

Policy Empowerment and Public Participation: Insights from the Necessary Condition Analysis

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Abstract: *The growing demand for broader public participation in addressing social challenges has heightened interest in understanding the factors that influence participation. This study adopts the perspective of empowerment theory and employs a mixed-methods approach, integrating Structural Equation Modelling (SEM), Necessary Condition Analysis (NCA), and Fuzzy-Set Qualitative Comparative Analysis (fsQCA), to evaluate the impact and priorities of policy resources, and psychological and decision-making empowerment on public participation in poverty governance. The findings demonstrate that policy resource empowerment emerges as fundamental and necessary among the three types of empowerment. And when resource empowerment and psychological empowerment work in tandem, they can obtain the most favourable outcomes. By contrast, while decision-making empowerment can foster more proactive engagement, it plays a valuable supplementary role rather than serving as the primary driving force. These findings help solve the limitations associated with a single methodology to provide new insights into the prioritisation of policy empowerment measures to influence public participation and to identify the necessary and sufficient conditions to enrich the research related to the factors influencing public participation. The findings also offer actionable insights for policymakers aiming to enhance public engagement in poverty governance.*

Keywords: Public participation; Policy Empowerment; Resource; Attitude; Autonomy

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1. Introduction

The global fight against extreme poverty has faced significant setbacks, exacerbated by intersecting crises such as climate change, health emergencies, and geopolitical instability. As of 2023, approximately 660 million people globally live in extreme poverty, highlighting the urgent need for effective poverty governance. Public participation has emerged as a crucial element in creating sustainable and equitable solutions. However, achieving meaningful participation is impeded by systemic barriers like weak accountability mechanisms, restrictive social norms, and information asymmetry (Qureshi et al., 2025).

Effective public participation depends not only on creating channels for engagement; it relies on empowering citizens with the capacity, willingness, and authority to participate (Bobbio, 2019). This emphasis on empowerment as a foundational element has garnered substantial scholarly consensus, underscoring its multidimensional nature in fostering meaningful civic involvement (Fung, 2009). At a broader level, empowerment encompasses resource, psychological, and decision-making dimensions, each uniquely contributing to bridging participation gaps and enhancing democratic legitimacy. Specifically, resource empowerment provides the material and informational support necessary for citizens to exercise their voice, with the lack of critical resources identified as a major barrier to inclusive participation, particularly for marginalised groups (Bryer & Prysmakova-Rivera, 2018). Complementing this, psychological empowerment focuses on citizens' belief in their ability and right to influence policy, crucial for overcoming political alienation and encouraging participation (Zimmerman, 1995). Finally, decision-making empowerment determines whether participation is symbolic or substantive, as true citizen empowerment occurs only when individuals possess real bargaining power or partial decision-making authority, distinguishing it from symbolic participation (Arnstein, 1969).

These widely recognised theoretical dimensions of empowerment pose a complex empirical challenge in their operationalisation across different institutional contexts, with insufficient discussion on the interplay between state-led empowerment and public participation in developing contexts like China. As the world's largest developing economy, China has implemented ambitious governance reforms to integrate public input into the policy

process. A series of policies aimed at enhancing public empowerment have been implemented, including resource mobilisation initiatives designed to alleviate poverty and promote citizen participation. However, implementation challenges persist, such as diminishing marginal returns on broad policy investments and negative social incentives that hinder broader participation. Despite a significant increase in participatory activities, concerns remain about insufficient public engagement in critical areas like poverty governance (Liu et al., 2019). A cornerstone of this strategy is the Counterpart Assistance policy, a unique top-down mobilisation framework where more developed regions and government entities provide targeted financial, technical, and personnel support to impoverished areas (Tang & Zhang, 2024). This policy represents a large-scale, state-led experiment in empowerment. However, it raises a key question: to what extent does policy empowerment under the counterpart assistance paradigm promote public engagement, and through which mechanisms do they operate?

However, a thorough investigation of this question is hindered by several significant gaps within the current body of scholarly work. First, empowerment is a multidimensional construct, yet few studies synthesise these dimensions into a comprehensive model, limiting a nuanced understanding of their synergistic or compensatory effects. Furthermore, empirical research on policy-driven empowerment in contexts like China's state-led poverty governance is scarce. Empowerment theories, which were primarily developed in Western democratic settings, require rigorous empirical validation in different political environments. Finally, previous studies have often relied on single-method approaches, failing to fully capture the necessity and sufficiency of empowerment dimensions, with little insight into their relative priorities, hindering targeted policy recommendations.

To address this gap, this study establishes a comprehensive analytical framework based on empowerment theory to explore how a specific empowerment policy—Counterpart Assistance—shapes public participation through different dimensions (resource, psychological, and decision-making). The study achieves this objective through an integrated approach combining Covariance-Based Structural Equation Modelling (CB-SEM), Necessary Condition Analysis (NCA), and Fuzzy-Set Qualitative Comparative Analysis (fsQCA), using survey data on public participation in poverty governance from a province in China.

This study makes three contributions. First, using sample data from a region in China, this study empirically tests the impact of policy empowerment on public participation, providing empirical evidence for the applicability of the empowerment theory. Second, the single-conditional necessity and sufficiency analyses of resource, psychological, and decision-making empowerment expand the research on factors influencing public participation. Third, the integration of multiple research methods based on different causal logics addresses limitations of single-perspective approaches, offering a nuanced explanation of the complex relationship between policy empowerment and public participation, with practical implications for improving poverty governance strategies.

2. Literature Review and Hypothesis Development

2.1 Literature review

Policy empowerment is the core theoretical construct explaining the transformation of the public from passive policy recipients to active participants. Within the participatory governance literature, a broad consensus holds that empowerment effectively promotes civic engagement in public affairs by enhancing citizens' capabilities and motivation (Biggeri & Frediani, 2019). Existing research has separately confirmed the importance of these three dimensions. Resource Empowerment addresses the “can” dimension of participation by providing citizens with critical information, skills, and network capital to overcome structural barriers (Mäkinen, 2006). Psychological Empowerment tackles the “want” dimension by cultivating individuals' sense of internal efficacy (Leung, 2009; Zimmerman, 1995). Decision-making empowerment involves substantive power-sharing and procedural justice, ensuring that citizens' voices tangibly influence policy outcomes—addressing the “worth” dimension of participation (Lennon et al., 2019; Nithyanandhan & Mansor, 2015).

However, fragmented perspectives fail to form a complete logic of policy empowerment, as empowerment theory itself emphasises multidimensional constructs (Petter et al., 2002). This perspective is highly complementary to policy feedback theory, which examines how policies reshape citizens' political attitudes and participation behaviours through resource and interpretive effects (Soss & Schram, 2007). For instance,

policy feedback theory reveals that empowerment policies (such as welfare reforms) can amplify psychological empowerment by enhancing citizens' perceived efficacy through resource provision, thereby promoting proactive participation (Mettler & Welch, 2004). Resource feedback alone may prove insufficient to sustain participation, as it overlooks how policies interpret citizenship (interpretive effects), thereby influencing motivational formation at the psychological level (Béland & Schlager, 2019). The Theory of Planned Behaviour (TPB) complements this dynamic model of empowerment by focusing on individual intent. It suggests that attitudes, subjective norms, and perceived behavioural control collectively predict participation intent—elements that can be viewed as extensions of psychological empowerment (Ajzen, 1991). However, isolated psychological empowerment (e.g., merely enhancing attitudes) cannot translate into action unless synergised with resource empowerment (providing opportunities) and decision empowerment (normative support). Otherwise, the intention-behaviour gap persists (Abdulai et al., 2024). While the convergence of these theories has advanced the field beyond the search for singular necessary conditions, it simultaneously exposes a critical research gap: it remains unresolved whether each dimension is truly indispensable across all contexts, and to what extent they can compensate or substitute for one another.

2.2 Hypothesis development

2.2.1 Policy resource empowerment and public participation

Public participation can be viewed as a form of rational behaviour. Under specific external conditions, an individual's decision to engage in public activities depends on a cost-benefit analysis of their own interests. Resources are recognised as a fundamental condition for empowerment, with the distribution of material and knowledge resources playing a critical role in shaping the public's governance capacity (Perkins & Zimmerman, 1995). Resource empowerment emphasises providing resource support in pro-poor governance, including financial resources, human capital, and social support. By empowering communities with financial aid, technical assistance, education, and access to information, resource empowerment enhances self-efficacy and builds capacity among community members, thereby contributing to the sustainable development of poverty governance (Alkire

et al., 2020). The effectiveness of public participation largely hinges on participants' access to essential resources, such as information, technology, and funding. Through counterpart assistance, the interactive process of resource pooling has delivered substantial financial, policy, and industrial aid to recipient areas, enhancing the developmental and participatory capacity of local populations (Wang, 2022). Based on this understanding, the study proposes the following hypotheses:

H_{1a} Resources positively influence Public Participation.

From the perspective of resource mobilisation theory, the resource base of an individual or a group is the determining variable in attempting to influence decision-makers (Jenkins & Perrow, 1977). Therefore, it is further hypothesised:

H_{1b} Resources are a necessary condition for Public Participation.

In the context of empowerment and governance, resource allocation significantly impacts public attitudes. Access to resources not only increases the likelihood of participation in governance but also shapes perceptions of the governance process and its outcomes. By providing economic support, knowledge, and social resources, resource empowerment can improve living conditions and foster more positive attitudes toward participation (Gupta & Vegelin, 2016). Empirical studies reinforce this causal pathway: for instance, policy feedback mechanisms, such as resource allocation in public programmes, reshape citizens' attitudes toward participation by enhancing perceived efficacy and value alignment (Soss & Schram, 2007). Similarly, research on community renewal in China shows that resource allocation positively influences participation attitudes by strengthening internal motivations and fostering trust (Sun et al., 2025). To explore the relationship between these variables further, the study proposes an additional hypothesis:

H_{1c} Resources positively influence attitudes.

2.2.2 Policy psychological empowerment and public participation

The psychological empowerment framework highlights that the public's

psychological state and motivation to participate significantly impact governance effectiveness. Key factors such as “self-efficacy” and a “sense of belonging” play crucial roles in community governance and determine the level of sustained public participation (Zimmerman, 1995). Additionally, psychological empowerment represents the psychological process by which individuals, organisations, and communities gain greater control over their affairs (Christens, 2012). This process enables the public to master participation and develop a critical understanding of their circumstances (Maan et al., 2020). Research in organisational behaviour, grounded in Job Demands-Resources (JD-R) and Self-Determination Theory (SDT), has shown that when individuals perceive their participation as meaningful, believe they are competent, feel they have autonomy, and recognise their actions as impactful, they are more likely to demonstrate autonomous motivation, resulting in greater engagement and energy (Monje-Amor et al., 2021). These affective appraisals and perceptions reflect public attitudes toward participation, and positive attitudes have been shown to significantly enhance participation (Choi & Song, 2020; Neshkova & Guo, 2012). Counterpart assistance has endeavoured to enhance the recipients’ awareness of development, competence and rights, and to stimulate the endogenous development drive of poor subjects to participate actively in the process of improving regional development (Wang, 2022). Based on this understanding, the study uses attitudinal assessments as a proxy to measure the effects of psychological empowerment, and proposes the following hypotheses:

H_{2a} Attitude positively influences Public Participation.

Research in recent years suggests that individuals’ identities, attitudes, political trust, self-efficacy, and expectations directly determine whether and how they participate in public affairs (Mazzurco, 2012; Uslaner & Brown, 2005). Empirical studies further substantiate this, showing that attitudes significantly predict political participation intentions and behaviours (Götting & Becker, 2025). Citizen attitudes have also been identified as a critical mechanism and essential condition for associations to influence political participation (Hadziabdic, 2025). Numerous planned behaviour theory models and empirical studies identify attitude as a key determinant, yet often treat it as one of several equally weighted factors, neglecting its role as a necessary condition. This creates a critical gap in understanding

the causal influence of attitude within the participation process. Thus, we further hypothesise that:

H_{2b} Attitude is a necessary condition for Public Participation.

2.2.3 Policy decision-making empowerment and public participation

New Public Management theory suggests citizens often lack the intrinsic, instrumental, and collective agency required to navigate the power dynamics of participatory processes (Yount et al., 2019). Decision-making empowerment focuses on providing the public with greater influence and voice in the policymaking process. It is recognised as a key factor in enhancing public participation. These forms of empowerment emphasise the availability of opportunities, meaningful engagement in discussions, transparency in decision-making processes, and guaranteed access to information. Specifically, when citizens have higher levels of engagement and the right to access information about policy issues, their willingness to participate and the quality of their contributions significantly increase (Michels & De Graaf, 2017; Zimmerman, 1995). Such empowerment gives more power and influence to the public, emphasising increasing their sense of control over the participatory process and enhancing their autonomy.

In the context of poverty governance, autonomy emerges as a critical driver of participation. Involving the public fosters a sense of ownership and responsibility, and higher perceived autonomy correlates with increased satisfaction and engagement levels (Wang, 2022). Empirical evidence supports a positive causal pathway from autonomy to public participation. For instance, a cross-national analysis found that greater local autonomy significantly enhances input legitimacy, a dimension of legitimacy encompassing citizen participation in political processes (Bastianen & Keuffer, 2024). Similarly, in rural China, autonomy is linked to higher levels of governance participation through the intermediary of trust (Song et al., 2021). Based on these considerations, the study measures the public's evaluation of autonomy in the participatory process as a measure of their feelings of empowerment in decision-making and proposes the following hypotheses:

H_{3a} Autonomy positively influences Public Participation.

According to self-determination theory, autonomy is one of the core elements of intrinsic motivation (Deci & Ryan, 2000). Public participation is not only a manifestation of behaviour but also an expression of a power relationship, where empowering individuals or groups with autonomy means that they can dominate and influence the decision-making process. In other words, empowerment involves developing participatory processes that build autonomy among individuals and communities. These processes, in turn, create conditions and structures conducive to decision-making, thereby opening up new opportunities for engagement (Cavalieri & Almeida, 2018). Empirical evidence further substantiates autonomy as a necessary condition. Within the context of behavioural public policy, the absence of autonomy undermines self-constitution and deliberative participation, rendering engagement superficial and non-internalised, while autonomy-supportive design is essential for fostering reflective, sustained civic participation (Colin-Jaeger & Dold, 2025). It is further hypothesised that

H_{3b} Autonomy is a necessary condition for Public Participation.

3. Methodology

3.1 Data and sample

The empirical foundation of this study is based on 393 valid responses collected from participants involved in poverty governance in a southern province of China. This region provides a compelling context for the study; historically burdened by a poverty rate as high as 70%, it successfully eradicated absolute poverty by 2020. Notably, its counterpart assistance programme received an “excellent” performance assessment, and the participants were widely publicised for their commendable deeds. Given that participants in poverty governance are numerous and geographically dispersed, the survey was conducted online over six months using a snowball sampling technique to efficiently access target groups with relevant knowledge. However, this nonprobability sampling method, while effective for hard-to-reach populations, may introduce selection biases, such as overrepresentation of participants from interconnected social networks or those with similar demographic characteristics (e.g., higher education levels), potentially limiting the diversity of perspectives and generalisability of

findings. This is acknowledged as a key limitation of the study. To enhance the questionnaire design, a pre-survey was conducted with 45 participants before the formal distribution. The final sample data used for the study were screened for usability (e.g., unusually short answer duration, no experience of participation in poverty governance) to ensure the high quality and reliability of the data required for subsequent analyses. The final sample size was also considered applicable to the sample requirements for conducting the SEM, fsQCA, and NCA, as recommended in related studies (Hair et al., 2012; Vis & Dul, 2018).

Table 1 presents a comprehensive overview of the demographic distribution of the sample. Of the respondents, 47.6% were female. The age distribution was well-balanced across four age groups. Educational attainment was diverse, with half of the participants holding a bachelor's degree. The duration of participants' involvement in poverty governance was evenly distributed, while their occupational diversity further enriched the representativeness of the sample. The balanced demographic distribution of the samples ensures the quality of the subsequent data analyses.

Table 1: Demographic variable description statistics (N=393)

Item	Type	Frequency	Percentage
Genders	Male	206	52.4
	Female	187	47.6
Age	18-30	145	36.9
	31-40	131	33.3
	41-50	83	21.1
	51-60	34	8.7
Education	Primary School	3	0.7
	Junior High School	45	11.5
	High School	25	6.4
	Diploma	92	23.4
	Bachelor's Degree	200	50.9
	Postgraduate or higher	28	7.1
Experience	0-2 years	172	43.8
	More than 2 years	221	56.2
Occupation	Government officials	82	20.9
	Professional and technical staff	66	16.8
	Industry personnel	63	16.0
	Local farmers	45	11.5
	Individual operators	6	9.2
	Social organisations	32	8.1
	Other	69	17.6
Total	393	100.0	

3.2 Measurement items

The study employed a five-point Likert scale as the primary measurement tool to assess the key variables. As participation is difficult to determine, it is difficult to assess the effectiveness and willingness to participate in a structured (rather than highly subjective) way (Rowe & Frewer, 2004). Given that participation satisfaction reliably predicts effectiveness and continued willingness to participate, some studies use stakeholder satisfaction to measure the participatory process (Li et al., 2013; Zolotov et al., 2018). Public participation in this study was measured using six items, including information access, expression of claims, performance, extensiveness, satisfaction, and legitimacy. adapted from the work of Brombal et al. (2017) and Mwenda et al. (2012). The resource scale comprised four items adapted from prior studies (May & Ross, 2017). The items measured participants' perceived access to key resources, including knowledge, skills, social networks, and financial resources. The attitude scale was adapted from Jacobs et al. (2021) to capture participants' attitudes toward public participation, focusing on their emotional and cognitive orientations toward the governance process. Autonomy was measured using a decision-making autonomy scale adapted from (Kirmeyer & Shirom, 1986; Zhang, 2006). This scale focuses on the degree to which participants perceive they have control, choice, and influence over decisions within the participatory process. By incorporating this measure, the study aims to evaluate the role of autonomy in shaping public engagement. These variables were chosen for their theoretical centrality to empowerment in poverty governance, as they represent the respective dimensions of structural access to resources, psychological orientation, and control over decision-making, all of which are directly linked to participation outcomes.

3.3 Data analysis methods

The study employed a hybrid analytical framework incorporating CB-SEM, Necessary Condition Analysis (NCA), and Fuzzy-set Qualitative Comparative Analysis (fsQCA). This study investigates the mechanisms through which policy empowerment influences public participation. Answering this question requires exploring different causal logics, as their complexity cannot be fully addressed by a single analytical method. CB-

SEM was used to evaluate the modelled links between variables, NCA identified the type and magnitude of key conditions, and fsQCA validated previous findings and explored the effects of various combinations of empowerment measures on public participation. This combination allows for the complementarity of different approaches: SEM is particularly advantageous for analysing complex relationships among multiple latent variables; NCA excels in determining the necessity of specific conditions and quantifying their impact (Vis & Dul, 2018); fsQCA not only identifies necessary conditions but also captures the full configuration of conditions leading to specific outcomes (Pappas & Woodside, 2021). In recent research, such a methodological combination, increasingly adopted, is recognised for its ability to reveal complex causal relationships (Sukhov et al., 2023). It provides a comprehensive and integrated perspective on the interplay between policy empowerment measures and public participation.

4. Empirical Result

4.1 Descriptive statistics

The preliminary data analysis confirmed that the dataset was suitable for hypothesis testing. First, the assumption of data normality was met, as the absolute values for skewness (< 3) and kurtosis (< 8) for all measurement items were well within the acceptable ranges proposed by Kline (2023). Furthermore, a correlation analysis revealed significant positive relationships among all variables, lending preliminary support to the research hypotheses. Finally, the issue of multicollinearity was dismissed, as all Variance Inflation Factor (VIF) values (ranging from 1.288 to 1.972) were substantially below the conservative threshold of 5, indicating it is not a concern for this study.

4.2 Structural Equation Modelling (SEM) results

This study performed Exploratory Factor Analysis (EFA) on all variables using SPSS 26. EFA yielded a robust four-factor structure (KMO = 0.935, Bartlett's test: $p < 0.001$), and all scales demonstrated high internal consistency, with Cronbach's alpha coefficients ranging from 0.886 to 0.926. A subsequent Confirmatory Factor Analysis (CFA) indicated good model fit. As detailed in Table 2 and 3, the measures met the standards for convergent

validity ($AVE > 0.5$) and discriminant validity ($HTMT < 0.85$), confirming they were distinct and reliable.

Table 2: Model fit of the CFA model

	χ^2/df	RMSEA	GFI	AGFI	CFI	IFI	TLI
Recommended value	≤ 5	≤ 0.08	≥ 0.8	≥ 0.8	≥ 0.9	≥ 0.9	≥ 0.9
Indicator	3.206	0.075	0.889	0.853	0.945	0.945	0.934

To address potential common method bias, ex-ante measures included clear question design and respondent anonymity. Post-collection assessments used Harman's One-Factor Test, where the first factor explained less than 50% of variance, and a Single-Factor CFA, which showed poor fit ($\chi^2/df = 13.327$, $GFI = 0.621$, $RMSEA = 0.177$), suggesting minimal bias.

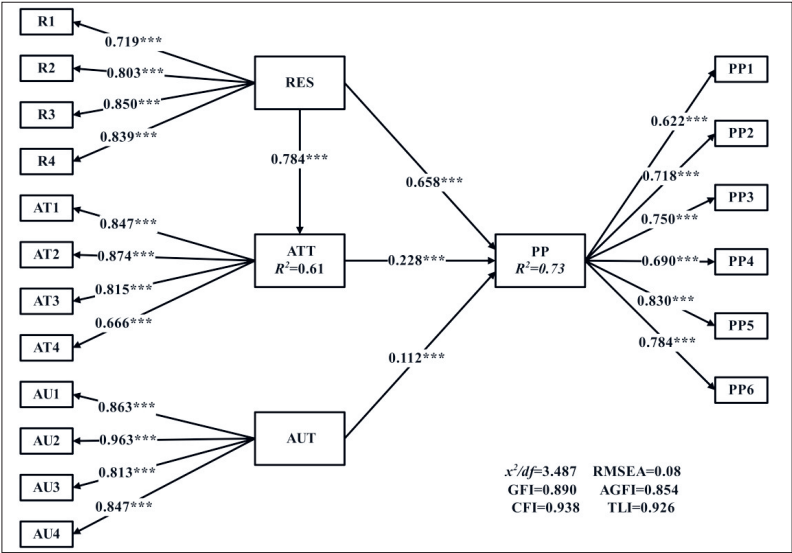
Table 3: Convergent validity and combinatorial reliability

Variable	Measurement Items	Loadings	Cronbach's alpha	AVE	CR
PP	PP1	0.662	0.886	0.566	0.886
	PP2	0.751			
	PP3	0.760			
	PP4	0.706			
	PP5	0.835			
	PP6	0.789			
RES	R1	0.748	0.886	0.673	0.892
	R2	0.821			
	R3	0.864			
	R4	0.845			
ATT	AT1	0.850	0.875	0.647	0.879
	AT2	0.873			
	AT3	0.809			
	AT4	0.670			
AUT	AU1	0.863	0.926	0.763	0.928
	AU2	0.961			
	AU3	0.812			
	AU4	0.851			

The structural model exhibited acceptable fit indices and R^2 values (see Figure 1). The path analysis revealed that resources, attitudes, and autonomy all had significant, positive effects on public participation. Furthermore, resources strongly influenced attitudes, and the interaction

term Resources*Attitudes also significantly predicted public participation ($\beta = 0.836$, $p < 0.01$). These findings support hypotheses H1a, H1c, H2a, and H3a.

Figure 1: Structural equation modelling path results



Note: ***= $p < 0.01$

4.3 Necessary Condition Analysis (NCA) results

Building on the SEM, a Necessary Condition Analysis (NCA) was conducted to identify any essential prerequisites for public participation. According to established guidelines, a condition is deemed necessary if it satisfies three criteria: a theoretical basis for the hypothesised relationship, an effect size greater than 0, and a p-value less than 0.05 when tested against the null hypothesis (Dul et al., 2020). The results (Table 4) showed that resources were a necessary condition of small-to-medium importance for achieving public participation (validating H1b). While attitudes were also statistically necessary, the effect size was trivial, suggesting they are not a critical bottleneck (supporting H2b). In contrast, autonomy was not found to be a necessary condition, with both the CR and CE methods showing a Ceiling zone and effect value of 0, leading to the rejection of H3b.

Table 4: The test of the necessary conditions affecting public participation

Factor	Method	Accuracy	Ceiling zone	Scope	<i>D(Effect)</i>	p
Resource	CR	99.5%	2.005	14.0	0.143	0.000
	CE	100%	2.333	14.0	0.167	0.000
Attitude	CR	100%	0.625	14.0	0.045	0.087
	CE	100%	1.250	14.0	0.089	0.020
Autonomy	CR	100%	0.000	14.0	0.000	1.000
	CE	100%	0.000	14.0	0.000	1.000

Note: $0 \leq d < 0.1$: “low level”; $0.1 \leq d < 0.3$: “medium level”. Permutation test, redraws=10000

Bottleneck analysis via CR-FDH (Table 5) highlighted thresholds for achieving varying levels of public participation. For high levels ($\geq 80\%$), moderate resource fulfilment (33.3%) and minimal attitude fulfilment (9.4%) were required, while autonomy was found to be unnecessary. Bottleneck thresholds for resources and attitudes were identified at 50% and 80% levels of public participation, respectively. Notably, the resource condition exhibited a lower bottleneck level, emphasising its critical role in driving public participation. These findings underscore the prioritisation of resources as a necessary condition, highlighting their significance over attitudes and autonomy in fostering effective public participation.

Table 5: NCA Method Bottleneck level (%) analysis results (CR-FDH, NN=Not Necessary)

Y	1	2	3
0	NN	NN	NN
10	NN	NN	NN
20	NN	NN	NN
30	NN	NN	NN
40	NN	NN	NN
50	4.2	NN	NN
60	13.9	NN	NN
70	23.6	NN	NN
80	33.3	9.4	NN
90	43.0	20.3	NN
100	52.7	31.2	NN

Note: The grey shaded area shows the minimum percentage of each condition required for high public participation

4.4 Fuzzy-Set Qualitative Comparative Analysis (fsQCA) results

The fsQCA was employed to evaluate the necessity of individual conditions and sufficient combinations for public participation. Before analysis, variables were calibrated into fuzzy sets using indirect methods, with anchors at the 95%, 50%, and 5% percentiles for full membership, crossover, and non-membership.

The results of the single-condition necessity test revealed that autonomy fell short of the criteria, rejecting H3b. In contrast, resources and attitudes exceeded consistency thresholds (≥ 0.8) and coverage (> 0.83), qualifying as necessary conditions in moderate-sample contexts (Fiss, 2011), with resources displayed stronger metrics, reinforcing H1b and H2b in line with NCA findings.

Table 6: The fsQCA single conditional necessity analysis

Condition	Public participation		~Public participation	
	Consistency	Coverage	Consistency	Coverage
Resource	0.875	0.872	0.571	0.549
~Resource	0.547	0.569	0.867	0.870
Attitude	0.864	0.837	0.594	0.555
~Attitude	0.569	0.580	0.827	0.854
Autonomy	0.750	0.768	0.568	0.561
~Autonomy	0.572	0.579	0.765	0.748

Note: The tilde sign “~” represents logical NOT.

The study constructed truth tables and conducted detailed analyses, setting thresholds to ensure the reliability of the results: an original consistency threshold of 0.8, a PRI consistency threshold of 0.7, and a case frequency threshold of 1. The conditional sufficiency analysis for fsQCA produced consistent simple, intermediate, and complex solutions converging on the pathway Resources*Attitudes, with high solution consistency (0.912) and coverage (0.794). These results validate the sufficiency of the resource and attitude conditions as core drivers of public participation but fail to confirm the adequacy of the autonomy condition.

5. Discussion and Implications

The study uses a comparative analysis of SEM, NCA, and fsQCA, to provide a more intuitive and nuanced understanding of the complex relationship between policy empowerment and public participation in poverty governance. The SEM results confirmed that resources, attitudes, and autonomy each have a positive effect on public participation, aligning with prior empowerment literature (MacLeod & Scott, 2021; Poliakoff & Webb, 2007), and reaffirming the general importance of empowerment (Wang et al., 2020).

However, the necessity and sufficiency analyses from NCA and fsQCA offer a more refined perspective. The NCA bottleneck analysis reveals that a minimum of 4.2% in resource conditions is required to achieve even a modest 50% level of public participation. This threshold emphasises the fundamental importance of resource provision as a prerequisite for meaningful engagement. It reinforces the notion that resource empowerment—spanning economic, informational, and technological dimensions—plays a pivotal role in reducing participation barriers and bridging the capacity gaps, particularly among marginalised and disadvantaged groups (Gudowsky & Bechtold, 2013). This resonates with the perspective in resource mobilisation theory that resources form the foundation of collective action (McCarthy & Zald, 1977). In poverty governance, the indispensability of resources is amplified because participants in low-income communities often lack the foundational capabilities needed for engagement and frequently rely on external provisioning (Sutter et al., 2023). This may also explain why resources can serve as a critical causal lever for achieving active participation.

Our findings also clarify the role of psychological empowerment (attitude). While attitude is a necessary condition for participation, its effect as a standalone factor is minimal. This nuanced role moves beyond previous research that emphasises only the positive or negative effects of attitudes on public participation (Ho et al., 2022). Instead, our analysis reveals that the true impact emerges when combined with resources, as the resources*attitude configuration is the only pathway to sufficiency. This implies a critical synergy: policy interventions targeting both resources and attitudes simultaneously are far more effective than those focusing on psychological empowerment in isolation. The NCA bottleneck analysis

provides support for this interdependence: to achieve a high (80%) level of public participation, a resource level of at least 33.3% and an attitude level of at least 9.4% are required. This perspective is consistent with Peterson and Speer (2000), who posit that empowerment involves not only providing resources but also enhancing individuals' sense of self-worth and motivation.

Contrary to expectations, this study found that decision-making empowerment (autonomy), despite exhibiting a positive effect in SEM analysis, is neither a necessary nor sufficient condition for achieving high levels of public participation. This finding indicates that within the specific context of China's poverty governance, autonomy plays a supplementary rather than a foundational role. The underlying reason for the rejection of this hypothesis is that participants in a multi-party collaborative context, such as poverty governance, may prioritise access to resources and a supportive environment over being the dominant decision-maker, especially when resource or capacity gaps exist (Quick & Bryson, 2022; Tritter & McCallum, 2006). This logic becomes clearer within the broader context of China's "targeted poverty alleviation" and subsequent "rural revitalisation" initiatives. China's poverty alleviation model represents a quintessential "state-led" governance paradigm, wherein the government serves as the primary resource provider, central agenda-setter, and ultimate accountability bearer (Liu, 2022). Within this institutional framework, the value and effective pathways for public participation do not lie in challenging or replacing the government's decision-making authority, but rather in achieving "consultative embeddedness" within the state-defined framework (He & Thøgersen, 2010). The result provides an empirical case for the view that socio-economic, cultural, and institutional contextual factors can influence participation outcomes (Reed et al., 2018; Yaakub et al., 2023).

Table 7: Summary of findings

Empowerment Dimension	SEM	NCA	fsQCA	Overall Implication
Resources Empowerment	Significant Positive	Necessary Condition	The “Resources * Attitude” configuration is the only sufficient pathway for high participation.	Foundational Prerequisite. Resources serve as the fundamental support and most critical lever for enabling effective engagement.
Psychological Empowerment	Significant Positive	Necessary Condition, but the standalone effect is minimal.	The “Resources * Attitude” configuration is the only sufficient pathway for high participation.	Synergistic Catalyst. The value of attitude is amplified when combined with resources. Policy interventions should target both simultaneously.
Decision-making Empowerment	Significant Positive	Not Necessary Condition.	Not sufficient condition.	Supplementary & Context-Dependent Role. Within the state-led governance context, the value of participation lies more in “consultative embeddedness” than in dominant decision-making.

6. Conclusion

The study, which integrates SEM, NCA and fsQCA, transcends traditional linear models to reveal the asymmetry, configurational nature and context-dependence of policy empowerment and its impact on public participation in China’s poverty governance. The analysis first establishes resource empowerment as a foundational prerequisite for participation, a finding that not only reinforces resource mobilisation theory but also highlights the existence of critical activation thresholds for engagement. Psychological empowerment (attitude) acts as a synergistic catalyst, activated only when combined with resources. This underscores the profound interdependence between material and psychological support. Finally, the study finds that decision-making empowerment (autonomy) is neither a necessary nor sufficient condition in this context, challenging the universality assumption of empowerment theory. This highlights the role of institutional context, such as China’s state-led governance model, in reshaping the function and value of empowerment dimensions. These findings provide a more nuanced and contextualised perspective for understanding the complex relationship between empowerment and participation.

This study offers policymakers a dual-pronged strategy to transform the public from passive responders into active co-creators within governance. In the short term, the critical task is to rapidly enhance citizens' capacity and confidence to participate. Since resources constitute the fundamental driver of public engagement, policymakers should immediately implement concrete measures to lower participation thresholds, such as establishing open and transparent public information portals and providing essential skills training. Concurrently, to bolster psychological empowerment, policies should rapidly enhance citizens' sense of self-efficacy and decision-making involvement through interactive policy workshops and pilot projects yielding tangible outcomes. Over time, these short-term strategies can evolve into sustained initiatives. For example, ongoing civic education campaigns and mentoring programmes can foster profound shifts in attitudes and cultivate a sense of responsibility. Long-term efforts should focus on reforming governance structures, implementing pilot participatory forums enabling citizens' direct involvement in local decision-making, and encouraging proactive feedback mechanisms. This approach integrates immediate capacity-building with structural power-sharing. Such a comprehensive strategy will cultivate a sustainable participatory ecosystem, thereby more effectively mobilising societal potential, enhancing governance effectiveness, and addressing increasingly complex governance challenges.

While this study offers valuable insights, its limitations suggest directions for future inquiry. Firstly, the study uses a medium-sized sample for analysis within a specific context, which constrains the external validity of its conclusions. Consequently, future research urgently requires the adoption of large-sample quantitative methods to test the universality of the causal configurations we propose across broader geographical and policy domains. Moreover, due to practical operational constraints, this study did not exhaustively examine all possible combinations of critical conditions; instead, it focuses on more representative variables such as resources, attitudes, and autonomy. Potential confounding factors, including aspects of social capital and local political dynamics, could be incorporated in future research, particularly within longitudinal case studies or comparative analyses. This approach would help clarify causal inferences and capture the dynamic evolution of empowerment processes.

CRedit author statement

Yangcui Weng: Conceptualization, Design of methodology, Data collection/curation, Formal analysis. **Yangcui Weng, Rajah Rasiah, Fumitaka Furuoka:** Writing - Original draft preparation and editing

Data availability

Data will be made available upon request.

Conflict of interest statement

The authors have no conflict of interest.

Ethics declarations

Research approved by Universiti of Malaya Research Ethics Committee.

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