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Extending the ARC (Ask, Record, Confirm) Technique to Enhance Real-Time Member Checking: A Case Study at Malaysia's Transport License Department

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Abstract

This study introduces the Extended ARC (Ask, Record, Confirm) technique as a methodological innovation for enhancing real-time member checking in qualitative focus group discussions (FGD). Building on the original ARC technique, the Extended ARC integrates physical and digital tools to improve transparency and rigour in data validation. Conducted at the Transport License Department (TLD) with operational officers engaged in a blockchain-based e-payment workflow, the method employed Google Forms for structured engagement, Google Sheets for real-time visualisation, and ATLAS.ti 25 for analysis. Implemented in seven phases that begin with preparation, logistics setup, thematic discussion, response submission, live monitoring, clarification, and final validation. The process enabled dynamic capture, refinement, and confirmation of participant input during the session. Real-time validation reduced the need for post-session transcription and strengthened the trustworthiness, dependability, and confirmability of findings. A deductive thematic analysis of the verified data yielded insights into blockchain's suitability for improving inter-organisational collaboration workflow in the e-payment systems. By addressing the limitations of conventional member checking, the Extended ARC demonstrates methodological innovation, contextual adaptability, and offers a replicable framework for qualitative research in complex institutional environments.

1. Introduction

Amidst the growing recognition of qualitative study inquiry, focus group discussions (FGD) have emerged as a group data collection method. This method enables researchers to seek in-depth and contextual understandings, especially valuable in multifaceted organisational settings (Thomas et al., 2025). Similarly, Liamputtong (2019) and Stewart and Shamdasani (2017) argue that FGD is an established qualitative study that enables the systematic exploration of participants' perceptions, emotions, and lived experiences on a specific phenomenon through guided group interactions. In contrast, Barbour (2018) and Korzenevica et al (2025) mention that FGD is distinguished by its capacity to obtain rich, contextualised data, as participants engage in collective dialogue that encourages the articulation of diverse viewpoints and facilitates the emergence of social meaning through interaction. It lies in its multidimensional capacity for data generation, offering a nuanced understanding of shared experiences, cultural assumptions, and collective sense-making processes in a particular context (Morgan, 1997).

One of the primary benefits of FGD is their capacity to foster dynamic interactions among participants, which often leads to the emergence of themes that may not discover in individual interviews (Dwyer et al., 2022). They observed that FGD are effective in involving hard-to-reach populations and are especially useful when discussing complex phenomenon which required peer discussion. Similarly, Nazeer et al. (2022) emphasized that the FGD allows participants to converse about critical issues, promoting a rich data collection based on participants lived experiences. This interactive setting is essential, as it encourages participants to build on each other's ideas, thus creating a more nuanced understanding of the discussed topic (Hasson et al., 2021).

Furthermore, the flexibility of FGD can be adapted to various contexts and participant needs, including both in-person and virtual formats. For instance, studies from Kamminga et al. (2023) and Menary et al. (2021) illustrate how FGD have successfully shifted online, maintaining their effectiveness despite physical distancing constraints imposed by the COVID-19 pandemic. The online format has proven to be equally effective, if not superior, for certain demographics, allowing broad participation while still contribute valuable insights (Marley et al., 2023).

Nevertheless, despite its advantages, FGD have been critiqued for methodological limitations particularly on data validation and the accuracy of member representations (Zairul et al., 2023). In contrast, the conventional validation procedures, such as post-session member checking through returned transcripts are often time-consuming and may lead to discrepancies between participant intentions and researcher interpretations (Elsharkawy et al., 2025 and Koelsch, 2013). The delays and ambiguities of members checking could compromise the immediacy and trustworthiness of qualitative data, which is particularly problematic in applied research contexts demanding timely outputs (Bang, 2024 and Birt et al., 2016).

Therefore, to address these methodological limitations, Zairul (2019) introduced the ARC technique which known as Ask, Record, and Confirm, as a procedure to enable immediate members checking process. The ARC technique allows researchers to document participant input during FGD interactions and immediately confirms the accuracy of researchers' interpretations in real time. This approach fosters a collaborative and transparent research environment by bridging the temporal gap between data generation and member verification. In general, the ARC process was operationalised through three main stages: (1) Asking participants open-ended questions related to the research issues; (2) Recording their responses and inviting them to write additional comments and reflections on Post-it notes, which were subsequently affixed to the right side of an A1-sized sheet for categorisation; and (3) Confirming the ideas, discussions, and emerging codes on two separate occasions to ensure accuracy and mutual agreement. The ARC session is assisted by second moderator. A second moderator was present throughout the session to observe and document both verbal and non-verbal cues, as well as to assist in the transcription process for further analysis. Initially, the ARC technique was implemented through face-to-face focus group sessions, employing physical tools such as Post-it notes and collaborative charts. However, in the post-COVID-19 context, the technique has been adapted into a modified format that accommodates real-time member validation through online platforms, thereby preserving methodological rigour while responding to evolving research constraints and digital opportunities.

In the present study involving participants from the Transport License Department of Malaysia, the researcher adapted key elements of the ARC technique for use in a face-to-face FGD, while simultaneously incorporating digital tools to support and enhance the previous ARC techniques. This hybrid approach facilitated more effective interaction between the researcher and the participants, thereby enabling the FGD session to be conducted efficiently. Discussions centred on their two-month experience utilising a blockchain-enabled shared dashboard provided valuable experiential insights, which are instrumental to the aims of this study.

2. Literature review

The ARC technique has emerged as a methodological innovation in qualitative research, particularly in expediting the members' checking process and enhancing the rigour of data validation during FGD sessions. In the initial phase, Zairul (2019) employed the ARC technique in a study on developing a business model for affordable housing; the technique was applied in a face-to-face setting. Participants engaged through structured

prompts, recorded their responses on Post-it notes, and collaboratively verified key ideas on A1 paper sheets. This hands-on, visual process enabled immediate participant validation, minimising post-session ambiguity and fostering a participatory approach to data confirmation. An enumerator observed non-verbal cues and managed group dynamics, ensuring analytical precision and richer observational insights.

Subsequent studies have demonstrated the adaptability of the ARC technique across various domains. For instance, Sonet and Shahruddin (2024) employed ARC in sustainable townscape development research involving urban design experts, combining physical facilitation with digital tools and subsequent coding in ATLAS.ti application. Similarly, Mohd Nor et al. (2024) apply the ARC technique in a phenomenological inquiry into end-of-life vehicle (ELV) policy formulation. In both cases, participants verified their contributions during the session through summarised notes and feedback loops, reducing interpretive drift and supporting data triangulation. Meanwhile, Md Rami et al. (2024) applied the ARC technique in a leadership study with youth leaders and stakeholders across Malaysia. This study integrated the method into semi-structured interviews and thematic analysis, demonstrating its compatibility with inductive approaches and its value in reinforcing credibility, dependability, and confirmability in qualitative research.

As time goes by, the ARC technique has also evolved in response to changing research environments and conditional constraints. To adapt to the COVID-19 period, Zairul et al. (2023) presented the modified ARC in an online adaptation that was developed in the post-COVID-19 period. The FGD session was conducted via Google Meet platform. This technique incorporated with chat functions for capturing and validating responses in real time, with direct export into ATLAS.ti for coding and analysis. This digital iteration streamlined data management and significantly reduced it. Despite its versatility, the ARC technique has yet to be thoroughly tested in complex public sector environments characterised by inter-organisational collaboration in the e-payment process at the Transport License Department with a complex procedural system, and digital transformation.

Therefore, the present study addresses this gap by introducing the Extended ARC technique, a hybrid model that integrates physical interaction with digital tools such as mobile devices, Google Forms, and Google Sheets. Applied within the Transport License Department, where participants are trialling blockchain-based e-payment processes, the method enables the validation of workflow-based experiential knowledge in real time. By combining physical facilitation, digital augmentation, and dual moderation, the Extended ARC advances the technique's capacity to capture, verify, and organise participant feedback with in-depth and contextual relevance.

Table 1: Summary of previous studies employing ARC technique

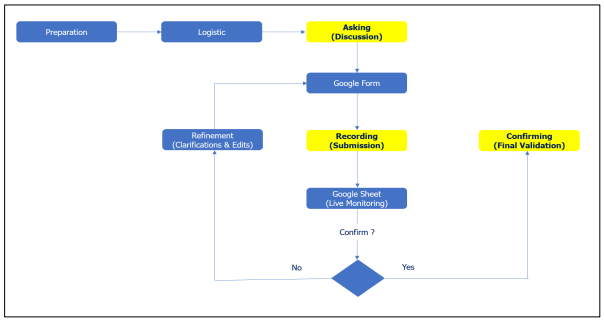
Author(s) and Year	Context of Study	ARC Application
Zairul (2019)	Affordable housing business model development in Malaysia	Face-to-face FGD with Post-it notes and A1 paper for real-time member checking; second moderator for triangulation
Zairul et al. (2023)	Online focus groups on cooperative strategy development	Online FGD using Google Meet and chat box; real-time data validation and direct coding with ATLAS.ti
Sonet and Shahruddin (2024)	Sustainable townscape development in Malaysia	Physical FGD with digital tools; expert panel validation and thematic analysis using ATLAS.ti
Mohd Nor et al. (2024)	End-of-life vehicle (ELV) policy for local governments in Klang Valley	Semi-structured interviews with note-based in-session member checking to validate experiential insights
Md Rami et al. (2024)	Youth leadership development across sectors in Malaysia	Semi-structured interviews applying ARC for trustworthiness framework; inductive coding

3. Research methods

The Extended ARC (Ask, Record, Confirm) technique is built upon the original ARC framework by integrating physical and digital tools to support real-time member checking during focus group discussions. As illustrated in Figure 1, the process comprised seven interconnected phases: preparation, logistics setup, asking (discussion), recording (submission), Google Sheets display (live monitoring), refinement (clarifications and edits), and confirming (final validation). The sequence began with preparatory work and logistical arrangements, followed by guided participant engagement and structured response collection using Google Forms.

Responses were displayed in real time via Google Sheets, enabling immediate group review. Where necessary, these responses were refined before final validation. Consequently, the iterative and structured nature of this approach facilitated continuous verification of participant input, thereby enhancing the accuracy and credibility of data collected during the focus group sessions.

Figure 1: Extended ARC Technique process flow



3.1 Preparation Phase

The process commenced with the preparation phase, during which the researcher developed a series of structured questions categorised under five deductive themes using Google Forms. These predetermined questions provided a guiding framework for participant discussions, thereby ensuring a systematic and thematically aligned approach to data collection.

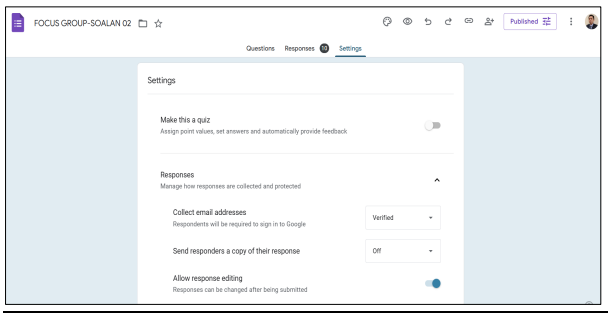
In this study, the questions were organised into five separate Google Forms: (1) data sharing through a shared system, (2) improving operational efficiency, (3) enhancing T+1 fund transfer monitoring, (4) strengthening communication systems, and (5) eliciting

participants' general opinions on the discussion topic (see Figure 2). All questions were presented in the Malay language to maximise clarity and facilitate more meaningful responses, given the linguistic familiarity of the target group.

Figure 2: Google Form link by deductive

To ensure participant flexibility during the subsequent validation stage, the researcher enabled the "Edit After Submission" function in Google Forms, thereby allowing respondents to revise or expand their feedback in real time (see Figure 3). For real-time data visualisation and to facilitate member checking, each Google Form was linked to a corresponding Google Sheet. To streamline verification during the FGD session, each deductive theme was organised into separate spreadsheet tabs. This arrangement reduced cognitive load and improved navigability, particularly during the confirmation stage when participants collectively reviewed their responses. Consequently, these preparatory measures established a coherent and participant-friendly environment that aligned with the methodological requirements of the Extended ARC technique.

Figure 3: Google Form for editable setting



3.2 Logistic setup

The logistics setup phase ensured that the FGD environment was fully prepared to support both physical and digital components of the session. This phase involved selecting a conducive discussion space equipped with a stable, high-speed internet connection to facilitate uninterrupted access to digital tools. In anticipation of participant engagement with the Google Forms platform, all individuals were provided access to a smartphone or laptop capable of supporting real-time data entry. A projector or digital screen was also installed to display participant responses in real time via the linked Google Sheet. This visual display was integral to enabling live validation and fostering interactive discussion, in line with the principles of the Extended ARC technique. Collectively, these logistical arrangements established the infrastructure necessary for a hybrid data collection and validation process that integrated both face-to-face and digital elements.

Figure 4: FGD room session

3.3 Asking Phase (Discussion)

The asking phase marked the initiation of participant engagement in the FGD session. During this stage, the researcher introduced the discussion topics, which were directly aligned with the deductive themes identified during the preparation phase. Acting in a facilitative capacity, the researcher guided participants through a structured exploration of the thematic areas, encouraging open dialogue and

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the sharing of experiential insights relevant to the study's objectives.

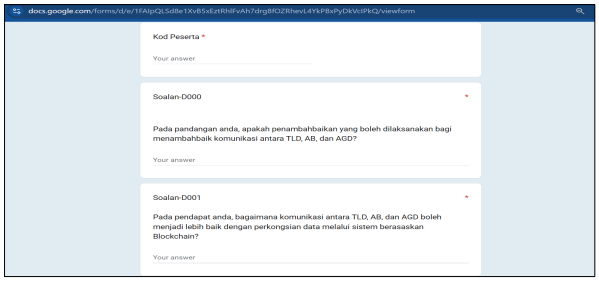
To stimulate deeper reflection and elicit richer data, probing questions were employed for each theme. These prompts clarified participant responses, uncovered underlying perceptions, and ensured that critical aspects of the discussion were addressed comprehensively. Upon completion of each thematic discussion, participants recorded their individual reflections and group consensus responses in the designated Google Forms. This integration of guided dialogue and digital input facilitated real-time data capture and established the basis for subsequent validation by the Extended ARC technique.

3.4 Recording Phase (Submission)

The recording phase involved the formal submission of participants' responses following the completion of each thematic discussion. Participants entered their feedback into the structured Google Forms provided (see Figure 5), which were pre-linked to corresponding Google Sheets for automatic data capture. This digital integration ensured that all responses were systematically recorded and securely stored in real time. Data visibility was prioritised by projecting the Google Sheet interface onto a screen within the focus group setting, enabling all participants to view their contributions collectively.

This live display facilitated transparent, collaborative review and reinforced participant accountability. Consequently, the phase supported the principles of the Extended ARC technique, in which immediate data verification is essential for ensuring credibility, coherence, and mutual understanding within the group context.

Figure 5: Google Form feedback view

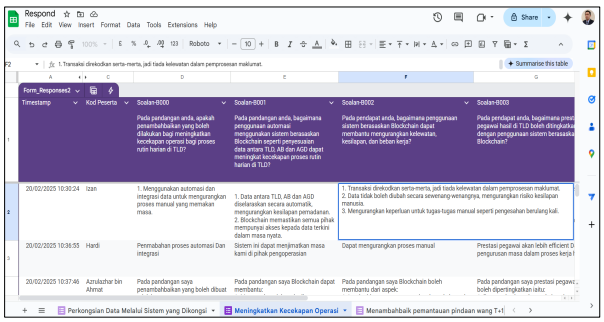


3.5 Google Sheets Display (Live Monitoring)

Upon submission of responses through Google Forms, the data were automatically populated into Google Sheets (see Figure 6), which functioned as a live monitoring and display interface during the FGD session. This real-time projection enabled the researcher and participants to collectively review and assess the clarity, completeness, and coherence of the responses. The on-screen visibility fostered collaborative validation and reinforced transparency in the data review process, consistent with the core principles of the Extended ARC technique.

Responses that were clear, thematically accurate, and sufficiently detailed advanced to the confirming phase for final validation. In contrast, responses that were ambiguous, incomplete, or required further elaboration were redirected to the refinement phase, allowing participants to make immediate corrections or additions. Consequently, this iterative review process upheld data quality while maintaining participant engagement in the co-construction and verification of meaning.

Figure 6: Google Sheet live preview



3.6 Refinement Phase (Clarifications & Edits)

The refinement phase was initiated when participant responses required clarification, elaboration, or thematic alignment. At this stage, the researcher engaged directly with participants to address ambiguities by posing follow-up or probing questions that enhanced the precision and depth of the data. This interactive clarification process supported the trustworthiness of the findings by ensuring that

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the recorded responses accurately reflected participants' intended meanings.

Participants revised or expanded their initial entries directly within the Google Forms interface, using the "Edit Response" function enabled during the preparation phase. These updates were synchronised in real time with the corresponding Google Sheets, allowing both the researcher and participants to monitor and confirm changes as they occurred. By embedding this reflexive editing mechanism within the data collection process, the Extended ARC technique facilitated an iterative, participant-driven approach to data refinement, thereby strengthening the rigour and interpretive validity of the qualitative findings.

Figure 7: Google Form editable respond view

3.7 Confirm Phase (Final Validation)

The confirm phase represented the final stage of the Extended ARC process, during which all reviewed, clarified, and refined participant responses underwent a final round of validation. At this stage, the responses were collectively confirmed as accurate, thematically aligned, and reflective of the participants' intended contributions. The researcher verified that each response met the study's criteria for completeness and clarity, ensuring that no ambiguities remained and that all thematic insights were appropriately captured.

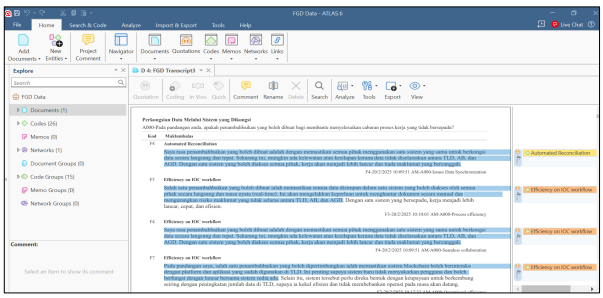
Once confirmed, the validated responses were deemed final, thereby concluding the data collection and real-time validation cycle of the Extended ARC technique. This phase not only marked the closure of the interactive FGD process but also demonstrated the successful implementation of a collaborative and transparent data validation framework, enhancing the credibility, dependability, and confirmability of the qualitative findings.

4. Results and Discussion

In this study, the FGD were conducted at the TLD, involving personnel directly involved in the daily operation of the e-payment process and also have tried with a blockchain-based shared dashboard. The data generated from these sessions were analysed thematically, a technique that facilitated the identification of patterns of meaning across participant narratives (Braun & Clarke, 2006). The analysis process was analysed using ATLAS.ti version 25, a computer-assisted qualitative data analysis software (CAQDAS) that has been widely used for supporting the coding, retrieval, and organisation of large textual datasets in qualitative research.

The data recorded through Google Forms integrated with the Extended ARC technique was automatically compiled into Google Sheets and subsequently imported into ATLAS.ti for analysis (see Figure 7). Unlike traditional FGD that relied on delayed transcript verification, this study benefited from real-time member checking, whereby participants reviewed and confirmed their responses during the session. This real time validation mechanism aligned with Zairul (2021) recommendations for integrating digital tools into qualitative workflows, demonstrating that real-time verification could reduce transcription burdens while simultaneously enhancing methodological efficiency. Consequently, the researcher was able to shift analytical attention directly to coding and thematic interpretation rather than time-intensive data preparation

Figure 7: Transcript that obtained from the Google Sheet



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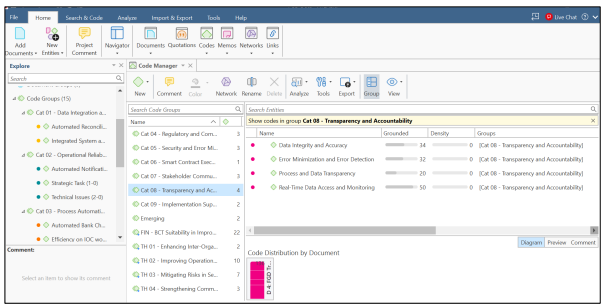
In this study, the thematic process was guided by Saldaña (2013), which followed a deductive approach. Predetermined codes were derived from the study's research objectives, particularly about blockchain suitability, inter-organisational collaboration workflows, and challenges in the e-payment process. Then, these codes were subsequently clustered into several categories, which enabled the emergence of final themes (see Figure 8). The iterative coding process captured both technical and operational perspectives from participants, thereby offering critical insights into real-world implementation dynamics within the public sector. This finding resonates with prior qualitative inquiries into digital governance, which have emphasised the importance of combining technology suitability with institutional realities when evaluating emerging technologies (Fathi et al., 2025; Wirtz et al., 2019).

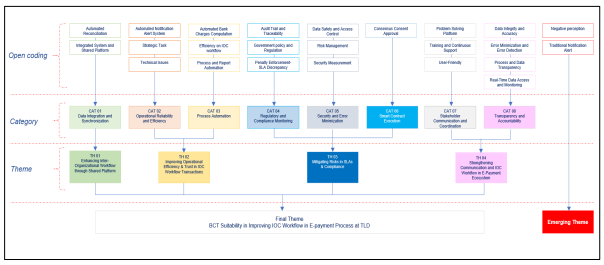
Figure 8: Process of categorizing and final theme



An ethical consideration emerged regarding the display of participants' verbal contributions in written form. While the real-time projection of responses via Google Sheets enhanced transparency and accountability, it also carried the potential for discomfort as participants viewed their feedback in text. Forbat and Henderson (2005) similarly cautioned that member checking procedures may create pressure for participants to self-censor. To mitigate this risk, the researcher clarified the validation process during the initial phase of the FGD, ensuring that participants were aware of how their input would be displayed and confirmed. In practice, participants responded positively, engaging constructively with the live feedback and frequently providing additional clarification or elaboration (Schafer & Phillippi, 2025). This outcome underscored the suitability of the Extended ARC in fostering collaborative dialogue while minimising risks associated with participant visibility.

The integration of the Extended ARC technique with CAQDAS, like ATLAS.ti, strengthened both the accuracy of the data and the rigour of interpretation. By combining objectivist strategies of verification with interpretivist emphasis on participant meaning-making, the study generated findings that were both empirically robust and contextually sound. This outcome not only confirmed the suitability of blockchain for enhancing inter-organisational collaboration workflows in the TLD's e-payment process but also contributed to methodological debates on real-time validation in qualitative research. In this regard, the Extended ARC technique advanced beyond conventional member checking approaches by embedding verification within the data generation process itself, thereby enhancing credibility, dependability, and confirmability in alignment with qualitative methodology trustworthiness (Lincoln & Guba, 1985).

Figure 9: Overall network that shows the process from coding to final theme



5. Conclusion

In conclusion, this study revealed that the suitability of blockchain technology to improve inter-organisational collaboration workflow in the e-payment process at the TLD. These

operational benefits were effectively captured through the Extended ARC technique, which enabled real-time validation of participant feedback and ensured that participants' experiential insights were accurately represented. Thematic analysis, guided by a deductive coding framework, further highlighted how participants valued the collaborative and reflexive nature of the process, reinforcing both the accuracy and contextual depth of the findings.

From a practical perspective, the study demonstrated that the Extended ARC technique is particularly well-suited to FGD data collection in the context of public sector organisations, which expedite the member checking process. By combining physical facilitation with digital augmentation through Google Forms, Google Sheets, and CAQDAS tools such as ATLAS.ti 25, the technique streamlined data collection and validation. This hybrid configuration reduced reliance on delayed transcript verification and minimised interpretive errors, offering a replicable strategy for enhancing trust and efficiency in inter-agency collaboration within digital payment systems. While, from a theoretical perspective, the study advanced qualitative methodology by extending the ARC framework into a digitally augmented, seven-phase process.

The Extended ARC illustrated how real-time member checking could be systematically embedded within FGD to preserve methodological rigour while enhancing participant engagement. This contribution adds to the growing discourse on methodological innovation in qualitative research, particularly in contexts that demand both empirical robustness and collaborative meaning-making. In summary, the Extended ARC technique enhanced methodological trustworthiness, strengthened participant engagement, and streamlined the research process. Its successful application within the TLD context underscores its potential as a transferable and scalable framework for qualitative inquiry in domains characterised by technological intervention, organisational complexity, and multi-stakeholder interaction. Future researchers may adopt or refine this technique to align with the epistemological and practical demands of their respective studies, thereby extending its relevance across diverse institutional and disciplinary settings.

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