the goal of developing low-carbon economy and constructing low-carbon governments has been the ultimate mission of governments at all levels. Under this background, the only way to enhance urban competitiveness and promote the harmonious development of global low-carbon society is to scientifically locate government's role in low-carbon economy and actively introduce new technological means to comprehensively settle various social problems.

WeChat has gone through a soaringly rapid development ever since it was launched at January, 2011. Until September 2018, the number of active WeChat users has reached 1.082 billion, 4.5 billion messages are sent through WeChat per day, which is of an 18% year-on-year growth, and 410 million times of video and voice call, of a 100% year-on-year growth. Under this condition, WeChat has successfully grown as the most popular social media in China. The government WeChat subscription service is for governmental departments like party and government organs, administrative organs and institutions at all levels to register their accounts at WeChat platform and send government affairs relevant informations to citizens’ mobile communication terminals by means of texts, pictures, sounds and videos on WeChat platform and it is a novel tool and method for governments to provide application service, as well as a new communication bridge between governmental officials and people. According to incomplete statistics of Tencent, the number of government Wechat public accounts in China has exceeded 100,000 at present, and they are distributed in 31 provincial and 334 Prefectural Administrative regions, in which the proportion of county and township government Wechat subscription alone has already exceeded 50%.

2. Government WeChat Account Aids the Construction of Low-carbon Government
Low-carbon government means he kind of government that bears the concept of low-carbon development, in order to promote low-carbon economy and low-carbon social development as one of
its basic functions, constantly provide various institutional guarantees to promote low-carbon development, and strive to enhance the management capacity of low-carbon development, not only to achieve low-carbon management of social and public affairs, but also to achieve low-carbon management of their own internal affairs; not only to achieve the management of domestic affairs but also realize the low-carbon mission at the management of international affairs. The devotion of government WeChat subscription is going to effectively enhance the construction of low-carbon government in China.

2.1. Government WeChat Account Innovates the Mechanism of Government Management
The subscription of government WeChat account is beneficial to the reasonable optimization of resources and the strengthen of city operating mechanism and effectiveness. With the ever more increasing awareness of citizens of participating in the administration and discussion of state affairs, more and more of them are eager to join in the field of public management. WeChat services are popular among the public because of their convenience and ease of use. The government WeChat account public platform enables it possible for citizens to receive government information and public services through simple operation at any time and anywhere, which is conducive to building an efficient platform for the interaction between government and citizens as well as government-enterprise interaction. In addition, it is helpful in transforming the traditional government's regulatory mechanism into a new mechanism of joint consultation and diversified joint governance of service-oriented government.

2.2. Government WeChat Account Cuts down Communication Costs
The establishment of government WeChat account subscription reduces the communication links between government departments and the public, and enables the public to better participate in the supervision of government information resources and rights, so that our country can evolve in a positive direction. Through this platform, government WeChat account is able to deliver the first-hand policies and official information to citizens, guide the correct vane of public opinion for the people, and eliminate rumors and reducing the cost of communication between government departments and the public, which is of great help to enhance the credibility of the government. What's more, people can participate in activities such as questionnaires, government interviews and other activities to participate in political activities. The establishment of government WeChat account has changed the one-way transmission of information from the government to the public, and improved the public's sense of identity with the government.

2.3. Government WeChat Account Improves the Quality of People's Lives
The usage of government's WeChat is by no means a simple information repost for government affairs but an innovative movement to improve the living environment of the public. At present, lots of WeChat account for government affairs have assembled numerous services for citizens’ convenience, for instance, public security services like registered residence, vehicle administrative office and entering and leaving the border, as well as medical services like registration, reservation, payment and report. All of these services mentioned above create much convenience for people and improve the efficiency of the government, all of which will generate great assistance for strengthening the level of sense of happiness for people.

3. Construction of the Quality Assessment Model for Government WeChat Public Platform under the Perspective of Service-oriented Government
As it is stated above, government WeChat account has endowed positive effects on the establishment of service-oriented government, and it has become a new direction of online governmental administration. With the wide-spread users group of WeChat in China, people have ever increasingly high request on the ability and quality of government’s service. The service quality of government WeChat public account is utterly crucial to its existence, so it is necessary to apply scientific assessment model to
conduct precise and useful evaluation on the service quality to further enhance the healthy and sustainable development of government WeChat public account.

3.1. Selection of Assessment Indicators

Among all these evaluation methods for service quality, the SERVQUAL model launched by PZB focuses on five aspects—tangibles, reliability, responsiveness, assurance and empathy—to conduct the assessment that has gained overall acceptance and application among the industry. On this basis, the E-SERVQUAL model for evaluating the quality of network services is derived, which generalizes the dimensions of network service evaluation into eleven indicators, such as navigability, reliability, personalization, responsiveness and accessibility. Based on this, this article adheres to the basic principles of "purposefulness, completeness, scientificity and concreteness" to consult and analyse the existing relevant literature, and conduct consultation interviews with experts from industries, enterprises, colleges, government departments and senior users of government micro-credit. It also refers to Xinbang and Qingbo index to choose the following data indicators as assessment indicators for the service quality of government WeChat public platform under the perspective of service-oriented government. It contents three first level indexes(Platform Design, Service capability, Information content), eight second level indexes (Tangibility, Convenience, Reliability, Self-help service, Interactive service, Information amount, Information quality, Communication effect), and twenty four third level indexes (Accessibility, Functional completeness, Page friendliness, Menu settings, Help function, Cross-platform collaboration, Stability, Pravicy, Safety, Convenicence, Practicability, Individualization, Timeliness, Friendliness, Effectiveness, Richness, Real-time, Publishing frequency, Accuracy, Practicability, Readability, Reading volume, Reposting volume, Praise volume).

3.2. Weight Determination of Assessment Indicators

Analytic Hierarchy Process (AHP) is one of the most widely used methods to determine weights at present. It could be used in conjunction with Delphi method and fuzzy comprehensive evaluation method to ensure that the index weight is more scientific and reasonable. In this way, this article applies the AHP method to confirm each and every weight determination of the service quality assessment indicator system for government WeChat public platform, specific steps of which are as the following:

3.2.1. Construct Analytical Hierarchy Structure and Judgement Matrix. The purpose of constructing the hierarchical analysis structure is to decompose the complex problems to be solved into several levels, to clarify the progressive structure among the levels and the relationship and membership between the indicators. After the establishment of the hierarchical structure, it is necessary to compare the elements of each level and to construct a judgment matrix. In order to make the calculated index weights more objective and obtains the reliable judgment matrix, 20 scoring questionnaires have been given out respectively to university experts, government WeChat public account operators and senior users to invites them to compare the relative importance of indicators at different levels according to the 1-9 scale method. Because of limited space of this article, the first-level indicators will then be taken as an example to demonstrate the importance comparison process, which are specifically shown as the following Table 1:

| C                  | Platform design | Service capability | Information content |
|-------------------|-----------------|--------------------|--------------------|
| Platform design   | 1               | 1/2                | 1/3                |
| Service capability|                 | 1                  | 1/2                |
| Information content|                |                    | 1                  |
3.2.2. Calculate Index Weight. After getting the judgement matrix \( F \), use the square root method to calculate the judgement matrix \( F \):

\[
M_i = \prod_{j=1}^{n} a_{ij} \quad (i=1, 2, \ldots, n), \quad n \text{ is the matrix order}
\]

\( \bar{W}_i \) is the n-th root of \( M_i \), \( \bar{W}_i = \sqrt[n]{M_i} \) \((i=1, 2, \ldots, n)\)

Conduct the normalization on the vector quantity \( W = [W_1, W_2, \ldots, W_n]^T \) is the require eigenvectors, which is the weight of the next level index relative to the upper level index. In the meantime, determine the maximum eigenvalue of judgement matrix \( W = [W_1, W_2, \ldots, W_n]^T \), in which \((\text{CW})_i\) is the element at number \( i \) of the vector \( \text{CW} \).

By means of the above steps, the matrix can be obtained and the weight vector can be obtained as the following: \( W=(0.1976, 0.4905, 0.3119) \)

3.2.3. Consistency Test of Judgment Matrix. As for ensuring the accuracy of the results, consistency testing is needed. The steps of consistency testing are as the following:

First of all, calculate the consistency index \((CI)\), \( CI = \frac{\lambda_{\text{max}} - n}{n-1} \) \((n \text{ is judgment matrix order}, \lambda_{\text{max}} \text{ is the maximum eigenvalue of judgement matrix})\). Second, calculate the average random consistency index \((RI)\), \( RI \) is obtained by calculating the eigenvalues of random judgement matrices repeatedly and calculating the arithmetic mean. Average random consistency indexes given by Saaty are referred as Table 2. Third, calculate the consistency ratio of judgment matrix \( CR, CR = \frac{CI}{RI} \), when \( CR<0.1 \), it is generally considered that the consistency of the judgement matrix is acceptable. On the contrary, the judgment matrix needs to be further optimized.

| Matrix order | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------|---|---|---|---|---|---|---|---|
| RI           | 0 | 0 | 0.52 | 0.89 | 1.12 | 1.26 | 1.36 | 1.41 |

The maximum eigenvalue of the first-order index judgment matrix solved is \( \lambda_{\text{max}} = 3.0537 \), \( CI = \frac{\lambda_{\text{max}} - n}{n-1} = 0.02685 \), \( CR = \frac{CI}{RI} = 0.0517<0.1 \), which means that the consistency of the judgment matrix is acceptable. And indexes weight of platform design, service capability and information content calculated by it are credible, they are respectively 0.1976, 0.4905 and 0.3119. The weight calculation process of other indicators is the same as that of other indicators. The weight of each index calculated from the scoring questionnaire could be referred in Table 3:
Table 3. Weight of Indicators at All Levels

| Level | First Level Index (Weight) | Second Level Index | Weight | Synthetic Weight | Third Level Index | Weight | Synthetic Weight |
|-------|-----------------------------|--------------------|--------|------------------|-------------------|--------|------------------|
|       | Platform Design (0.1976)   | Tangibility        | 0.1199 | 0.0196           | Accessibility     | 0.6479 | 0.0154           |
|       |                              |                     |        |                  | Functional        | 0.2299 | 0.0054           |
|       |                              |                     |        |                  | completeness      |        |                  |
|       |                              |                     |        |                  | Interface         | 0.1222 | 0.0029           |
|       |                              |                     |        |                  | friendliness      |        |                  |
|       |                              | Convenience         | 0.6080 | 0.0996           | Menu settings     | 0.539  | 0.0647           |
|       |                              |                     |        |                  | Help function     | 0.1638 | 0.0197           |
|       |                              |                     |        |                  | Cross-platform    | 0.2973 | 0.0357           |
|       |                              |                     |        |                  | collaboration     |        |                  |
|       |                              | Reliability         | 0.2721 | 0.0446           | Stability         | 0.1429 | 0.0077           |
|       |                              |                     |        |                  | Privacy           | 0.2857 | 0.0154           |
|       |                              |                     |        |                  | Safety            | 0.5714 | 0.0307           |
|       | Service Ability (0.4905)    | Self-help Service   | 0.5    | 0.2453           | Convenience       | 0.4    | 0.0981           |
|       |                              |                     |        |                  | Practicability    | 0.4    | 0.0981           |
|       |                              |                     |        |                  | Individualization | 0.3    | 0.0736           |
|       |                              | Interactive Service | 0.5    | 0.2453           | Timeliness        | 0.3119 | 0.0765           |
|       |                              |                     |        |                  | Friendliness      | 0.1976 | 0.0485           |
|       |                              | Information         | 0.2857 | 0.1540           | Effectiveness     | 0.4905 | 0.1203           |
|       | Information Content (0.3119)| Amount              |        |                  | Richness          | 0.5571 | 0.0496           |
|       |                              |                     |        |                  | Real-time         | 0.3202 | 0.0285           |
|       |                              |                     |        |                  | Publishing        | 0.1226 | 0.0109           |
|       |                              |                     |        |                  | frequency         |        |                  |
|       |                              | Information Quality | 0.5714 | 0.3080           | Accuracy          | 0.5485 | 0.0977           |
|       |                              |                     |        |                  | Practicability    | 0.2409 | 0.0429           |
|       |                              |                     |        |                  | Readability        | 0.2106 | 0.0375           |
|       |                              | Transmission Effect | 0.1429 | 0.0770           | Reading volume    | 0.1638 | 0.0073           |
|       |                              |                     |        |                  | Reposting volume  | 0.2973 | 0.0133           |
|       |                              |                     |        |                  | Praise volume     | 0.539  | 0.0240           |

4. Conclusion

Compared with traditional online government affairs management, government WeChat account subscription has promising and distinct advantages at aspects like accessibility, information release, online services, public participation, privacy, security and more. Operation efficiency of government WeChat account will have the impact straightly on the quality of government public services. This article constructs an evaluation model of the service quality of government WeChat from the perspective of low-carbon government. In the subsequent research and exploration, we are going to carry out empirical research with actual cases, and continue to probe into effective measures and methods for government WeChat to provide high-quality services under the concept of service-oriented government.

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