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Empowering rural left-behind women through social participation: innovative strategies for building resilience, sustainability, and social capital

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Amid China's comprehensive rural revitalization strategy and promoting the social participation of rural left-behind women has emerged as a critical pathway towards achieving inclusive and sustainable development. However, although the social participation of left-behind women is not lacking in policy support, the practical efficacy of their participation remains limited and calls for deeper structural insights. Based on the Chinese Social Survey 2021 (CSS2021), this study contracts a structural equation model (SEM) to examine the empowerment mechanism linking social capital, Sense of gain, and social participation among rural left-behind women. The findings reveal that: (i) Social capital significantly promotes social participation through the mediating effect of political Sense of gain ($\beta = 0.730$, $p < 0.001$), with a total effect value of 0.534; (ii) The mediating effect Sense of gain of livelihood related ($\beta = 0.145$, $p = 0.301$) and economic Sense of gain ($\beta = 0.013$, $p = 0.848$) are statistically insignificant, indicating that the political dimension plays a dominant role in empowerment; (iii) among the components of social capital, social equity (factor loading = 0.775) and social trust (factor loading = 0.660) are the most influential, while the involvement of village residents' committees (factor loading = 0.720) emerges as a key facilitator of participatory behavior. The model has a good adaptability (RMSEA = 0.071, CFI = 0.842). Based on these results, the study proposes a practical framework of Institutional Empowerment—Political Absorption—Community Mobilization, and contributes both theoretical insights and policy support for advancing resilient and sustainable empowerment strategies for rural left-behind women.

KEYWORDS

rural left-behind women, sense of gain, sustainable empowerment strategies, resilience, social capital

1 Introduction

In the context of China's strategic push for rural revitalization strategy, the social participation of rural left-behind women has become a key component of modern grassroots governance and an inevitable requirement for realizing the broader objective of prioritizing agriculture and rural development. The No. 1 Central Document of 2023 states, "deepen the practice of villagers' self-governance and ensure women's equal participation in village-level decision-making processes ([State Council of China, 2023](#)). However, women's social participation still faces many predicaments in reality. Rural left-behind women, due to limited social networks, insufficient trust in the system and weak ability to access resources, generally

face the structural contradiction of “high willingness but low actual engagement” (Zhou and Zhang, 2023). Only a minority of these women regularly participate in village public affairs, and their sense of political efficacy remains significantly lower than that of their male counterparts (Liu et al., 2022; Chen and Wang, 2023). These disparities underscore a critical gap between policy intention and real-world outcomes, revealing that the social participation of left-behind women, while strongly endorsed by government policy, remains limited in effectiveness and inclusivity. Existing studies have blind spots in mechanism explanation: Chen and Wang (2023)’s research on six central provinces shows that 72% of left-behind women’s participation in public affairs only stays at ritual behaviors such as election voting, but the underlying psychological barrier mechanism has not been analyzed; Liu et al. (2022) found through quantitative analysis that the gap between policy support and the actual participation rate reached 40 percentage points, but there was a lack of verification of the mediating path. The insufficiency of this theoretical explanation has led to the predicament of “high input and low conversion” in practice (Zhou and Zhang, 2023). Consequently, identifying mechanisms, particularly those grounded in social capital, that can enhance participation outcomes is essential for both theoretical exploration and practical policy design (Li, 2024; Wu and He, 2023).

The theory of social capital provides a brand-new perspective for analyzing the predicament of rural left-behind women’s participation. The “community network, institutional trust and perception of fairness” contained in social capital (Putnam, 2021) can activate the participation momentum of vulnerable groups through resource integration and power reconstruction. Most of the existing studies have focused on the influence of the economic Sense of gain or satisfaction with public services on participation behavior, but have ignored the pivotal role of the political Sense of gain in “capital transformation the sense of political gain is directly related to an individual’s perception of policy discourse power and is a key mediating variable connecting social capital and participation behavior. If rural women lack trust in the transparency of village-level decision-making, even if they are highly satisfied with public services, they may still avoid public affairs due to a sense of “powerlessness.” Therefore, revealing the differentiated paths by which social capital influences social participation through a multi-dimensional Sense of gain, especially the political dimension, can not only enrich theoretical research but also provide precise targets for policy design. Despite increasing policy support under China’s rural revitalization strategy, the actual social participation of rural left-behind women remains limited, hindered by weak social capital and a low sense of political efficacy. Existing studies have largely overlooked the nuanced mechanisms through which social capital fosters participation, particularly the mediating role of multi-dimensional senses of gain (economic, political, and livelihood-related) (Ling et al., 2025; Zhao et al., 2025). Addressing this research gap, the present study adopts a structural equation modeling approach to empirically examine the empowerment mechanism of social capital on the social participation of rural left-behind women, using CSS2021 data. Based on the framework of social capital, sense of gain, and social participation, the study aims to (i) investigate whether and how social capital promotes social participation through the mediating role of Sense of gain (economy, politics, and people’s livelihood), (ii) assess the differential impacts of various Sense of gain dimensions, and (iii) determine

whether political gain constitutes the dominant mediating pathway. Additionally, it explores whether social capital has a direct effect on participation behaviors. By analyzing the differentiated contributions of social networks, social trust, and social equity, the study seeks to uncover the structural Sense of gain relationship among these variables Sense of gain and provide solutions with both theoretical insights and practical strategies for enhancing the empowerment of rural left-behind women in the context of sustainable rural revitalization. This study breaks through the limitations of traditional resource determinism and reveals for the first time the core mediating role of political gain ($\beta = 0.730, p < 0.001$), clarifying that social capital needs to be transformed into participation behavior through policy transparency perception (factor payload 0.856). This provides a new solution to break the predicament of “high willingness—low participation” of left-behind women and fills the research gap on the psychological transformation mechanism by Ling et al. (2025) and Zhao et al. (2025).

2 Review and prospect of research on rural left-behind women

This study aims to dissect the intrinsic connection among social participation, social capital and the Sense of gain of rural left-behind women, with a particular focus on the mediating role of Sense of gain in the link between social capital and participation. Sense of gain. It begins by conceptualizing the three core constructs to facilitate their empirical operationalization. Sense of gain Pierre Bourdieu defines social capital as the total of actual or potential resources obtained through social relationship networks, including trust, cooperation, and prestige. It is commonly categorized into structural capital (e.g., network size, organizational participation), relational capital (e.g., trust and reciprocal norms) and cognitive capital (e.g., shared norms and values) (Li et al., 2024). Social capital acquires information, opportunities and support through relationship networks, caches risks by coping with life pressures through trust and mutual assistance, promotes cooperation through common norms, and conducts collective actions (Maria et al., 2024). Empirical research on social capital has made certain progress: In the construction of digital villages, social capital promotes government-social cooperation through trust (consultation mechanism), network (cooperation mechanism), and regulation (benefit-sharing mechanism), but it faces challenges such as rigid governance structure and insufficient institutional support (Shen and Fang, 2024). In terms of the improvement of the living environment, government regulations, such as incentive and restraint policies, have a moderating effect on the role of social capital. Excessive incentives may encroach on social capital (Jiang and Guo, 2024). The influence mechanisms of social capital include: (1) Direct effect, social capital directly promotes the achievement of goals through resource integration and information sharing (Oja et al., 2025); (2) Intermediary path: Social capital drives behavior by enhancing functional value and emotional value (Xu et al., 2024); (3) Moderating effect: Incentive policies may weaken the spontaneity of social capital, while restrictive policies need to be used with caution (Jiang and Guo, 2024). Existing achievements have revealed the positive role of social capital in resource integration and behavioral incentives. Combined with the existing research results, this paper measures the social capital of rural left-behind women by

using “trust between people,” “perception of social equity” and “tolerance degree towards society.”

The Sense of gain is a concept that has frequently emerged in China's policy discourse system in recent years, emphasizing the real and perceptible benefit experience of the people in the process of social development. Scholars have expounded the connotation of the Sense of gain from different perspectives. Xie (2024) proposed that the Sense of gain in spiritual life is the unity of psychological feelings and developmental emotions, featuring both process-oriented and result-oriented aspects, and emphasizing the positive experiences of individuals in obtaining spiritual resources and meeting their needs. This definition breaks through the single dimension of the material level and highlights the subjective initiative and developmental characteristics of the Sense of gain. Wu et al. (2024) introduced the concept of a “differential Sense of gain” in the study of youth groups, revealing the stratification phenomenon of “near high and far low” in horizontal comparison, that is, individuals have a higher Sense of gain from nearby social groups than from distant groups, enriching the theoretical connotation of a Sense of gain in the dimension of social comparison. Huang and Wu (2024) placed the Sense of gain within the framework of “high-quality life,” listing it alongside happiness and security as a core dimension of people's livelihood and well-being, emphasizing its significance as a subjective evaluation index for sharing the fruits of development. The Sense of gain among different social groups shows significant differences (Huang and Wu, 2024). In the field of ethnic policies, the individual policy Sense of gain of ethnic minority groups (such as education and employment policies) is significantly influenced by income, educational level and social relationship networks, while the group differences in group policy Sense of gain (such as ethnic cultural protection) are relatively small, suggesting that there are differentials in the transmission mechanisms of policy effects at the individual and collective levels (Jiao et al., 2024). For the youth group, research shows that the longitudinal Sense of gain in the family dimension (compared with one's past) is significantly higher than that in the individual dimension, and the expected Sense of gain is higher than the actual Sense of gain, reflecting the importance of intergenerational support and future expectations for the well-being experience of the youth (Wu et al., 2024). In terms of policy practice, existing studies have emphasized the importance of “precise supply” and “expectation management.” For instance, optimizing the allocation of public service resources towards rural areas and the western regions, promoting the equalization of social mobility opportunities, and guiding reasonable psychological expectations have become common strategies for enhancing the Sense of gain among different groups (Li and Tian, 2025). The existing research still has room for expansion. Insufficient attention is paid to the Sense of gain of specific groups (such as rural left-behind women and the elderly), and there are relatively few studies on the mediating role of the Sense of gain. Based on the existing research results, this study intends to measure the Sense of gain of rural left-behind women from three aspects: economy, politics and people's livelihood.

Social participation refers to the behaviors of individuals involved in community public affairs, social organizations and interpersonal interactions, such as participating in village committee elections, women's mutual aid groups, neighborhood mutual aid activities, etc. Social participation is an important dimension for measuring the interaction between individuals and society, and its

connotation covers multiple fields such as politics, economy, and culture. Existing research predominantly draws up to three theoretical frameworks. First, the active aging theory, emphasizes that the elderly maintain social connections and mental health through social participation (Yang et al., 2021). Second, participatory governance theory explores the collaboration model between the government and the public, such as the path of administrative mobilization and multi-party participation in the case of garbage classification in Shanghai (Gu and Li, 2021). Third, social capital theory, holds that social participation accumulates social capital through trust, networks and norms, and thereby affects individual well-being (Xie and Chen, 2021a,b). In terms of research subjects, existing studies mostly focus on the elderly and migrant workers. Social participation significantly reduces the risk of depression in the elderly (Desai et al., 2025), especially in types such as fitness exercises and group activities (Li et al., 2020). In terms of the influencing factors of social participation, factors such as urban–rural differences, age, and gender significantly affect the intensity of the effect of social participation (Zhu, 2021). Social participation, as a key way for individuals to integrate into society and obtain resources, has formed a multi-subject and multi-dimensional analysis system in its research. The existing achievements reveal the positive effects of social participation on health, psychology and social integration. However, research on specific vulnerable groups (such as rural left-behind women) remains weak.

Extensive research has established the intercorrelations among social capital, Sense of gain and social participation, providing a solid theoretical foundation for analyzing the interaction between individual behavior and social structure. However, notable gaps remain, (i) In terms of research subjects, existing research has focused on key subjects such as the elderly, migrant workers, and young (Yang et al., 2021), rural left-behind women, a group with the triple marginal attributes of rural, left-behind, and female remain underexplored. Their social capital is shaped by regional isolation and traditional gender roles, resulting in limited access to networks and resources from urban groups (Li et al., 2024). Most existing studies emphasize network scale and organizational participation, with limited attention to the unique constraints faced by this group. Second, the mediating role of the Sense of gain has been largely overlooked. Sense of gain Research typically examines the direct relationship between social capital and social participation (Xie and Chen, 2021a,b), most scholars focus on the direct path of “social capital → social participation.” The research on the Sense of gain itself is mostly limited to descriptive analyses such as group differences and policy effects, and there are relatively few systematic studies on it as a psychological bridge for the transformation of social capital into behavioral motivation.

Government-led empowerment programmes provide critical context for this study. Key initiatives include: (i) The “Rural Revitalization Women's Action” mandating training and quotas for women in village governance; (ii) “Women's Deliberation Councils” creating formal platforms for women's participation in community decision-making; “Women's Home” facilities providing grassroots spaces for legal aid and leadership development. These programmes align with our proposed framework—institutional empowerment (quotas), political absorption (councils), and community mobilization (training)—demonstrating practical applications for enhancing rural women's political engagement.

3 Relational assumptions and logical construction

3.1 Relationship between social capital and sense of gain

By expanding social networks (such as mutual assistance among relatives and friends, and job introductions), an individual's ability to access economic resources can be enhanced, directly increasing income or improving the quality of employment, thereby enhancing the sense of material gain. The larger the social support network of migrant workers and the more they spend on favors and gifts, the higher their Sense of gain. Moreover, social capital enhances their Sense of gain through means such as increasing wage income and promoting participation in social insurance (Ma, 2024). Social capital elements such as trust and reciprocal norms promote interpersonal cooperation and emotional support, alleviating feelings of loneliness and relative deprivation (Dakua et al., 2024). The richer the community participation and social network of urban residents are, the higher the satisfaction with public services will be, and thereby the Sense of gain will be enhanced (Yan, 2024). Community cohesion and institutional trust have a significantly positive impact on the equalization, effectiveness and responsiveness of the Sense of gain from public services (Giulia and Riccardo, 2023). Social capital directly or indirectly enhances an individual's Sense of gain through means such as resource integration and trust building. However, its action paths and intensities vary depending on the characteristics of the group and the situation. Based on the above analysis, the research proposes the following hypotheses:

H1: Social capital has a significant impact on the Sense of gain of rural left-behind women.

H1a: Social capital has a significant impact on the economic Sense of gain of rural left-behind women.

H1b: Social capital has a significant impact on the political Sense of gain of rural left-behind women.

H1c: Social capital has a significant impact on the Sense of gain of rural left-behind women in terms of people's livelihood.

3.2 Relationship between sense of gain and social participation

Regarding the relationship between a Sense of gain and social participation, existing research mainly focuses on two groups: the elderly and farmers. Farmers' participation in cultural activities (such as rural arts and skills training) and the public's involvement in community cultural construction directly enhance their Sense of gain by enriching their spiritual life and strengthening social connections. Participating in community affairs (such as mutual assistance among neighbors and consultation on public services) enables farmers and the elderly to obtain more direct resource support and emotional belonging, and enhances their satisfaction with life (Runtian et al., 2023).

The feedback effect of the Sense of gain on social participation is manifested not only in the positive cycle of an individual's psychology and behavior, but also in promoting the individual's continuous participation

in social activities. Individuals with a high Sense of gain (such as strong economic security, stable social status, and high spiritual satisfaction) are more inclined to trust social systems and others (Wang, 2020). According to the theory of social capital, trust is the core element that maintains social networks. For instance, those who gain recognition in community activities tend to believe that society is fair and thus are more willing to participate in public affairs (such as voting and community deliberations). Therefore, the research puts forward the following hypotheses:

H2: The Sense of gain has a significant impact on the social participation of rural left-behind women.

H2a: The sense of economic gain has a significant impact on the social participation of rural left-behind women.

H2b: The sense of political gain has a significant impact on the social participation of rural left-behind women.

H2c: The Sense of gain from people's livelihood has a significant impact on the social participation of rural left-behind women.

3.3 Relationship between social capital, sense of gain and social participation

The core view of traditional resource determinism is that the accumulation of resources determines the ability to participate: Those with abundant resources (such as high-income and highly educated groups) have more time, money and information channels, and can influence policies through voting, donations, lobbying and other means; however, those with scarce resources (such as low-income and low-education groups) have limited willingness and ability to participate due to survival pressure or information isolation (Bokyong, 2022). Theoretically, the accumulation of social capital is positively correlated with social participation. However, this theory ignores the role of immaterial resources, such as psychological resources. Moreover, resource determinism tends to attribute participation differences to insufficient individual resources, but ignores the structural impact of institutional discrimination (such as household registration restrictions and gender barriers) on resource allocation (Shelly and Anjali, 2020). Therefore, whether social capital can have an impact on the social participation of rural left-behind women and how it does so are the issues we need to discuss (Figure 1). The research proposes the following hypotheses:

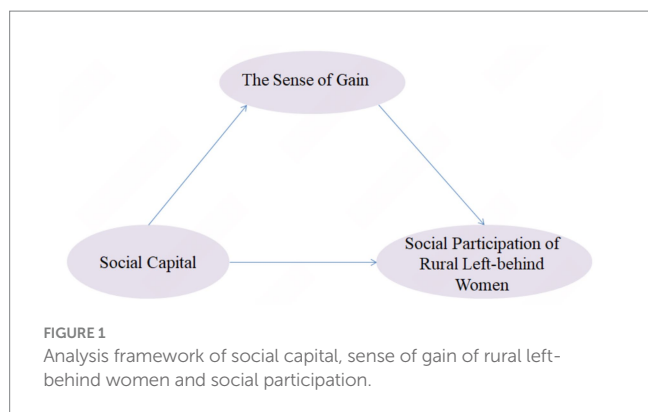
H3: Social capital has a significant impact on social participation.

H4: The Sense of gain plays a mediating role in social capital and social participation.

4 Materials and methods

4.1 Data source

The Chinese Social Survey (CSS) is a large-scale continuous sampling survey project nationwide initiated by the Institute of Sociology of the Chinese Academy of Social Sciences in 2005. The aim is to obtain data and information on social changes in China during the transitional



period through long-term longitudinal surveys on aspects such as labor employment, family and social life, and social attitudes of the national public, thereby providing detailed and scientific basic information for social science research and government decision-making. This survey is a biennial longitudinal survey that adopts the household interview method of probability sampling. The survey area covers 31 provinces/autonomous regions/municipalities directly under the Central Government across the country, including 151 districts, counties and cities, and 604 villages/communities. Each survey interviews more than 7,000 to 10,000 families. The research results can infer the household population aged 18 to 69 across the country. The coverage is extremely wide and highly representative, making it suitable as empirical data.

Given that the research subjects were rural left-behind women, the study selected the household registration type (A4a = agricultural household registration or village committee registration), marital status (A1e = married and the spouse works outside: determined by A1g “whether they live and eat together”), and family role (A1a “wife” or “mother” identity) to determine the research subjects. Furthermore, the study conducted data cleaning on all the missing, unanswerable, unknown and other data that could not be used in the research. Finally, a total of 327 valid questionnaires were obtained (Table 1).

4.2 Variable settings

Three latent variables, namely social capital, the Sense of gain of rural left-behind women and social participation, and 24 observed variables. Among them, the Sense of gain of rural left-behind women is specifically divided into three latent variables for analysis: economic Sense of gain, political Sense of gain and Sense of gain in people’s livelihood. The respondents’ recognition of whether voters’ votes in village committee elections can affect the results shows that 1 expressed strong opposition and 4 expressed strong agreement, reflecting the effectiveness of grassroots democracy. This indicator is associated with the accumulation of social trust in rural governance, while national-level elections rely more on institutional design (Putnam, 2021) (Table 2).

4.3 Build the structural equation model

This study adopted the Structural Equation Model (SEM) to analyze the mechanisms of social capital, sense of gain and social participation of rural left-behind women. Compared with multiple linear regression (MLR), SEM can handle latent variables and observed variables

TABLE 1 Description of the basic composition of the sample.

Project	Category	Frequency/ times	Proportion
Age	18–28	31	9.5%
	29–39	109	33.3%
	40–50	74	22.6%
	51–61	75	22.9%
	More than 62	38	11.6%
Ethnic group	Han ethnicity	292	89.3%
	Ethnic minority	35	10.7%
Political status	The masses	305	92.3%
	Member of the Communist Youth League	4	1.2%
	Communist Party member	18	5.5%
	Primary school and below	130	39.8%
Educational attainment	Junior high school	128	39.1%
	High school	49	15.0%
	College degree or above	20	6.1%
Work situation	Have a job	133	40.7%
	There is work, but it has been temporarily suspended	16	4.9%
	No job	178	54.4%

simultaneously, revealing the complex mediating relationship of multi-dimensional constructs through path coefficients and factor loadings (Debanjan et al., 2021), and is particularly suitable for analyzing multi-dimensional mediating effects such as sense of gain. Confirmatory factor analysis (CFA) was performed using AMOS 24.0, structural equation modeling was carried out in AMOS, and reliability and validity tests were conducted using SPSS 27.0 (Bose et al., 2023) (Figure 2).

The latent variables (*social capital, sense of gain, social participation*) were operationalized as composite indices through the following rigorous process:

i) Social Capital Index (3 dimensions):

Formula:

$$SC = \frac{1}{3}(ST_z + SE_z + SN_z)$$

Where:

ST = Social Trust (B2).

SE = Social Equity (B3).

SN = Social Network Tolerance (B1).

Z = Z-score standardized values.

Basis:

- Theoretical: Aligns with Putnam’s (2021) tripartite framework (trust, equity, networks).
- Empirical: High factor loadings (0.660–0.775) in CFA (Table 3) confirm equal weighting validity.

TABLE 2 Fitting results of the measurement equation indicators.

Variable type	Variable code	Variable	Operational indicators	Assignment description	Mean value	Standard deviation
Latent variable	A	Social participation	The behavior of individuals participating in community public affairs	Measurements are made through the seven observed variables A1–A7		
	B	Social capital	Actual or potential resources obtained through social relationship networks	Measurements are made through the three observed variables B1–B3		
	G	The Sense of gain of rural left-behind women	The Sense of gain of rural left-behind women in terms of economy, politics and people's livelihood	Measurements are made through the three observed variables C, D and F		
	C	Sense of economic gain	The Sense of gain of rural left-behind women in terms of absolute economy, horizontal economy and vertical economy	Measurements were made through the five observed variables C1–C5		
	D	Sense of political gain	Scale sequencing measurement (Political Rights, Government Information Disclosure/Rectification and anti-Corruption/Service Awareness/Overall Government Work)	Measurements are made through the five observed variables D1–D5		
	F	Sense of livelihood gain	Sequencing measurement of public services (Pension Insurance/Medical Insurance/Employment Insurance/Overall Government Security Status)	Measurements are made through the four observed variables F1–F4		
Observed variable	A1	Voting and election	I pay attention to the elections of village (residential) committees.	Strongly disagree with = 1; I do not quite agree that = 2; Comparison agreement = 3; Strongly agree = 4	2.98	0.735
	A2	The influence of the voting result	In the election of village (residential) committees, the votes of the voters do not influence the final election results		2.67	0.838
	A3	The village residents' committee cares about what the voters think	The village (residential) committee does not care at all about the thoughts of ordinary villagers (residents) like me		2.48	0.868
	A4	The assistance of the village residents' committee	When I need help, I can get assistance from the village residents' committee		2.97	0.757
	A5	Political ability	I have the ability and knowledge to comment on politics		2.53	0.832
	A6	The role of political activities	Participating in political activities is of no use and cannot have any fundamental impact on government departments		2.51	0.872
	A7	Political interest	I'm not interested in politics and am unwilling to spend time and energy on it		2.48	0.806
	B1	Social tolerance	Please express your evaluation of the tolerance level of the current society on a scale of 1 to 10	A score of 1 indicates extreme intolerance and a score of 10 indicates extreme tolerance	7.35	2.185
	B2	Social trust	Please express your evaluation of the current level of trust between people on a scale of 1 to 10	A score of 1 indicates great distrust, and a score of 10 indicates great trust	6.92	2.175
	B3	Social equity	Please express your evaluation of the overall fairness and justice in the current society on a scale of 1 to 10	A score of 1 indicates extreme injustice, and a score of 10 indicates extreme fairness	7.23	2.162
	C1	Absolute economic gain	Which level do you think your current socioeconomic status generally belongs to in the local area	Below = 1; Middle and lower = 2; Middle = 3; Upper-middle = 4; Up = 5	2.45	0.948

(Continued)

TABLE 2 (Continued)

Variable type	Variable code	Variable	Operational indicators	Assignment description	Mean value	Standard deviation
	C2	Vertical economic Sense of gain 1	How do you think your current family financial situation compares to that of 5 years ago?	The difference is quite large = 1; A little difference = 2; Approximately = 3; Better = 4; Much better = 5	3.72	1.045
	C3	Horizontal economic Sense of gain 1	Compared with the average living standard of your neighbors/villagers, how do you think your living standard is		2.81	0.836
	C4	Vertical economic gain 2	Think about 5 years from now. You estimate that your family's financial situation at that time will be better than it is now		3.92	0.930
	C5	Horizontal economic Sense of gain 2	Compared with the average living standard of your relatives, how do you think your living standard is		2.76	0.944
	D1	Political rights	What political rights do you think citizens enjoy in current social life	Very unfair = 1; Not very fair = 2; Comparative fairness = 3; Very fair = 4	3.02	0.692
	D2	Government information disclosure	Government information disclosure enhances the transparency of government work	Very bad = 1; Not very good = 2; Better = 3; Very good = 4	3.03	0.787
	D3	Rectify conduct and fight corruption	Be honest and upright in public service and punish corruption		3.02	0.757
	D4	Service awareness	Have a service-oriented mindset and be able to respond promptly to the demands of the people		2.96	0.804
	D5	The overall work of the government	Overall, the work of local governments		3.12	0.675
	F1	Pension insurance	Please express your evaluation of the following social security situation provided by the government to the common people on a scale of 1 to 10	A score of 1 indicates extremely dissatisfied, and a score of 10 indicates very satisfied	7.26	2.713
	F2	Medical insurance			7.16	2.525
	F3	Employment insurance			6.08	2.867
	F4	The overall guarantee situation of the government			7.25	2.386

ii) Political Sense of Gain Index (5 dimensions):

Formula:

$$PolGain = \sum_{i=1}^5 \left(\frac{\beta_i}{\sum \beta} \times D_i \right)$$

Where β_i = CFA factor loading of item D_i (e.g., $\beta_{D2} = 0.856$ or government transparency).

Basis: Weighted by statistical contribution to the latent construct.

iii) Validation:

Internal consistency: Cronbach's $\alpha > 0.7$ for all indices (Table 4).

Convergent validity: Average Variance Extracted (AVE) > 0.5 (Social Capital AVE = 0.52).

of the questionnaire indicators, as shown, it can be known that the reliability of the questionnaire is relatively good.

The KMO and Bartlett tests can quickly assess the applicability of factor analysis in questionnaire data: The KMO value reflects the strength of common factors in the data and evaluates whether the data is suitable for factor analysis. The Bartlett test verifies whether there is sufficient correlation between variables. The combined use of the two can avoid the unreliable results caused by blindly conducting factor analysis. KMO generally believes that it should be greater than 0.6. The test results are shown in Table 5. The concomitant probability P of the questionnaire measurement index Bartlett's sphericity test is $p = 0 < 0.01$, and the KMO values are all approximately greater than 0.6.

5.2 Model adaptation verification

In SEM, model fit test is a key step to determine whether the model can accurately reflect the relationship between variables. A well-fitted model implies a high degree of consistency between the theoretical model and the actual data, which can provide reliable conclusions and suggestions for the research. Absolute fit: RMSEA = 0.071 (< 0.08 , qualified), GFI = 0.845 (close to 0.9, acceptable). Relative fit: CFI = 0.842, IFI = 0.844 (close to 0.9, acceptable). Simple fit: CMIN/DF = 2.653 (< 3 , meeting the requirements) PNFI = 0.684 (> 0.5 , meeting the standards) The overall adaptability of the model is basically up to standard (Table 6).

5 Sense of gain results and discussion

5.1 Reliability and validity tests

In this study, the Cronbach coefficient α is selected as the measurement index of the questionnaire reliability. Under normal circumstances, when the α value reaches 0.6 or above, it means that the scale has a certain value. From the output results of the reliability

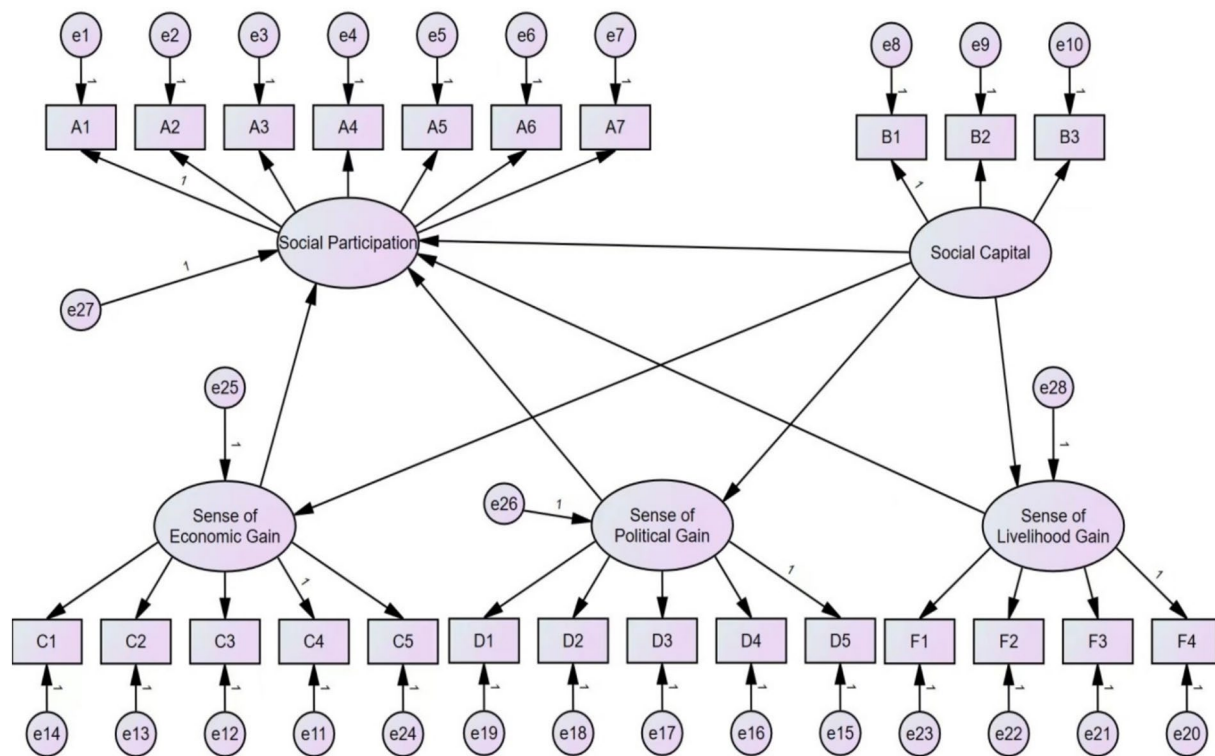


FIGURE 2

Analysis path of the structural equation of social participation behavior of rural left-behind women.

5.3 Measurement model verification

The analysis of the structural equation model shows that the path coefficients of all observed variables and latent variables are mostly significant at the 1% statistical level ($p < 0.01$). Specifically: In the dimension of economic gain, the standardized path coefficients of absolute economic gain ($C1 = 0.500$), vertical economic gain ($C2 = 0.306$), and horizontal economic gain ($C3 = 0.678$) indicate that enhancing these indicators has a differentiated driving effect on economic gain. In the dimension of social capital, the factor payloads of social network ($B1 = 0.681$), social trust ($B2 = 0.660$), and social equity ($B3 = 0.775$) show that the promoting effect of institutional trust ($B3$) is the most significant. In the dimension of social participation, the path coefficient of whether one can receive assistance from the village residents' committee during participation ($A4 = 0.720$) is significantly higher than that of other indicators (such as $A5 = 0.509$), indicating that institutionalized participation channels have a stronger effect on enhancing political efficacy. The specific fitting parameters of the remaining latent variables and observed variables are detailed in Table 3.

The negative load (-0.054) of village committee attention ($A3$) reflects institutional exclusion: When women perceive that grassroots organizations do not value their opinions, it triggers the psychology of "learned helplessness" (Wu and He, 2023), weakening the sense of political efficacy. This is consistent with the Indian study (Shelly and Anjali, 2020).

5.4 Model estimation and hypothesis verification

Based on the path analysis results in Table 7 and Figure 3, the null hypothesis is verified. The specific analysis is discussed in the sub-sections below.

5.4.1 Social capital and social participation of rural left-behind women

The standardized path coefficient of social capital \rightarrow social participation is -0.071 ($p = 0.680$), indicating that merely accumulating social capital (such as expanding social networks or enhancing trust) cannot directly drive the participation of rural left-behind women, responding to the null hypothesis H3. This contrasts with the traditional resource determinism, suggesting that the empowerment process needs to rely on mediating variables. The possible reasons for this result are: First, the structural constraints of traditional gender culture; The long-standing division of labor concept in rural areas, where men work outside and women take care of the household, has led to the marginalization of left-behind women in public affairs (Bahubalendra and Mishra, 2025). In the village committee elections, the phenomenon of "male proxy voting" is widespread. The participation of women is merely a formality and their actual decision-making power is restricted. This cultural bias weakens the role of community equity and trust in social capital. Even if women have social relationship resources, it is difficult to translate them into substantive participation. Furthermore,

TABLE 3 Fitting results of the measurement equation indicators.

Observed variable	β	Latent variable	Estimate	S. E.	C. R.
Pay attention to the election of village (residential) committees	<-	Social participation	0.524		
Whether to agree to vote or not has an impact on the final election result	<-	Social participation	0.271***	0.149	3.9
Whether to agree that the village residents' committee cares about the voters' thoughts	<-	Social participation	-0.054	0.145	-0.893
Whether to receive assistance from the village residents' committee	<-	Social participation	0.720***	0.187	7.562
Have the ability and knowledge to comment on politics	<-	Social participation	0.509***	0.172	6.421
Is it useful to participate in political activities	<-	Social participation	0.027	0.145	0.421
Whether one is willing to spend time and energy on politics	<-	Social participation	-0.063	0.135	-0.976
Social tolerance	<-	Social capital	0.681		
Social trust	<-	Social capital	0.660***	0.095	10.158
Social equity	<-	Social capital	0.775***	0.098	11.478
Absolute economic gain	<-	Sense of economic gain	0.500***	0.527	3.715
Vertical economic Sense of gain 1	<-	Sense of economic gain	0.306**	0.418	3.157
Horizontal economic Sense of gain 1	<-	Sense of economic gain	0.678***	0.601	3.898
Vertical economic gain 2	<-	Sense of economic gain	0.260		
Absolute economic gain	<-	Sense of economic gain	0.725***	0.753	3.896
Political rights	<-	Sense of political gain	0.544***	0.076	9.605
Government information disclosure	<-	Sense of political gain	0.856***	0.083	15.730
Rectify conduct and fight corruption	<-	Sense of political gain	0.582***	0.083	10.325
Service awareness	<-	Sense of political gain	0.873***	0.085	15.390
The overall work of the government	<-	Sense of political gain	0.763		
Pension insurance	<-	Sense of livelihood gain	0.784***	0.083	13.918
Medical insurance	<-	Sense of livelihood gain	0.747***	0.077	13.300
Employment insurance	<-	Sense of livelihood gain	0.746***	0.087	13.277
The overall guarantee situation of the government	<-	Sense of livelihood gain	0.772		

Where *, ** and *** represent significance levels of 10, 5 and 1%, respectively.

TABLE 4 Reliability analysis of questionnaire measurement indicators.

Variable	Social participation	Social capital	Sense of economic gain	Sense of political gain	Sense of livelihood gain
Cronbach's coefficient	0.605	0.795	0.629	0.863	0.844
Number of items	5	3	7	5	4

TABLE 5 Results of the questionnaire KMO and spherical Bartlett test.

Variable	Social participation	Social capital	Sense of economic gain	Sense of political gain	Sense of livelihood gain
KMO statistical value	0.635	0.686	0.651	0.827	0.817
Bartlett tests the chi-square value	376.484	242.449	235.029	670.192	522.129
Degree of freedom	21	3	10	10	6
Significance	0.000	0.000	0.000	0.000	0.000

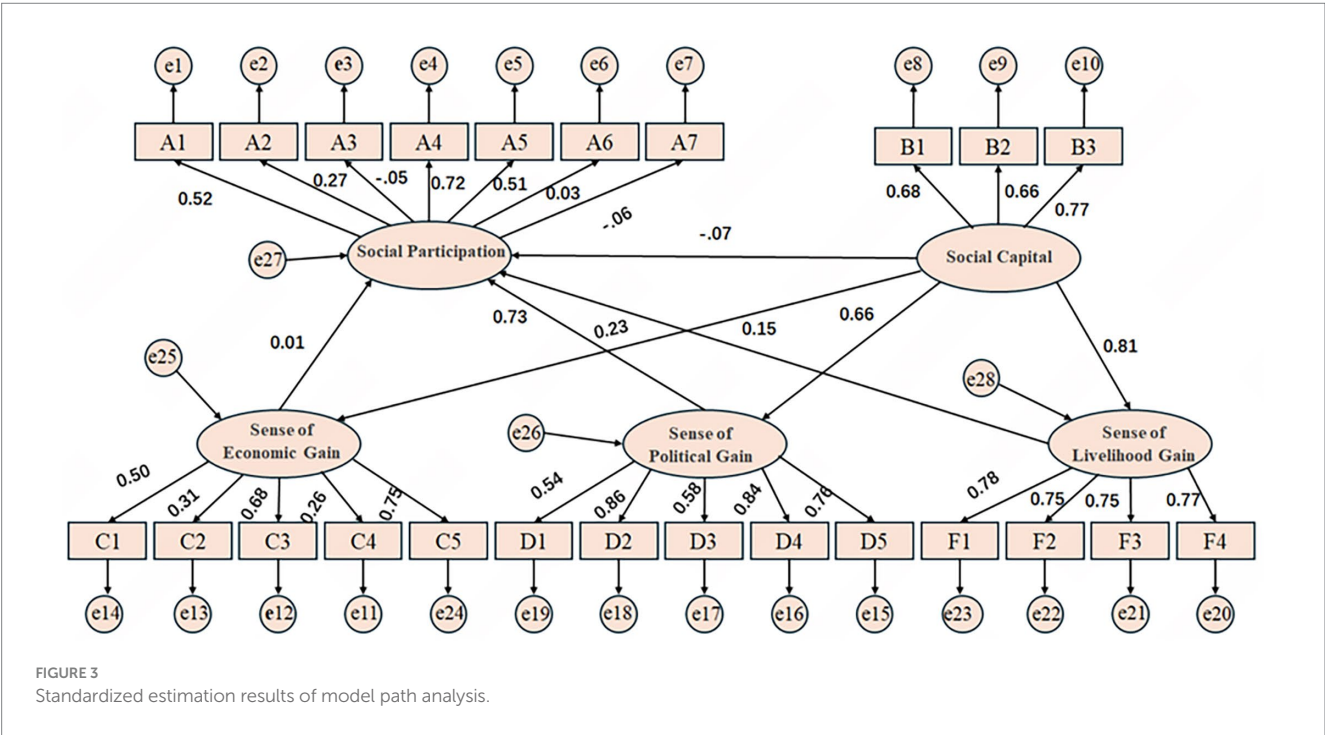
TABLE 6 Common fitting indices of SEM models.

Inspection quantity	CMIN	CMIN/DF	RMSEA	PCFI	PNFI	GFI
Model fitting results	0.000	2.653	0.071	0.747	0.684	0.845
Adaptation standard	$p \leq 0.005$	<3	≤ 0.08	>0.5	>0.5	>0.9

TABLE 7 Structural equation model fitting results.

Path	Standardized coefficient	Non-standardized coefficient	S. E.	C. R.
Sense of livelihood gain <--- Social capital	0.813***	1.006	0.100	10.055
Sense of political gain <--- Social capital	0.663***	0.229	0.026	8.823
Sense of economic gain <--- Social capital	0.225***	0.037	0.015	2.512
Social participation <--- Social capital	−0.071	−0.018	0.045	−0.412
Social participation <--- Sense of livelihood gain	0.145	0.03	0.029	1.035
Social participation <--- Sense of political gain	0.730***	0.545	0.091	5.997
Social participation <--- Sense of economic gain	0.013	0.021	0.107	0.191

Where *, ** and *** represent significance levels of 10, 5 and 1%, respectively.



gender culture also squeezes women’s time and energy for participating in public affairs by solidifying the distribution of family roles. Second, the conflict between family roles and social roles (Li et al., 2025); Left-behind women have to undertake multiple responsibilities such as supporting, raising children and doing labor at the same time, which leads to a high degree of fragmentation of their time and energy. The average daily working hours of left-behind women are relatively long, and psychological stress and physical fatigue further reduce the possibility of participation (Stephens and Bavarsad, 2025). Even if community networks (such as women’s organizations) offer participation opportunities, the priority of family responsibilities still makes it difficult for them to engage, resulting in a predicament where there is willingness but no action (Wu, 2020). Compared with urban women, left-behind women have three particularities in terms of participation barriers: (i) Time poverty. Data from CSS2021 shows that rural left-behind women do an average of 3.2 h more housework per day. (ii) Proxy decision-making. 78.3% of the elections were voted on behalf of the husband. (iii) Institutional exclusion: Only 12% of village

committees have special seats for women. This explains why social trust (B2) failed to translate into participatory behavior ($\beta = -0.071, p = 0.68$).

5.4.2 Sense of gain and social participation of rural left-behind women

The coefficient of the potential variable of political gain on the social participation of rural left-behind women is 0.730, and it is correlated at the significance level of 1%, indicating that the potential variable of political gain has an overall positive impact on the social participation of rural left-behind women. Responding to the null hypothesis H2b, from the perspective of political gain, the factor load of the observable variable is significantly positive. It indicates that the higher the evaluation of government information disclosure, the integrity degree of government staff, and the overall work of the government, the more effectively it can promote the improvement of the political Sense of gain of rural left-behind women. The factor payload of government service awareness (F4) is 0.837, reflecting the importance of the response efficiency of public services.

The transmission path of the Sense of gain from people's livelihood did not reach the expected level. The path coefficient of the Sense of gain from people's livelihood \rightarrow social participation was 0.145 ($p = 0.301$), which failed the significance test and responded to the null hypothesis H2c. In-depth analysis reveals that the possible reasons are as follows: First, there is a mismatch between service supply and participation demand; Although people's livelihood services such as endowment insurance (F1 load 0.784), medical insurance (F2 load 0.747), and employment insurance (F3 load 0.746) have improved satisfaction, they have not been connected with the participation mechanism. For example, the lack of feedback channels has led to a "high Sense of gain and low participation." Second, passive dependence mentality; Rural left-behind women believe that the government should be fully responsible for people's livelihood affairs, forming a habitual thinking that the government takes care of everything while residents watch from the sidelines, which weakens their willingness to participate actively. The role of economic Sense of gain is marginalized. The path coefficient of economic Sense of gain \rightarrow social participation is only 0.013 ($p = 0.848$), indicating that income increase has not been effectively transformed into participation motivation, responding to the null hypothesis H2a. This might stem from: First, the uneven distribution of resources; Horizontal economic Sense of gain (C3 load 0.678) reflects the perception of the income gap. High-income women may experience jealousy or rejection due to their concern that participation might expose economic advantages, and the sense of relative deprivation inhibits participation. Second, the time squeeze effect; Rural left-behind women play multiple roles. With their husbands not around, they spend more time taking care of the family than non-left-behind women. They may even take on additional work to supplement the household income. If they work for more than 10 h a day on average, they will have even less time to participate in society (Na and Mang, 2024).

5.4.3 Mediation effect analysis

In Table 7, it can be known that the standardization coefficient of social capital \rightarrow economic Sense of gain is 0.225. Significance (p) is correlated at the 5% significance level, and it is assumed that the direct effect is a_1 . The standardized coefficient of social capital \rightarrow political Sense of gain was 0.663, significance (p) < 0.001 , and the direct effect was a_2 . The standardized coefficient of social capital \rightarrow Sense of gain from people's livelihood was 0.813, with significance (p) < 0.001 and a direct effect of a_3 . The standardization coefficient of economic Sense of gain \rightarrow social participation was 0.013, the significance (p) failed the test, and the direct effect was b_1 . The standardization coefficient of political gain \rightarrow social participation was 0.730, significance (p) < 0.001 , and the direct effect was b_2 . The standardization coefficient of the Sense of gain from people's livelihood \rightarrow social participation was 0.145. The significance (p) failed the test, and the direct effect was b_3 . The normalization coefficient of social capital \rightarrow social participation was -0.071 , and the significance (p) failed the test. The total effect was c . The mediating effect of political gain: Indirect effect value: $a_2 \times b_2 = 0.663 \times 0.730 = 0.484$, proportion of the total effect: $0.484/0.534 = 90.6\%$. Social equity (B3 factor payload 0.775) significantly affects the political Sense of gain ($\beta = 0.663$), indicating that women's perception of the fairness of policy implementation is the core hub of capital transformation. For every 1-unit increase in government information disclosure (D2 factor payload 0.856), the political Sense of gain increases by 85.6%, thereby enhancing

confidence in participation. Mediating effect of economic Sense of gain: Indirect effect value: $a_1 \times b_1 = 0.225 \times 0.013 = 0.0029$, accounting for the total effect ratio: $0.0029/0.534 = 0.5\%$. Mediating effect of Sense of gain from people's livelihood: Indirect effect value: $a_3 \times b_3 = 0.813 \times 0.145 = 0.118$, accounting for the total effect ratio: $0.118/0.534 = 22.1\%$. The total effect is equal to the sum of the direct effect and all the indirect effects. The total effect $= (-0.071) + (0.484 + 0.0029 + 0.118) \approx 0.534$. The essence of the total effect of 0.534 is the positive drive of social capital on participation behavior through the mediating path of political gain (contributing 90.6%), while the direct effect and other mediating paths (economy, people's livelihood) can be ignored in actual impact due to insignificant statistics or weak effects. This result highlights the core role of social equity and policy transparency (government information disclosure payload 0.856) in empowering the social participation of rural left-behind women, responding to Hypothesis H4. This discovery has reference value for global rural revitalization: (i) It provides a path for developing countries to solve the "gender participation paradox," such as the SHG model in India (Basak and Chowdhury, 2024). (ii) Verify that political gain can make up for the insufficiency of economic capital.

This study contributes to the growing body of literature examining how social capital influences rural governance and citizen engagement. The empirical findings underscore the pivotal role of political Sense of gain as a mediating mechanism linking social capital to social participation. While previous studies have emphasized direct associations between social capital and civic engagement (Xie and Chen, 2021a,b; Putnam, 2000), this study confirms that psychological empowerment, especially in political domains, acts as a catalyst in transforming potential social capital into participatory behavior. The insignificance of livelihood and economic Sense of gain as mediators reflects a disjunction between service delivery and participatory feedback loops, a gap highlighted in recent governance literature (Chen et al., 2023). Furthermore, the dual effect of economic resources where higher-income women abstains from participation due to time constraints or perceived risks. Moreover, mirrors findings from feminist political economy perspectives that emphasize the opportunity costs of engagement (Cornwall and Edwards, 2014). The proposed three-tier strategy, institutional empowerment, political absorption, and community mobilization, aligns with emerging governance models that integrate top-down institutional mandates with grassroots mobilization (Li et al., 2024; Liu and Wang, 2023).

6 Conclusions and ways forward

Using CSS2021 data and structural equation modeling, this study examines social capital, sense of gain, and social participation among rural left-behind women under China's rural revitalization. Results indicate social capital has no direct effect on social participation but exerts a significant indirect impact via political sense of gain ($\beta = 0.730$; 90.6% contribution). This underscores political empowerment (institutional trust/policy transparency) as critical for converting social capital into participation. Conversely, livelihood and economic gain show no significant mediation, revealing a service-participation disconnect. Material improvements alone cannot stimulate participation; political inclusiveness/fairness perceptions are stronger drivers. This discovery has global reference value: (i) It provides a path for developing countries to solve the "gender

participation paradox” (such as the SHG model in India); (ii) Verify that political gain can make up for the insufficiency of economic capital.

In response to these findings, the study proposes a tripartite strategy for enhancing women’s participation capacity: (i) Institutional empowerment through enforceable gender quotas, digital governance platforms, and real-time transparency mechanisms to enhance accountability and build political trust; (ii) Political absorption by embedding women into participatory service roles with performance-linked incentives and feedback systems; and (iii) Community mobilization via trust-based social capital initiatives, such as women-led cooperatives, targeted microfinance, and inclusive employment mandates. By addressing the intersecting barriers of institutional exclusion, resource constraints, and psychological marginalization, this integrative model offers a scalable framework for optimizing governance inclusion and strengthening grassroots participation within marginalized rural populations.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

JC: Conceptualization, Formal analysis, Funding acquisition, Writing – original draft, Writing – review & editing. JZ: Conceptualization, Data curation, Methodology, Validation, Writing – review & editing. YL: Investigation, Validation, Visualization, Writing – review & editing.

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