

Collaborative Innovation for Vulnerable Communities: Unpacking the Mediating Pathways of Accessibility and Social Participation in Public Service Innovation

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ABSTRACT:

This study examines how accessibility and social participation mediate the relationship between Collaborative Public Service Innovation (CPSI) and the quality of life of vulnerable communities. Previous studies have largely assumed a direct link between public service innovation and community wellbeing, providing limited evidence on the mechanisms through which innovation produces meaningful outcomes. Addressing this gap, the study adopts the CPSI framework to explain how collaborative innovation translates into improved quality of life through accessible and participatory public services. Survey data were collected from 271 respondents across five sub-districts in Malang, Indonesia. Twelve indicators were measured using a structured questionnaire. Ordinal data were transformed into interval scores using the Method of Successive Interval (MSI) before multiple regression analysis in SPSS. The results show that CPSI improves quality of life only indirectly through accessibility and social participation. Accessibility is the stronger mediator, highlighting the importance of inclusive infrastructure, communication, and service delivery, while social participation provides a complementary contribution by strengthening community engagement. CPSI has no significant direct effect on quality of life, indicating that collaborative innovation alone is insufficient without effective implementation mechanisms. The study advances an accessibility-centered administration perspective by demonstrating that accessibility and participation are essential pathways linking collaborative innovation to community wellbeing. These findings provide practical guidance for designing more inclusive public service policies for vulnerable populations.

Keywords: Accessibility, Collaborative, Public Service, Innovation, Social Participation

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1. Introduction

Unequal access to public services for vulnerable communities remains a persistent and increasingly complex problem ((De França et al., 2020; Gordon et al., 2020)). These inequalities weaken governance effectiveness and administrative justice. They also create durable barriers to equitable service delivery. In response, a large body of research has examined vulnerable communities through the lens of public policy ((Fatkhullah et al., 2022; Numans et al., 2021; J. Osborne et al., 2021)) and policy analysis (Batanda Mubiru et al., 2022; Hou, 2019; Pfaff et al., 2021; Sousa et al., 2019). Much of this literature, however, stops at the implementation or evaluation stage of existing policies (Bovaird et al., 2019; Mafra et al., 2024). It pays comparatively little attention to the governance structures and administrative processes that actually shape collaborative service innovation.

A separate stream of scholarship approaches the issue through public service innovation, particularly its contribution to vulnerable communities' quality of life (Mulvale & Robert, 2021; Napp & Conklin, 2022; Tajima et al., 2022). Within this stream, two mechanisms recur but remain under-theorized: accessibility and social participation. Accessibility reduces the structural obstacles vulnerable groups face. Collaborative innovation, in turn, generates solutions that respond more directly to their needs. Embedding both mechanisms shifts service design away from a top-down process and toward one that incorporates community input (Nations, 2016). This shift strengthens vulnerable communities' involvement in decisions that affect their own lives.

Putnam (2000) argued that when vulnerable communities gain better access and participate more actively, they tend to feel more empowered. They also become better able to contribute to their community. Social participation fosters belonging and shared responsibility. In doing so, it strengthens social cohesion and reduces social inequality. These dynamics are precisely what this study sets out to test: whether accessibility and social participation function as the mechanisms

through which CPSI improves quality of life, or whether they operate independently of it. Examining these mediating mechanisms is therefore essential for understanding how CPSI can improve vulnerable communities' quality of life.

This study contributes to public administration theory by examining how governance mechanisms facilitate collaborative innovation in service delivery for vulnerable communities. By focusing on the mediating roles of accessibility and social participation, it extends innovation-policy research beyond its conventional focus on technological change or implementation. Understanding these mediating factors, from a public administration perspective, is essential for building administrative systems that connect institutional capacity with community needs. Contemporary governance therefore requires a clearer account of how administrative structures can be redesigned. Such structures must foster collaborative innovation while genuinely engaging vulnerable populations and attending to broader social values.

To address this need, the study is guided by three questions: does CPSI improve quality of life directly, or only through accessibility and social participation; which of these two mediators carries the larger effect; and what does the answer imply for how governments should design innovation policy? This study adopts the Collaborative Public Service Innovation (CPSI) perspective, which treats user involvement as a catalyst for innovation while also accounting for community quality of life (Bekkers & Homburg, 2007; S. P. Osborne & Brown, 2011). This view aligns with networked-governance frameworks that treat cross-sector collaboration as central to effective service delivery. Several studies (Bozic, 2021; Y. S. Chen & Chang, 2023; Mulvale et al., 2019; Tobirin, 2020) have examined vulnerable communities through various government innovation initiatives.

Governments have, accordingly, developed a range of service innovations aimed at improving vulnerable communities' quality of life. Bozic's (2021) research shows that such innovations can

narrow the gap between vulnerable communities and the broader society. They do so mainly by making services easier and more affordable to access. Involving vulnerable communities in developing these innovations further allows governments to design more impartial and populist policy outcomes. Chen's (2023) study shows the importance of collaboration between government and vulnerable communities in developing innovative services. This reflects a broader shift toward more democratic and inclusive public management. Mulvale et al. (2019) and Tobirin (2020), however, show that social and cultural aspects also need attention. Vulnerable communities live within diverse social and cultural contexts, and governments must account for this diversity when designing service innovations.

Taken together, these studies show why understanding vulnerable communities matters when governments design innovative services. Such understanding produces solutions that better reflect shared social values. This research accordingly addresses a gap in the public administration literature: how can institutional arrangements and administrative processes be restructured to strengthen accessibility and community participation as mediating factors in service innovation? In doing so, it offers a new account of how social values, convenience, and inclusion shape the development of innovative public services for vulnerable communities.

2. Literature Review

Several studies (Callens, 2023) elaborate the CPSI perspective in public services. They identify four core ideas: (1) the need for inter-organizational cooperation, (2) the strengthening of community participation, (3) the expansion of service dimensions, and (4) the primacy of flexibility and adaptability. Millan's (2019) study complements this framework by examining the dynamics of interaction within public service innovation, while Callens (2023) focuses specifically on citizen participation. Studies on vulnerable communities' role in service innovation include Andries et al. (2019), Chui & Ko (2021), Frątczak-Müller (2022), Muluk et al. (2021), and

Mulvale & Robert (2021). Others, including Artaza (2021), Gospodinova (2023), and Mulvale & Robert (2021), establish the relationship between CPSI and vulnerable communities' quality of life.

Several studies focus specifically on accessibility within CPSI. Indriastuti et al. (2023), Lopes & Farias (2022), and Razak et al. (2022) show that accessibility conditions relate both to meeting community needs and to achieving organizational strategic goals. Related work by Wang et al. (2020), Vallée et al. (2022), and Sharma & Patil (2021) similarly shows that improving service accessibility matters for two reasons: it brings government services closer, and it improves the welfare of vulnerable communities more broadly. Social participation is likewise a recurring focus in research on vulnerable communities' quality of life (Ab Ghafar et al., 2022; Bhatt & Bathija, 2018; Higgins et al., 2023; Lazo-Porras & Penniecook, 2023). This work converges with Laurence (2021), Lestari et al. (2021), and Wilding et al. (2023) on one finding: social participation is positively associated with multiple dimensions of vulnerable communities' wellbeing. Maolana et al. (2020) further highlight growing pressure on public institutions to deliver services that are both more responsive and more sustainable over the long term.

Despite this body of work, a specific gap remains, and it motivates the present study. Governance literature generally acknowledges the importance of user involvement. Yet it says little about how administrative systems can systematically incorporate vulnerable communities' perspectives into service design and delivery. It is often assumed that governments developing innovative services become more responsive, accessible, effective, and better targeted almost automatically. Callens (2023) challenges this assumption: many studies discuss services that involve users, but few examine user involvement as a driver of collaborative innovation specifically. Hong et al. (2023) offer a partial response by situating accessibility within this gap.

The following section synthesizes the core constructs drawn from these prior studies to

address the institutional barriers that limit vulnerable communities' influence on governance and service innovation.

1. **Collaborative Public Service Innovation** refers to innovation in public services that combines cross-agency collaboration, public participation in planning, and technology integration to improve efficiency, quality, and responsiveness (Gesierich, 2023; Hong & Lee, 2023). This concept draws on networked-governance models that emphasize multi-stakeholder engagement. It is measured through three indicators: (a) inter-agency collaboration developing public services through collaboration between government and non-government institutions to increase effectiveness and affordability (Alonso & Andrews, 2021; Bozic, 2021; Siddiquee & Xavier, 2021); (b) public participation in planning active community involvement in planning and developing public services to ensure relevance and sustainability (Draçi & Laska, 2023; Mamokhere & Meyer, 2023); and (c) technology integration using information and communication technology to improve the accessibility and quality of collaborative public services (Zanchett et al., 2019).

2. **Improving the quality of life of vulnerable communities** refers to efforts that increase access to essential services, empower local economies, and strengthen social protection, in order to improve vulnerable communities' quality of life (Bevilacqua et al., 2022; Giorgi et al., 2022; Zabala et al., 2018). This definition reflects a shift from procedural efficiency toward outcome-oriented governance centered on equity and inclusion. It is measured through three indicators: (a) basic-services accessibility increased access to essential services such as education, health, and infrastructure (Balomenos et al., 2019; Ihantamalala et al., 2020; Luz et al., 2022); (b) local economic empowerment programs that promote local economic development to raise income and financial stability (Danial et al., 2021; Hidayat & Syahid, 2019; Migliaro, 2023; Winoto et al., 2021); and (c) social protection and security initiatives that improve protection, security, and welfare for

groups such as children, the elderly, and people with disabilities (Chatzikonstantinidou et al., 2023; Voronkova et al., 2019; Yokobori et al., 2023).

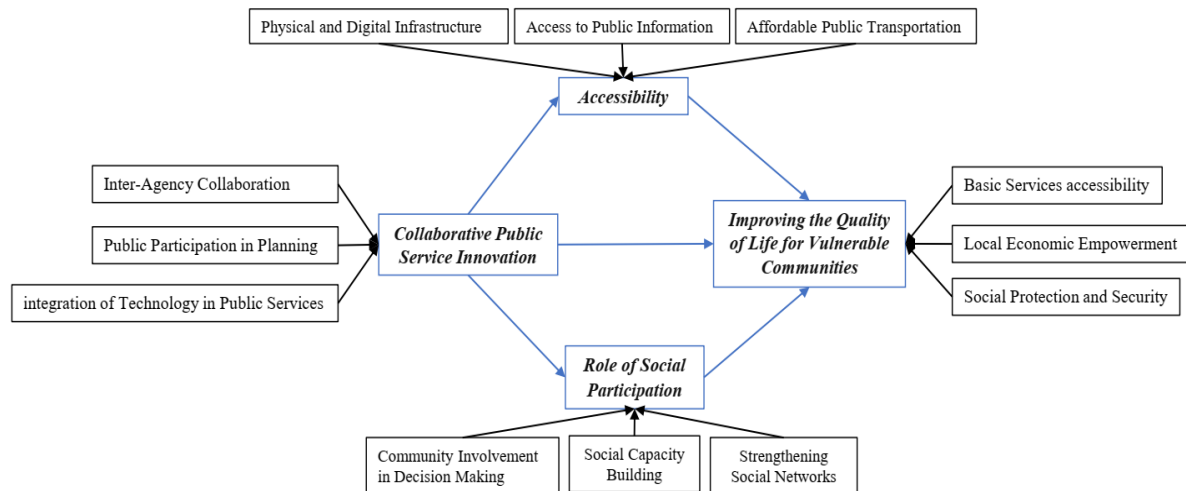
3. **The mediating role of accessibility** refers to the intermediary function of physical and digital infrastructure, accessible public information, and affordable public transportation in supporting community involvement and more inclusive services (Chandwani & Kulkarni, 2018; Giloth, 2023). This role connects institutional capacity with the lived experience of vulnerable populations. It is measured through three indicators: (a) physical and digital infrastructure ensuring adequate infrastructure to increase accessibility (Stroppe, 2023); (b) access to public information facilitating access to the information needed to use public services effectively (Flores et al., 2022; Kasim et al., 2019; Rudanetska, 2023); and (c) affordable public transportation expanding affordable and environmentally sound transportation to improve access to services (Prajapati et al., 2020).

4. **The mediating role of social participation** refers to the intermediary function of strengthening community participation through involvement in decision-making, social-capacity building, and stronger social networks, in order to increase social cohesion and the effectiveness of community-development programs (Cibin et al., 2020; Giloth, 2023; Warbroek et al., 2018). This construct captures a core dimension of democratic governance: how administrative structures enable meaningful civic engagement among marginalized populations. It is measured through three indicators: (a) community involvement in decision-making ensuring active participation in decisions on public-service policy and development (Özden, 2024); (b) social-capacity building programs that increase communities' capacity for participation, collaboration, and joint problem-solving (Ansori & Firdaus, 2020; Baucal et al., 2022); and (c) strengthening social networks building networks that support the exchange of knowledge, resources, and support around public services (Anthony, 2024; Watarai et al., 2023).

Building on this review, the present study advances one central proposition. CPSI improves the quality of life of vulnerable communities not directly, but through the

mediating roles of accessibility and social participation. This relationship is depicted in Figure 1.

Figure 1. Relationship among research variables



CPSI improves the quality of life of vulnerable communities through the mediating role of accessibility and social participation.

3. Methodology

This study uses a quantitative, exploratory design to analyze how public-service policy innovation affects the quality of life of vulnerable communities through the mediation of accessibility and social participation. Four theoretical constructs anchor the analysis: policy innovation, quality of life, accessibility, and social participation, each considered in the context of public services for vulnerable communities. The research was conducted in Malang City. Malang was selected for its geographic and demographic diversity, its status as a disability-friendly city since 2013, and its rapid development, all of which point to strong potential for social-policy innovation.

Malang's status as a disability-friendly city also makes it a useful test case for the study's central question: does inclusive intent translate into accessible outcomes, or does it depend on how well accessibility and participation are institutionalized? It is, in short, a relevant case for examining administrative innovation within a local-governance context already committed to inclusive service delivery. The research population comprises all individuals classified as

vulnerable communities in Malang City, including people with disabilities, the elderly, and low-income groups. The sample frame targeted residents of working age (18–60 years) who work in the informal sector or are not employed, and who fall into lower or low socio-economic categories. The sample size was 271 residents, determined using the formula of Lemeshow et al. (1991), with a 90% confidence level, a population proportion of 0.5, and a margin of error of $\pm 5\%$. Sampling used a stratified design, with the five sub-districts serving as strata.

Stratified sampling ensured proportional representation across administrative jurisdictions. This, in turn, strengthens the generalizability of the findings to comparable governance contexts. Data were analyzed using multiple regression, which allows the study's variables to be examined for how they interact to shape service-delivery outcomes. Respondents answered on a Likert scale. Their responses were then converted into interval-level scores using the Method of Successive Interval (MSI), a technique for approximating interval data from ordinal responses before regression analysis. This transformation follows recent recommendations

in quantitative public-administration research (Hong et al., 2023); it normalizes ordinal data and supports more precise regression estimates. The regression analysis checked the relevant statistical assumptions: normality of the data distribution, absence of multicollinearity among independent variables, and homoscedasticity. All analyses were conducted in IBM SPSS.

4. Results

Before the questionnaire was distributed, the measurement instrument's validity and reliability were tested.

The validity test shows that every variable's calculated *r*-value exceeds the critical *r*-value ($r\text{-table} = 0.113$). All variables are therefore confirmed valid. Variable Z1.1 has the highest calculated *r*-value, at 0.832, indicating a strong relationship. Variable Z2.3 has the lowest, at 0.614, which still exceeds the *r*-table value and is therefore valid.

Reliability analysis using Cronbach's Alpha yielded 0.692 across 12 items. This falls just below the conventional 0.7 threshold for ideal reliability. Even so, 0.692 is generally considered acceptable for exploratory social research (Hair et al., 2019), and it is treated as such here.

Normality, multicollinearity, and heteroscedasticity were tested next. The Kolmogorov-Smirnov test yielded a *p*-value of 0.080, above the 0.05 threshold. The residuals can therefore be regarded as normally distributed.

Tolerance values were 0.927 for CPSI, 0.982 for the mediating role of accessibility, and 0.939 for the mediating role of social participation. The corresponding VIF values were 1.079, 1.018, and 1.065. Because all tolerance values exceed 0.10 and all VIF values remain below 10, the data show no evidence of multicollinearity.

Significance values for heteroscedasticity were 0.129 for CPSI, 0.682 for the mediating role of accessibility, and 0.790 for the mediating role of social participation. All exceed 0.05. The data therefore show no heteroscedasticity: residual variance is constant across observations, and the homoscedasticity assumption holds.

1. Description of Respondents

Respondents came from diverse backgrounds and occupations. Of the 271 respondents, 75 percent were men and 25 percent were women. This imbalance is worth noting on its own terms: it may reflect who is available to answer a daytime survey as much as who actually works in these occupations, and the discussion returns to this point below. The distribution is broadly consistent with informal-sector participation patterns reported by Mulvale & Robert (2021) and Frątczak-Müller (2022), who note similar gender asymmetries in vulnerable communities' engagement with public services.

Occupationally, 45 percent of respondents work as motorbike-taxi or ride-hailing drivers, reflecting the dominance of application-based transportation work in the sample. Street vendors make up another 25 percent, and part-time workers, mostly in construction, make up 23 percent an occupational category also prominent in prior studies of vulnerable communities. Parking guards account for 5 percent, a service occupation directly connected to urban public services, while the remaining 2 percent sell newspapers and magazines.

This occupational profile matches Gospodinova's (2023) description of the "new vulnerable" in urban governance: individuals whose livelihoods sit at the intersection of traditional informal economies and emerging platform-based work. This intersection creates challenges for public administration systems that were designed around more conventional employment categories. Respondents' ages are similarly varied: 55 percent are 24–45 years old, 15 percent are 18–23, another 15 percent are 46–60, and the remaining 15 percent are over 60. Respondents' ages, in other words, concentrate in the young-adult to middle-aged range. The predominance of younger respondents in application-based work points to a socio-economic position that is particularly sensitive to shifts in government policy.

2. Analysis

Collaborative Public Service Innovation and the Quality of Life of Vulnerable Communities

CPSI shows no statistically significant direct effect on the quality of life of vulnerable communities ($\beta = 0.045$, $SE = 0.071$, standardized $\beta = 0.039$, $t = 0.644$, $p = 0.520$). The unstandardized coefficient suggests a marginal positive association, but the low t-value and non-significant p-value provide no real evidence that CPSI directly drives quality-of-life improvement. This is the study's central empirical finding, and the sections that follow work through what it means. The relationship between collaborative innovation and community outcomes, in short, is not linear. It appears instead to be embedded in multi-layered administrative dynamics that call for context-sensitive approaches, particularly in urban-governance settings such as Malang.

This finding diverges from the theoretical expectations of Artaza (2021) and Gospodinova (2023), who posit direct positive relationships between collaborative innovation and community wellbeing. It suggests that this governance relationship is more complex than the existing public administration literature has assumed.

Collaborative Public Service Innovation and the Mediating Role of Accessibility

CPSI has a statistically significant effect on the mediating role of accessibility ($\beta = 0.182$, $SE = 0.085$, standardized $\beta = 0.130$, $t = 2.146$, $p = 0.033$). Increases in CPSI are therefore associated with corresponding increases in accessibility. In Malang City recognized since 2013 as a disability-friendly city this finding underscores the importance of aligning innovation strategies with inclusive urban planning and transportation reform.

This significant relationship between innovation and accessibility is consistent with the framework proposed by Indriastuti et al. (2023) and Razak et al. (2022). Both emphasize that effective governance structures create the enabling conditions for service access, particularly for marginalized populations.

Collaborative Public Service Innovation and the Mediating Role of Social Participation

CPSI also has a statistically significant effect on the mediating role of social participation ($\beta = 0.306$, $SE = 0.074$, standardized $\beta = 0.245$, $t = 4.136$, $p < 0.001$). This is the strongest of the three coefficients examined, and it offers robust evidence that CPSI enhances social participation.

This finding aligns with Callens' (2023) emphasis on citizen participation as fundamental to administrative innovation. It suggests that collaborative approaches create governance spaces that facilitate meaningful engagement by vulnerable communities, extending theoretical work on social capital in public contexts.

Taken as a whole, the regression model using the mediating roles of social participation and accessibility, together with CPSI, as predictors of quality-of-life improvement shows a reasonably strong relationship. CPSI itself is not significant. Both mediators, however, significantly and positively influence quality-of-life improvement for vulnerable communities. These results support one proposition in particular: policies aimed at uplifting vulnerable populations should prioritize structural reforms that improve physical and digital access, while treating participation mechanisms as a strategic complement rather than a substitute.

This pattern calls for a reconsideration of linear governance models that assume a direct link between administrative innovation and community outcomes. It instead supports what Maolana et al. (2020) describe as "nested governance arrangements," in which institutional actions shape intermediary processes that, in turn, affect vulnerable communities' lived experiences.

5. Conclusion

This study shows that public service innovation policies significantly influence the quality of life of vulnerable communities, though not directly. Mediating factors specifically, public service accessibility and social participation play the crucial role in linking innovation policy to quality-of-life outcomes. Although CPSI itself is not

directly significant, improving vulnerable communities' quality of life is achievable by strengthening service accessibility and facilitating active social participation.

This research offers several theoretical and practical contributions to public administration and governance. Theoretically, it advances the understanding of service innovation by showing that the link between collaborative innovation and community wellbeing is not direct, but mediated through accessibility and participation mechanisms. This challenges conventional linear models of public service delivery and points toward a more nuanced account of how governance innovations translate into community outcomes. The study synthesizes and extends existing frameworks by proposing the "accessibility-centered administration" paradigm, which prioritizes equitable service access while using participatory processes to ensure responsiveness.

Practically, this research offers three insights for administrators and policymakers seeking to improve service delivery for vulnerable communities. First, it highlights the importance of prioritizing infrastructure and systems that strengthen accessibility across physical, digital, and informational dimensions. Second, it shows that community participation should be built into the entire service-innovation process, from design through implementation and evaluation. Third, the proposed four-pillar CPSI model offers a practical framework built on adaptive technology, local-asset utilization, responsive feedback mechanisms, and decentralized decision-making that administrators can adapt to local contexts.

Taken together, these implications suggest a clear ordering of priorities for governance practice. Investments in accessibility infrastructure may yield greater returns for vulnerable communities than efforts focused solely on collaborative processes. These findings also caution against neglecting participation, however, since community engagement remains essential for ensuring that accessible services actually address local needs and priorities. For policymakers in

Malang City and similar urban contexts, this suggests a strategy that balances targeted accessibility investment with sustained efforts to build community capacity for meaningful participation.

This study has certain limitations worth noting. The transformation of ordinal data Likert-scale responses, for instance into interval-level data using the MSI method assumes an approximately normal distribution in the resulting data. This assumption is not always fully satisfied, and it may affect the precision of the regression estimates that follow from it.

Future research should address this methodological limitation through mixed-methods approaches that combine quantitative analysis with qualitative exploration of community experiences. Longitudinal studies would also help clarify how accessibility and participation mechanisms evolve, and what their long-term impacts on community wellbeing look like. Research that examines how these dynamics vary across different types of vulnerable communities and governance contexts would further extend this work's theoretical and practical contributions, moving public administration scholarship toward more inclusive and effective governance models.

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7. Ethical Considerations

This study was conducted in accordance with the research ethics principles and guidelines outlined in the Research Guidelines of the Faculty of Administrative Science, Universitas Brawijaya (2024). Participation in the study was voluntary, and participants provided informed consent before completing the questionnaire.

Participants' privacy and confidentiality were protected, and the data collected were used solely for research purposes.

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