A Research of Instant Survey Based on Typical Scenario

Yinchoa Cheng*, Qifang Xie and Yan Ma
China Mobile Research Institute, Department of User and Market Research, Beijing 100032, China

*Corresponding author

Abstract. With the advent of 5G era and the continuous improvement of users' demands for intelligent services, traditional online research methods cannot meet the survey needs of the communication industry at the present stage. In order to collect user feedback more accurately and improve survey efficiency, this paper proposes an instant survey based on typical scenarios. This method can effectively obtain the most authentic feedback information from users by establishing the intelligent user invitation and accurate questionnaire release of the contact points between enterprises and users in typical scenarios. The research results show that the method in this paper is 3.75 times higher than the traditional online research in terms of user participation, and about 6 times higher in terms of the survey result recovery, which significantly enhances the accuracy of the survey and effectively shortens the survey cycle. This paper introduces the idea of instant survey into the field of communication for the first time, and widely applied to the user survey in the communication field. Keyword: Satisfaction survey, Satisfaction survey, Instant survey.

1. Introduction
With the advent of 5G technology and the continuous improvement of intelligent services, users have higher requirements for networks, services and professional works provided by communication carriers[1]. In order to further understand user requirements and improve service quality, enterprises usually use questionnaires to do business and acquire user needs and advices. User's feedback has become an important data source for the continuous improvement of intelligent services. Therefore, the quality of customer research directly affects the development of enterprises[2]. In the 5G+ environment, users have a close relationship with enterprises and higher services standard. Therefore, it is important to listen to user's voice and feedback, at the same time, adjust the business and optimize the service in time. In order to solve the problem of low user participation rate and questionnaire recovery rate, this paper proposes an instant survey based on typical scenarios.

2. Research Status of Traditional Online Research Methods
The existing questionnaire survey is implemented by pushing the questionnaires to users without any difference, and then manually screening the collected information to get the results of the questionnaire. The existing questionnaire method does not consider the scene difference of touch points, the psychological difference of users in different time periods and the difference of user feedback environment[3]. The survey results are greatly influenced by the subjective judgment of users, for this reason the survey data is inaccurate. In instant scenarios, the authenticity and immediacy of questionnaires often directly affect the accuracy of business decisions and the direction of business development[4].
The existing questionnaire survey method does not take into account the differences in the ideas of users in different business scenarios, and the subjective feedback of users after contact with enterprise service contact points have problems of understanding deviation (time-effectiveness deviation) in different time periods\[^{[5]}\]. This leads to the user's inaccurate information forgetting and feedback on the questionnaire. At the same time, because the existing methods require manual screening, a large amount of unnecessary labor resources are incurred\[^{[6]}\].

This paper provides an instant survey based on typical scenarios, the user is intelligently invited and accurately surveyed in different scenarios, and this method rules constraints on questionnaire triggering and data collection to get the user's most authentic feedback under the contact points. This method makes the results of the questionnaire more accurate and objective, and reduces the investigation cost.

3. Instant Survey Based on Typical Scenarios

First of all, we will introduce the process of Instant survey based on typical scenarios in detail, and then carries out a comparison experiment between traditional online research and Instant survey based on typical scenarios with home broadband as the experimental scene.

3.1. The Process of Instant Survey Based on Typical Scenarios

The process of the Instant survey based on scenario is shown in figure 1, including training typical scenario and developing scenarios questionnaires, establishing the trigger and validating rules, monitoring user behavior and matching with scenes, inviting user and verifying effectiveness, checking the results.

![Flow chart of Instant survey method based on typical scenarios](image)

**Figure 1.** Flow chart of Instant survey method based on typical scenarios

1) **Train typical scenarios and develop scenarios questionnaires**

This step takes the historical survey questionnaire information and ancillary information as input to train the general survey scenario type, and the scenario information includes at least one kind according to business type, contact points of different services, different contact points of the same service, different links of business process, different contents of the same application and so on.

**Example 1:** Specific scenarios in the operator NPS satisfaction questionnaire survey may include: after 5G consultation, after 5G card opening, after 5G traffic package processing, after 5G terminal purchase, after home broadband installation, after home broadband fault repair, after the marketing hangs up, after the business hall business is finished, after the network business hall self-ordering package is successful, after the network business hall self-checking the bill, after the 10086 voice complaint, after unsubscribe Migu reading client.

**Example 2:** The evaluation scenarios of users for different works in a reading app include: after the completion of "Work 1" and after the completion of "Work 2".

According to the types and characteristics of the above scenarios, a scene customization questionnaire is generated. Each type of questionnaire is a customized questionnaire.
corresponding to a specific scene, and the user information feedback in the scene can be accurately obtained. The scene and the questionnaire can be one-to-one and one-to-many. For example, the scenario questionnaire corresponding to the scene after the installation of the home broadband is the “User Family Broadband Installation Service Satisfaction Survey Questionnaire”.

2) Establish trigger rules and validity rules

This step by analyzing the historical questionnaire and recovery, questionnaire results accuracy ancillary data such as information, training questionnaire trigger key rules, questionnaire triggering rules including triggering time requirements, methods (based on the current user scenario, network, terminal and other way to select the most appropriate information), the effect, the style and quantity questionnaire rules. Users' network information includes 2/3/4/5G, wifi, signal quality and other conditions; User's terminal information includes screen resolution, terminal system, etc.

In addition, according to the above attached data of the historical questionnaire, key rules of the validity of the questionnaire are trained and summarized, including rules of timeliness, invalid forwarding and multiple clicks.

The questionnaire triggering rules (immediate validity rules) are shown in Table 1. If the effective answer time M is set to 2, that is, the timeliness of the questionnaire is 2 hours, the operating rules of the invited users are as follows: The invited users are within 2 hours. Participation in the answer is valid, more than two hours is invalid, prohibiting users from continuing to participate in the assessment. An example is as follows:

**User A:** After receiving the questionnaire invitation to the user response questionnaire for a period of 1.2 hours, you can access and participate in the answer;

**User B:** If the period of receiving the questionnaire invitation to the user response questionnaire is 2.5 hours, access is prohibited;

**User C:** After receiving the questionnaire invitation to the user response questionnaire for 1 hour, you can access and participate in the answer;

| Table 1. Questionnaire trigger rule validity rules. |
|-----------------------------------------------|
| **Questionnaire trigger rule** | **Push method rule** | **Questionnaire validity rule** |
| Trigger time requirement | Trigger within N minutes after the user completes the operation (generally N<15 minutes) | Scene and terminal characteristics | Push method rule | Specific constraints |
| | The user ordered a new package through the portal and ended the checkout | | Reorder page, message pop-up | Timeliness |
| | The user receives the questionnaire within M hours and operates as a valid questionnaire (usually M<=24 hours), which is prohibited after the statute of limitations. |
| method | Message pop-ups, text messages, message suspension, etc. | The user dialed 10086 and the complaint was completed. | SMS push | Prohibit forwarding |
| | | Prohibit answer after forwarding |
| effect | H5,WEB, etc. | After the user subscribes to the traffic package through the APP | In the APP order page, the floating push | Multiple clicks |
| | | | | The second click is invalid |

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3) monitor user behavior and match with the scenes
The server listens to the user behavior in real time through the user behavior monitoring module. After listening to the user's behavior, the user scene monitoring module is called to match and verify the current behavior with the preset scene. Taking the operator satisfaction questionnaire as an example, the user behavior of the monitoring includes: browsing 5G introduction, querying bills, point inquiry, payment, consultation, etc. After the user behavior meets or reaches certain preset scene conditions, the server will invoke the questionnaire triggering and configuration module to perform trigger rule verification. If the verification is passed, the server side invokes the channel distribution module to perform the questionnaire invitation; if the rule is triggered if it is not satisfied, the process will not be invited to the user.

4) Invite user and verify effectiveness
The user accepts the questionnaire invitation and initiates the questionnaire request. The server reads the questionnaire information and invokes the questionnaire validity verification module. If the validity verification of the questionnaire fails, the user is prohibited from participating in the survey; if the validity verification of the questionnaire is passed, the content of the questionnaire is displayed. To the user, after the user's research is completed, the results are fed back to the server.

5) Check the results
The server calls the result verification logic module, and the result is verified according to the questionnaire result verification algorithm. The questionnaire result verification algorithm is composed of the answer duration, data integrity, logical consistency, IP and other key segment repeatability, etc., if the result By checking, the data is added to the back-end database; on the contrary, if the result of the questionnaire is not verified, it will be deleted as invalid data. An example is as follows:

Example 1: The same IP generates questionnaire data multiple times, only the first questionnaire result is retained, and other data is used as abnormal data;
Example 2: the data generated by the questionnaire execution period is too short, that is, the questionnaire execution period is shorter than the preset threshold period, Questionnaire data as abnormal data;
Example 3: There is a logical contradiction between the contents of the same questionnaire data, the data is used as abnormal data;
Example 4: the questionnaire data is incomplete and missing, and the data is used as abnormal data;

3.2. Experiment of the Instant Survey Based on Typical Scenario
This section takes the household broadband installation satisfaction survey as an example, and compares the traditional interconnected survey method with the method of this paper. The test flow of this method is shown in Figure 2. By monitoring the user behavior and the scenario, when the preset condition is met, an invitation survey is initiated to the current target user of the scenario, the feedback information of the current user contact point is collected, and the service and service are immediately adjusted and optimized according to the feedback of the user.

Experiments 1: The household broadband installation satisfaction questionnaire was conducted through the traditional Internet survey method for user invitation and collection. The specific experimental data is as follows:
Questionnaire recovery: 10746
User Views: 150242
Experimental period: 2019-3-28 to 2019-4-03

Experiments 2: The home broadband installation satisfaction questionnaire was conducted through user-sponsored and collected methods based on a typical questionnaire-based real-time questionnaire. The specific experimental data is as follows:
Questionnaire recovery: 40251
The number of users reached: 534053
Experimental period: 2019-3-28 to 2019-4-03
The comparative analysis of the experimental results data is as follows:

1) User engagement

The experimental results of user engagement are shown in table 2 and table 3. From the data point of view, the recovered sample data based on the scene survey has the following advantages:

a) the total number of recovered samples based on the scene is 40,251, while the total number of recovered samples based on the traditional method is 10746, and the former is 3.75 times of the latter.

b) the recycling amount of traditional research methods is concentrated in the first 2-3 days, with a large gap between before and after the recycling amount; However, the number of samples recovered from the real-time survey based on the scene is relatively balanced, and the gap within the recycling period is very small, as shown in figure 3.

c) the amount of recovered samples based on the scene is directly proportional to the scale of business users in the province, which is more in line with the sampling rules of statistics;

![Figure 2](image-url)
| Province         | March 28 | March 29 | March 30 | March 31 | April 01 | April 02 | April 03 | Total   |
|------------------|----------|----------|----------|----------|----------|----------|----------|---------|
| Whole network    | 5500     | 5113     | 31       | 9        | 38       | 20       | 35       | 10746   |
| Anhui            | 89       | 85       | 0        | 0        | 0        | 0        | 0        | 174     |
| Beijing          | 1025     | 1128     | 25       | 9        | 38       | 20       | 35       | 2280    |
| Fujian           | 47       | 38       | 0        | 0        | 0        | 0        | 0        | 85      |
| Guansu           | 30       | 25       | 0        | 0        | 0        | 0        | 0        | 55      |
| Guangdong        | 114      | 121      | 0        | 0        | 0        | 0        | 0        | 235     |
| Guangxi          | 41       | 44       | 0        | 0        | 0        | 0        | 0        | 85      |
| Guizhou          | 70       | 91       | 0        | 0        | 0        | 0        | 0        | 161     |
| Hainan           | 12       | 8        | 0        | 0        | 0        | 0        | 0        | 20      |
| Hebei            | 674      | 550      | 1        | 0        | 0        | 0        | 0        | 1225    |
| Heilongjiang     | 508      | 145      | 0        | 0        | 0        | 0        | 0        | 653     |
| Heilongjiang     | 147      | 148      | 0        | 0        | 0        | 0        | 0        | 295     |
| Hunan            | 219      | 290      | 1        | 0        | 0        | 0        | 0        | 510     |
| Jilin            | 21       | 16       | 0        | 0        | 0        | 0        | 0        | 37      |
| Jiangsu          | 75       | 83       | 0        | 0        | 0        | 0        | 0        | 158     |
| Jiangxi          | 67       | 67       | 0        | 0        | 0        | 0        | 0        | 134     |
| Liaoning         | 481      | 440      | 1        | 0        | 0        | 0        | 0        | 922     |
| Neimenggu        | 54       | 43       | 0        | 0        | 0        | 0        | 0        | 97      |
| Ningxia          | 11       | 5        | 0        | 0        | 0        | 0        | 0        | 16      |
| Qinghai          | 3        | 2        | 0        | 0        | 0        | 0        | 0        | 5       |
| Shandong         | 110      | 109      | 1        | 0        | 0        | 0        | 0        | 220     |
| Shanxi           | 165      | 135      | 1        | 0        | 0        | 0        | 0        | 301     |
| Shannxi          | 229      | 213      | 0        | 0        | 0        | 0        | 0        | 442     |
| Shanghai         | 150      | 137      | 0        | 0        | 0        | 0        | 0        | 287     |
| Sichuan          | 70       | 71       | 0        | 0        | 0        | 0        | 0        | 141     |
| Tianjin          | 153      | 117      | 0        | 0        | 0        | 0        | 0        | 270     |
| Xizang           | 5        | 5        | 0        | 0        | 0        | 0        | 0        | 10      |
| Xinjiang         | 66       | 52       | 0        | 0        | 0        | 0        | 0        | 118     |
| Yunnan           | 60       | 72       | 0        | 0        | 0        | 0        | 0        | 132     |
| Zhejiang         | 123      | 101      | 0        | 0        | 0        | 0        | 0        | 224     |
| Chongqing        | 40       | 52       | 0        | 0        | 0        | 0        | 0        | 92      |
Table 3. Scene-based instant survey recovery data based on the scenario survey user participation recovery data

| Province     | March 28 | March 29 | March 30 | March 31 | April 01 | April 02 | April 03 | Total   |
|--------------|----------|----------|----------|----------|----------|----------|----------|---------|
| Whole network| 5769     | 5657     | 6311     | 6076     | 6332     | 4399     | 5707     | 40251   |
| Anhui        | 235      | 209      | 252      | 228      | 293      | 163      | 252      | 1632    |
| Beijing      | 99       | 93       | 171      | 148      | 149      | 104      | 131      | 895     |
| Fujian       | 49       | 47       | 61       | 52       | 56       | 30       | 44       | 339     |
| Guangxi      | 108      | 55       | 79       | 64       | 84       | 76       | 101      | 567     |
| Guangdong    | 1177     | 966      | 1500     | 1370     | 893      | 676      | 926      | 7508    |
| Hebei        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0       |
| Heilongjiang | 212      | 104      | 77       | 91       | 94       | 81       | 96       | 755     |
| Hainan       | 114      | 104      | 98       | 110      | 103      | 75       | 101      | 705     |
| Hebei        | 400      | 425      | 545      | 465      | 528      | 230      | 188      | 2781    |
| Henan        | 0        | 1        | 0        | 0        | 0        | 0        | 0        | 1       |
| Heilongjiang | 11       | 19       | 20       | 12       | 57       | 38       | 38       | 195     |
| Hubei        | 340      | 410      | 341      | 450      | 509      | 353      | 534      | 2937    |
| Hunan        | 222      | 241      | 131      | 172      | 248      | 193      | 258      | 1465    |
| Jilin        | 136      | 132      | 143      | 148      | 133      | 85       | 109      | 886     |
| Jiangsu      | 16       | 24       | 40       | 45       | 21       | 15       | 35       | 196     |
| Jiangxi      | 107      | 100      | 108      | 94       | 97       | 103      | 131      | 740     |
| Liaoning     | 136      | 97       | 140      | 115      | 129      | 129      | 159      | 905     |
| Neimenggu    | 0        | 0        | 0        | 0        | 0        | 1        | 9        | 10      |
| Ningxia      | 35       | 43       | 40       | 43       | 30       | 22       | 37       | 250     |
| Qinghai      | 26       | 24       | 21       | 18       | 22       | 13       | 21       | 145     |
| Shandong     | 15       | 15       | 17       | 26       | 24       | 14       | 20       | 131     |
| Shanxi       | 104      | 83       | 123      | 87       | 94       | 57       | 119      | 667     |
| Shandong     | 191      | 189      | 195      | 165      | 180      | 167      | 217      | 1304    |
| Shanghai     | 99       | 91       | 154      | 138      | 68       | 85       | 89       | 724     |
| Sichuan      | 747      | 1042     | 713      | 525      | 1131     | 717      | 836      | 5711    |
| Tianjin      | 151      | 126      | 158      | 167      | 215      | 154      | 212      | 1183    |
| Xizang       | 6        | 3        | 0        | 4        | 3        | 2        | 0        | 18      |
| Xinjiang     | 8        | 8        | 9        | 16       | 8        | 8        | 5        | 62      |
| Yunnan       | 6        | 14       | 8        | 8        | 14       | 9        | 10       | 69      |
| Zhejiang     | 900      | 882      | 1070     | 1177     | 988      | 692      | 900      | 6609    |
| Chongqing    | 119      | 109      | 97       | 138      | 161      | 107      | 129      | 860     |

Figure 3. Instant survey method based on a typical scenario.
2) Survey recovery rate
The results of the survey recovery rate showed that the effective sample rate of the traditional online research was 7.15%, and the instant survey was 7.54%. From the data point of view, the effective sample rate of the traditional online research is similar with instant survey. Since the total number of invited users is generally 6-7 times that of browsing users, the instant survey recovery rate of this method is about 6 times that of the traditional online research.

4 Conclusion
By comparing the instant survey with the traditional online research, the instant survey is obviously superior to the traditional online research in terms of user participation, the former is 3.75 times higher than the latter. In terms of the recovery rate of survey results, the instant survey is about 6 times higher than the traditional online research. In terms of the quality of sample data of survey results, the accuracy and objectivity of the survey results have been significantly improved due to the fact that instant survey has realized the real-time invitation and triggering of real scenes and real contact points of users. In conclusion, the instant survey based on typical scenario can achieve automatic scene matching and automatic triggering, which can significantly improve the survey results and effectively reduce labor costs and survey cycle. This method can effectively verify the business and effectively improve the company's reputation and user satisfaction.

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