

The Impact of Anonymity and Social Voice on Institutional Decision-Making

Jonathan Han

Collingwood School, 70 Morven Dr., West Vancouver, BC, V7S1B2, Canada

Keywords: Anonymous social voice; Group intelligence AI; Bilateral platform; Algorithmic agenda; Public governance

Abstract: There is a structural information bias between traditional public policy and business service feedback channels, and the demands of marginal groups are easy to become a weak signal that the system is difficult to capture. This paper adopts the case study method, takes the Vancouver Peripheral anonymous feedback platform as the object, and relies on the platform's public data to disassemble its 'signal acquisition-clustering-sequencing-data licensing' technical architecture, bilateral operation mode and local practice. The research shows that the platform uses Swarm AI and rarity engine to transform fragmented anonymous feedback into policy-available problem cards, which helps to identify the demands of vulnerable groups and optimize public services. However, commercial subscriptions and algorithmic agenda configuration also breed endogenous contradictions such as conflicts between public value and commercial profitability, and algorithmic shaping policy agendas. This study reveals the dual effects of anonymous social voice under the mediation of algorithms, and provides empirical reference for similar technical governance tools to balance governance effectiveness, business logic and algorithm power.

1. Introduction

The effectiveness of public decision-making is inseparable from the complete absorption of various social demands. The original public opinion collection mechanism will have structural deviations at the sample level. The actual experience and demands of many marginalized groups are difficult to be transformed into the institutional agenda. Anonymous technology combined with swarm intelligence algorithm can break the real obstacles caused by signal masking. The Peripheral system running in Vancouver is selected as the research carrier, and the technical framework, business operation mode and local practice of the anonymous feedback platform are dismantled. The realization path of integrating anonymous social voice into institutional decision-making through algorithm intermediary is explored, and the value contradiction breeding in the process of technology landing is sorted out, which brings reference to the practical application of similar technical governance tools.

2. The realistic dilemma of social voice

2.1 Information bias of traditional feedback channels

The standardized public opinion collection mechanism relies on questionnaires and formal complaint work orders to achieve information collection. The logic of channel operation is based on the premise that individuals are willing to disclose their identities and invest time and cost to complete information submission.[1] The information acquisition of public policy and business services will have its own sample screening bias, and the feedback output will be constrained by the expression ability, time resources and risk perception of the participating groups. The conventional research system is difficult to adapt to the access path of groups with low expression willingness, and the data collection is biased towards the objects that can actively participate in the institutional process. A large number of weak demands hidden in daily scenes cannot be transformed into effective signals that can be identified by institutions. Business-side market research is also constrained by the participation threshold. The aggregated data can only map the experience status of some groups, resulting in structural defects in the information base of policy research and business decision-making.

2.2 The signal shielding of the demands of marginal groups

The concerns at the identity level and the exclusion effect brought by the institutional level will suppress the expression of some groups. It is difficult to generate event signals with scale effects due to scattered service experience problems without fierce conflicts. Various types of fragmented appeals flow into public governance and business evaluation systems, and are often divided into individual cases that occur independently. The systematic defects at the service level cannot be supported by scattered feedback submitted by individuals. The existing institutional framework does not have the ability to carry out algorithm aggregation processing for weak signals, and the appeal cannot reach enough reporting volume, so it cannot be included in the scope of policy agenda setting and business optimization. The signal shielding phenomenon widens the deviation between governance work and service supply. Public policy adjustment and commercial product iteration only refer to the feedback that is exposed to the outside world. The service gap at the group level continues to maintain the original state and cannot be corrected accordingly.

3. Peripheral platform operation framework

3.1 System workflow

The signal acquisition link completes the original report acquisition through three access methods: self-service terminal, short message channel and two-dimensional code scanning. The single report submission time is controlled at the level of seconds, and the text field supports free narration and preset label mixed input [2]. In the problem clustering process, the Swarm engine performs semantic similarity calculation on all the storage reports, and merges the reports with overlapping topics and geographical scopes into the same problem card, and the timestamp and region code of the original report are retained in the card. The priority sorting link calls the rarity engine to perform weighted scoring on all problem cards. The scoring dimension covers three core indicators: hazard degree, frequency of occurrence and duration, and outputs the sorted list of questions. The data licensing link packages the problem card sets processed by regional aggregation into standardized data products, and delivers them to payment agencies such as government departments, medical institutions, and non-profit organizations through authorized interfaces. Data

delivery is performed on a weekly basis, as shown in Figure 1:

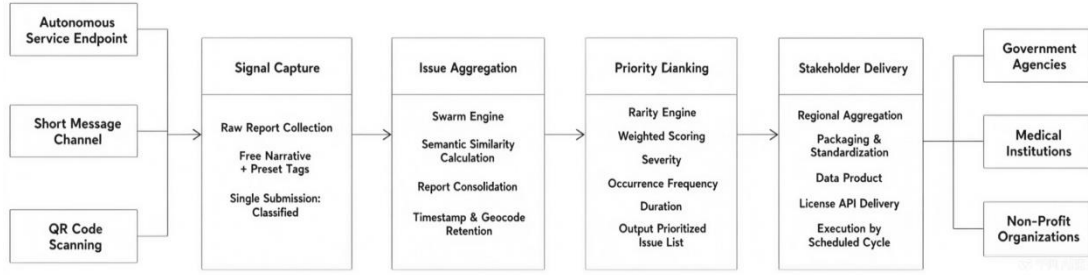


Fig.1 System working flow chart

3.2 Anonymous privacy protection mechanism

The system does not record sensitive metadata such as telephone number and IP address in the data acquisition layer. The regional positioning only collects the first three digits of the postal code. This granularity corresponds to the coverage of about square kilometers, and cannot be traced back to the specific residential address. The identity decoupling operation is performed immediately after all the reports are stored in the database. There is no correlation field between the report content and the submitter. The external shared data are processed by regional aggregation, and the aggregation unit is not lower than the community-level administrative division. If the user needs to track the subsequent processing status of the report, the system generates a random alphanumeric code for a single report as a query certificate. The length of the code is fixed to 16 bits, including a mixed code of upper and lowercase letters and numbers, without carrying any location or identity information. The false report filter layer deploys a verification code mechanism and a machine learning classifier. The classifier performs discrimination based on the three-dimensional features of audit response speed, message wording characteristics, and content pattern similarity. It is judged that the false report does not enter the clustering and sorting process.

3.3 Algorithm logic of Swarm AI and rarity engine

The Swarm AI aggregation model refers to the group behavior dynamics, regards each storage report as an independent agent, and forms a collective consensus through continuous iterative information interaction. In the problem clustering stage, the semantic vector space model is used, and the report text is converted into a high-dimensional vector by word embedding. The report whose cosine similarity between vectors exceeds the threshold θ is merged into the same problem card. The rarity engine performs priority scoring on the problem card. The scoring formula is:

$$S = w_1 \cdot H + w_2 \cdot F + w_3 \cdot D \quad (1)$$

Where S is the comprehensive priority score of the problem card; H is the hazard degree index, ranging from 0 to 10, which is generated by the rule engine mapping of the exposure risk and the degree of equity damage described in the report. F is the frequency index, and the logarithm of the number of reports under the problem card is taken, that is, $F = \ln(N + 1)$, N is the total number of reports in the card; D is the duration indicator, and the number of days between the earliest report and the latest report under the problem card is taken; w_1 , w_2 and w_3 are the weight coefficients of the three indicators, which meet $w_1 + w_2 + w_3 = 1$. Under the default configuration, w_1 takes 0.5, w_2 takes 0.2, and w_3 takes 0.3. The weight can be adjusted according to the policy priority needs of institutional customers. All the problem cards are arranged in descending order of S value, and the high-score cards are given priority to enter the early warning list of the institutional policy interface.

4. Vancouver area practice case analysis

4.1 LGBTQIA2S + adolescent medical service feedback practice

The original event reporting link in the medical service scene only receives formal written complaints. The experience level conflicts such as pronoun misuse and heterosexual standardized language use encountered in the process of individual treatment cannot enter the standardized event ledger. A single event record is classified as an independent accidental record, lacking a cross-sample association collection mechanism [3].

Relying on the Peripheral anonymous collection channel introduced above, the platform sets up a two-dimensional code entrance in the local community clinic in Vancouver to collect service experience feedback for the treatment group. After the original feedback is imported into the system, the semantic clustering is completed through the Swarm AI engine, and the similar experiences scattered at different treatment points and different time nodes are grouped into a unified problem card. The rarity engine completes the priority calculation according to the preset indicators. Even if the sample size is limited, the higher hazard weight can still lift the comprehensive score of the problem and generate a standardized problem card to push to the data access port of the medical institution.

Medical institutions retrieve the aggregated data set, start the internal process adjustment according to the signal characteristics presented by the card, complete the revision of the text of the reception, organize inclusive language special training for on-the-job medical staff, and focus on the use and communication expression norms of the interrogation link. The platform continuously collects the feedback of follow-up treatment scenarios, carries out timing tracking on similar experience reports, records the change of the number of relevant feedback, outputs the timing original signal set, and supports medical institutions to evaluate the effectiveness of service optimization.

4.2 Public transport accessibility management practice for the disabled

The original evaluation system of Vancouver government operation travel assistance plan takes the standardized check box questionnaire as the core carrier, and uses the five-point satisfaction scale to collect service evaluation. The scale framework only captures the overall satisfaction results, and does not set up the collection field for hidden service barriers. Peripheral deploys the hardware terminal at the corresponding exit point of the auxiliary traffic service, equipped with a self-service tablet computer suitable for the physical and cognitively restricted groups. The device has a built-in one-click feedback trigger module, presets a fixed query text as a feedback guide, and simplifies the operation steps other than all text input.

The original feedback collected by enters the Swarm AI crowd intelligence engine to carry out clustering operation, and merges the related reports with uncertain arrival time and long outdoor waiting time to generate independent problem cards. The rarity engine reads all the samples in the card, determines the degree of harm by combining the exposure risk and the appointment failure loss, counts the total sample of the internal report of the card, calculates the inter-temporal interval of the event, and combines the weight configuration to complete the priority scoring. The high hazard attribute under the medium frequency makes the problem card get a higher comprehensive score.

The problem card docking policy operation interface completes the associated labeling of the two external conditions of the loading period and the weather environment, and outputs the early warning signal data set. The operator reads the aggregated signal output by the platform, performs the revision of the operating parameters, compresses the established pick-up time window, and

opens the automatic delivery mechanism of passenger SMS arrival notification. The platform continuously collects the feedback samples after the completion of the transformation, forms two sets of independent cluster data sets before and after the transformation, and outputs the original signal set of time series, which is used for the objective comparison of the improvement effect of service obstacles.

4.3 Summary of the case

Two practical cases show the implementation path of Peripheral platform to solve the problem of social vocal signal masking. First, relying on the low-threshold anonymous collection entrance to capture the weak appeals of experience that are difficult to obtain in conventional research, and eliminate the expression barriers brought by identity concerns ; secondly, with the help of Swarm AI semantic clustering, individual cases scattered at different times and different points are aggregated into systematic problem cards, which breaks through the limitation that the traditional system can only identify large-scale complaints. Thirdly, the weighted scoring mechanism of rarity engine can identify the group dilemma with small sample size but high degree of harm, and promote medical institutions and public transportation departments to carry out targeted service adjustment.

5. Platform bilateral business operation mode

5.1 Client: community promotion and participation incentive

The target users of the platform are young people, marginalized groups and front-line workers. Community promotion is carried out simultaneously based on organizational network collaboration and scene contact laying [4]. The platform links local service organizations in Vancouver, covering grassroots nodes such as UBC, SFU universities and community clinics, and completes the first batch of channel layout. The offline two-dimensional code poster is the main material, which is arranged in the clinic waiting area, community center and campus public space. At the same time, the theme workshop is held to set up the scan code submission feedback and random code query demonstration links to help users establish trust in the anonymity mechanism.

The webpage side follows the previous anonymous privacy protection mechanism, zero registration and zero login can be accessed, and a single feedback takes several seconds ; filter false reports with verification codes and machine learning to ensure signal quality and dispel users ' concerns about invalid feedback. The platform analyzes the signal through Swarm AI and refines the scattered individual feedback into a systematic problem signal. Users can query the processing progress with random alphanumeric code, and maintain their enthusiasm for participation based on feedback visibility rather than material incentives. Compared with traditional research, the platform has a shorter insight into the output cycle, helps the organization to deal with the problem quickly, and feedbacks the effectiveness of the disposal to the community through signal changes, forming a closed-loop participation of ' supply-identification-disposal-feedback '.

5.2 Institutional side: pilot cooperation and data product realization

The target institutional customers of the platform cover clinics, non-profit organizations, schools and public sectors. The business development adopts the parallel mode of direct docking and pilot projects. In the early stage of cooperation, 1-3 months of low-risk pilot projects were provided for institutions. The pilot project did not require pre-investment, and the platform was equipped with dedicated personnel responsible for interface opening, system training and problem response to reduce the access threshold of institutions.

During the pilot period, the weekly output insight report covers signal clustering results, problem card priority, regional distribution and trend comparison, and relies on high-frequency delivery to help institutions evaluate platform analysis capabilities. The data product only provides the analysis conclusion after aggregation desensitization, and does not open the original personal feedback, which not only avoids the risk of privacy disclosure, but also improves the availability of data decision-making. Relying on the two-sided market architecture, the platform realizes the two-way matching of community feedback signals and institutional procurement needs.

The platform belongs to a commercial service organization that sells anonymous aggregated data insights, not a public welfare organization, and the income comes from data licensing fees. The regional aggregated data set is authorized to the government and various institutions to support public policy formulation and service optimization. After the effectiveness of the pilot was verified, the organization turned into a long-term subscription, and the platform continued to supply data products on a weekly basis to build a stable closed loop of institutional realization. In order to clearly present the operation logic of Peripheral bilateral platform, this paper constructs the decomposition matrix of bilateral platform operation elements, which is detailed in table 1.

Table 1: Peripheral bilateral platform operation factor decomposition matrix

Operational Dimension	User Side (Community Supply Side)	Institutional Side (Paying Buyers)
Composition of the Main Body	Youth, marginalized groups, and frontline workers	Clinics, nonprofit organizations, schools, and the public sector
Access Channels	QR code posters, web platforms, self-service kiosks, text messages	Data authorization interfaces, and policy operation interfaces
Identity Handling	No registration or login required; no collection of phone or IP metadata	No collection of personal identity information; only aggregated data is collected
Geographic Location	First three digits of the ZIP code	Community-level and higher aggregation units
Feedback Tracking	Random alphanumeric code	Issue card number and status flag
Data Format	Individual anonymous reports	Conclusive data derived from de-identified and aggregated sources
Filtering Mechanisms	CAPTCHA, machine learning classification	Data quality validation, and access control
Delivery Cycle	Completed in a matter of seconds per transaction	Continuous supply based on weekly authorization
Collaboration Methods	Workshops, scenario posters, organizational collaboration	Direct engagement, low-risk pilot projects
Value Delivered	Feedback is identified, issues are resolved	Decision-making insights, service optimization, and monetization of insights

The table reflects the core tension of the two-sided platform: the ordinary users of the community provide the original feedback data free of charge and do not receive economic returns themselves; after the platform processes and desensitizes the data, it sells data licenses to institutional customers to achieve commercial realization. Grassroots social organizations are not only platform promotion channels, but also potential paying customers. There is a boundary overlap between channel expansion and commercial development.

6. Value conflict of anonymous voice platform

6.1 The improvement of public governance efficiency

The anonymous feedback mechanism breaks the identity constraints of traditional government feedback channels, provides appeal expression channels for low-expression-willing groups that are difficult to reach in conventional research, and makes up for the structural lack of data collected by traditional public opinion. Different from the traditional research, which needs to rely on large-scale complaints to trigger institutional response, Peripheral can identify the group dilemma with limited sample size but prominent harm by means of the combination mechanism of anonymous collection, group intelligent clustering and rarity weighted sorting, and transform the fragmented individual experience into standardized decision-making materials that can be directly used by institutions.

The data set after desensitization and aggregation is open to government, medical institutions and non-profit institutions. The original individual data is strictly not leaked, which helps institutions save the cost of manual sorting of massive texts and directly obtain the governance reference basis after processing. The ability to continuously collect feedback on the timing of the platform can output a set of contrast signals before and after the service adjustment, provide an objective basis for the observation of the effect of public service optimization, promote policy adjustment based on the real experience of the group, get rid of the limitations of relying solely on explicit complaints and standardized questionnaires, and provide new data sources for the supply-side reform of public policy.

6.2 Internal tension under business logic

The platform is operated as a business entity, and the income mainly comes from the authorized sale of desensitization aggregation data sets. Community user feedback is the core raw material of data products, forming the two-sided market operation basis of community supply and institutional procurement. The platform relies on universities, community clinics, and non-profit organizations to lay promotion contacts, and such institutions themselves are potential customers, resulting in overlapping business boundaries between channel expansion and business development.

Data licensing only outputs the summarized problem cards. The original report is saved on the platform side. The data delivery scope and update frequency are constrained by the subscription agreement. Some governance issues with high public value but weak payment ability have the possibility of priority compression. Anonymous privacy protection relies entirely on the internal technical process of the platform to complete metadata filtering, identity decoupling and regional aggregation, and external subjects cannot verify the whole process of desensitization. Commercial subscriptions bind data access rights to payment agreements, and some signals required for public governance must be obtained through commercial procurement.

At the same time, the anonymous feedback platform is still difficult to eliminate the signal deviation: the digital divide will exclude the marginal groups that cannot use web pages and two-dimensional code terminals; even if the false report filtering model is configured, it still faces the problem of biased expression and group noise caused by anonymity. Only the top three postcodes are used for aggregation processing, and there is still a theoretical privacy risk of individual weight recognition in the sparse population scenario.

6.3 The shaping mechanism of algorithmic ranking on policy agenda

The background of the platform provides the parameter configuration function for the organization, and the organization can adjust the order of the problem display according to its own

work focus. This function comes from the background design of the platform's public document disclosure. The case material does not observe the actual consequences of the actual adjustment parameters of the organization, which belongs to the mechanism based on architecture deduction. After the rareness engine outputs the basic score, the organization can set the agenda adaptation coefficient to correct the interface display position of the problem card. The problem card with the same original priority score will produce completely different interface ranking results because of the difference in the agenda adaptation coefficient of the institutional settings. The parameter setting of the algorithm will change the opportunity for weak social signals to enter the field of institutional decision-making. The visibility of the signal is not simply determined by the objective hazard characteristics of the event itself. The background parameter configuration log of the algorithm is retained inside the system, and the institutional operators only read the final output problem card sequence, which makes it difficult to completely observe the whole operation process of the bit correction, thus forming the potential risk of the algorithm shaping the policy agenda.

7. Conclusion

Anonymous technology and swarm intelligence algorithm weaken the psychological burden at the expression level, and transform fragmented individual feelings into decision-making basis for public policy and business services. Peripheral relies on the bilateral business model to maintain the continuous operation of the platform, and completes the capture of marginal groups' demands and the adjustment of service content in Vancouver. Technical tools are difficult to smooth the internal conflicts between public governance objectives, business income demands and algorithm power. Algorithm weight allocation, data authorization rules, and privacy protection processes will affect the actual path of social voice transmission to institutional decision-making. It should be noted that this study is based on the single case of Vancouver Peripheral. The external validity of the conclusion is limited. The operation effect of the anonymous algorithm feedback platform in different systems and social environments still needs more case tests, forming a realistic proposition that the technical public opinion feedback platform needs to face continuously.

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