

Article

Internal Dynamics and External Contexts: Evaluating Performance in U.S. Continuum of Care Homelessness Networks

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Abstract

Understanding public service performance remains a persistent challenge, particularly when services are delivered through complex interorganizational networks. This difficulty is amplified in contexts addressing wicked problems such as homelessness, where needs are multifaceted, solutions are interdependent, and outcomes are hard to measure. In the United States, the Continuum of Care (CoC) system represents a federally mandated and HUD-funded network model designed to coordinate local responses to homelessness through collaborative governance. Despite its standardized structure and federal oversight, CoC's performance varies significantly across regions. This study investigates the conditions that influence the CoC network's performance, focusing on the delivery of Permanent Supportive Housing (PSH) services, a critical intervention for addressing chronic homelessness. It applies to a theoretical framework that combines Ansell and Gash's collaborative governance model with Emerson et al.'s integrative framework. This approach allows for a comprehensive assessment of internal network factors such as board size, nonprofit leadership, and federal funding, as well as external system contexts including political orientation, income levels, and rent affordability. Drawing on regression analysis of data from 343 CoCs across the United States, the study shows that federal funding, favorable political climates, and larger board size are significant predictors of PSH availability, while nonprofit leadership and income levels are not. Findings highlight the importance of aligning internal governance and external context to improve network outcomes.

Keywords: public service network performance; collaborative governance; homelessness; permanent supportive housing (PSH); continuum of care (CoC)



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1. Introduction

The provision of public services to address entrenched social problems such as homelessness, crime, and health inequity has become increasingly difficult to manage. These challenges are complex not only because they require collaboration among government, nonprofit, and private organizations, but also because they reflect the characteristics of wicked problems. Wicked problems are difficult to define, involve competing stakeholder interests, and demand solutions that evolve over time. Coordinating a diverse range of service providers with varying goals, resources, and institutional constraints makes it especially challenging to build consensus, sustain collaboration, and achieve measurable outcomes.

In response to these challenges, collaborative service networks have become an increasingly common approach to public service delivery, particularly in areas like homelessness

where no single organization can address the issue alone. These networks bring together multiple organizations to coordinate efforts, share resources, and combine expertise to enhance the scope and impact of services. As these collaborative models expand, evaluating their performance becomes essential—not only to assess how well they meet the needs of vulnerable populations, but also to ensure that limited public resources are used efficiently and effectively.

In recent years, research on homelessness service delivery has increasingly focused on CoC networks, federally funded, community-based coalitions that coordinate local responses to homelessness through collaborative governance. Established under the McKinney-Vento Homeless Assistance Act of 1987, the CoC program incentivizes coordination among public agencies, nonprofit organizations, and other stakeholders by streamlining applications for federal funding and encouraging integrated service delivery. As the primary vehicle for distributing homelessness assistance funds across the United States, the CoC program supports a range of services, including Permanent Supportive Housing (PSH), rapid rehousing, transitional housing, homelessness prevention, supportive services, and the Homeless Management Information System. Among these, PSH has become a centerpiece of national strategy, in part due to HUD's endorsement of the Housing First model. This approach prioritizes providing individuals experiencing chronic homelessness with stable housing immediately—without preconditions related to sobriety, treatment compliance, or employment—on the understanding that housing provides a foundation for addressing other challenges [1,2].

PSH differs from more traditional housing programs that typically require participants to resolve underlying conditions such as substance use or mental illness before qualifying for housing. In contrast, PSH offers long-term, non-time-limited housing with voluntary supportive services tailored to individual needs. Because clients placed in PSH are no longer considered homeless once housed, the expansion of PSH contributes directly to reductions in reported homelessness. Research has evidence that PSH is also cost effective in the sense that it compares favorably in cost to investment for emergency and public crisis services used by chronic homeless people, but with a better outcome which is, ending their homelessness [3]. The recent and rapid growth in the supply of PSH has been a top policy priority in the homelessness arena over the past decade with the intended goal to significantly reduce homelessness [4]. As a result, many CoCs have increasingly adopted PSH as a core strategy, both to align with federal priorities and to improve outcomes for vulnerable populations.

Although PSH is the primary focus of CoC networks, local CoCs performance varies significantly across regions. This variation highlights the importance of examining the factors that influence network effectiveness and points to a critical area of inquiry in the broader field of public service network performance. While a few scholars have developed comprehensive measures of network performance, these approaches are still in their nascent stages. For example, Turrini and his team conducted a meta-analysis to explain network performance [5], based on Provan and Milward's 1995 framework, proposing structural and functional characteristics of networks as key performance factors [6]. Other studies, added network age as a factor in their analysis and used more complex data analysis techniques to explore nonlinear relationships [7]. A configurational theory using Provan and Milward's model was developed which found, contrary to their conclusions, that network density, rather than centralization, is more important in influencing performance [8]. Research on network factors and their effect on network performance using rigorous methods often involves small sample sizes, limiting the generalizability and reliability of its findings. For instance, Wang [8] demonstrated data analysis with a sample size of fewer than fifty cases.

The extant research needs further exploration using new theories which this research aims to address and reflect current social, economic, and political contexts.

Thus, we examine the factors that influence the performance of the public service network of the CoC homelessness service networks, with a specific focus on the PSH services, which are some of the major and most highly funded services of the CoCs. This study analyzes internal network dynamics and external system context to examine their effects on the CoC network's performance across the United States. It examines key internal network factors, including board size, nonprofit leadership, and federal funding, as well as external system conditions such as political climate, household income levels, and median rent, to understand how these elements influence the effectiveness of CoC network performance. By incorporating both internal factors and external system contexts and exploring the real-world performance of CoC networks, the study provides a more nuanced understanding of the complex interactions shaping CoC performance.

To address this objective, the research investigates the following question: What internal network conditions and external system contexts are associated with CoC performance in expanding PSH capacity? To answer this question, we conduct a regression analysis of 343 CoCs across the United States using data from HUD's 2023 Housing Inventory Count, federal funding allocations, U.S. Census Bureau statistics, and CoC governance documents. For this study the CoCs' performance is measured by the proportion of PSH bed units within each CoC, which reflects a network's prioritization of long-term, housing-first interventions. This approach allows for a comprehensive examination of how internal organizational factors and broader community characteristics influence PSH implementation.

This inquiry is timely and relevant, as effective CoC performance reflects the broader conditions that enable successful cross-sector collaboration in responding to homelessness. As HUD emphasizes, performance measurement in this context requires the use of clear indicators, robust data, and evaluative frameworks that inform decision-making [9]. By identifying which internal and external factors are most strongly associated with PSH provision, this research helps CoCs better understand how to target their efforts, compare progress across regions, and justify investments in areas that deliver the greatest impact for vulnerable populations.

2. Literature Review

There have been significant advances in the study of public service network performance. Scholars have tested a variety of internal network factors—including leadership, network size, funding, and governance structure—as potential influences on performance outcomes in collaborative networks [1–11]. These studies have contributed to a growing understanding of how internal organizational design and resource capacity can enhance or hinder network effectiveness. However, substantial gaps remain in literature, particularly in studies that account for both internal network dynamics and the external system contexts in which networks operate.

While internal factors have been extensively examined, public service network performance studies that include external conditions remain relatively scarce. Yet, these contextual influences—such as regional socioeconomic status, political climate, or regulatory environments—can play a significant role in shaping how networks function and perform [12,13]. These surrounding system contexts consist of a wide array of political, legal, socioeconomic, and environmental factors that interact with and influence collaborative governance network [10]. Collaborative governance evolves within these contexts, which are often multilayered and dynamic. Events such as elections, economic downturns, natural disasters, or shifts in policy priorities can suddenly alter the operating landscape of a network, create new constraints or opportunities, and thereby affect its performance.

In this sense, system context is not a background condition but a critical influence on how networks function and how outcomes are produced.

For example, Mosley and Park investigated how external political conditions—such as local government support for affordable housing—shape the effectiveness of CoC networks [11]. They found that political environments which prioritize housing solutions are more likely to support the success of CoC networks, while politically hostile climates or restrictive zoning regulations present substantial barriers. Similarly, some researchers studied how socioeconomic conditions, such as poverty levels and income inequality, shape network outcomes [12]. Both studies highlight the importance of external factors, but their reliance on qualitative data and limited sample sizes (typically fewer than fifty cases) leaves room for further exploration using larger datasets and statistical methods.

To address this gap, this study develops a theoretical framework by combining two complementary approaches to collaborative governance. The first is Ansell and Gash's collaborative governance theory, which focuses on internal network characteristics such as inclusive participation, facilitative leadership, trust-building, and resource sharing [13]. According to this theory, collaborative governance works best when a wide range of stakeholders, especially those directly affected by the issue, are engaged in meaningful ways. For example, diverse network boards that include service providers, advocates, and community members tend to generate more effective and sustainable outcomes. Leadership within such networks is expected to be facilitative, fostering cooperation and bridging organizational boundaries [13].

The second theoretical framework comes from Emerson's study that offer an integrative model of collaborative governance that explicitly incorporates the surrounding system context. In their model, external political, economic, and social conditions are seen as integral to understanding collaboration processes and outcomes [10]. It defines system context as the constellation of political, legal, socioeconomic, and environmental factors that both influence and are influenced by collaborative networks. These factors can enable collaboration by providing supportive political leadership, legal frameworks, and funding mechanisms—or they can inhibit collaboration by introducing instability, political resistance, or resource constraints. For example, a shift in political leadership or economic crisis may suddenly affect the availability of housing or the feasibility of launching new programs. In this way, the system context is not static but dynamic, capable of shaping network conditions in both expected and unexpected ways.

The combination of these two frameworks provides a more comprehensive theoretical lens for evaluating public service network performance. While Ansell and Gash [13] provide insights into internal network processes, Emerson [10] extend this understanding by highlighting the significance of external system conditions. This study applies both frameworks to the context of homelessness services in the United States, specifically focusing on CoC networks. CoCs are federally designated networks of organizations that coordinate homelessness services in local jurisdictions. Their performance is shaped not only by how they are organized internally but also by the environments in which they operate [14].

One important but underexplored external factor is political orientation. Political climate can significantly shape how communities perceive homelessness, how local governments allocate funding, and how open communities are to interventions like Permanent Supportive Housing (PSH). Communities that lean toward progressive or liberal values, often indicated by higher shares of Democratic voters, are generally more supportive of redistributive policies and long-term investments in social welfare [15,16]. These political values are associated with greater support for Housing First models, which prioritize stable housing before addressing other social or health needs. In contrast, politically conserva-

tive communities may be more skeptical of such approaches, favoring more restrictive or conditional service models. Political orientation can also shape zoning policies, funding decisions, and the political will to address homelessness comprehensively.

Understanding these dynamics is essential because CoCs depend on local collaboration with public agencies, private nonprofits, and government actors. In politically supportive environments, these networks are more likely to secure partnerships, funding, and public support needed to expand PSH programs and deliver better outcomes. In contrast, hostile political climates may present barriers to coordination, reduce the legitimacy of CoC initiatives, or constrain the availability of affordable housing stock.

In sum, this study integrates collaborative governance theory with the system context framework to assess CoC performance in a national homelessness policy network. By combining internal and external perspectives and employing regression-based statistical analysis, the research addresses key gaps in the literature and contributes a more holistic understanding of what enables or constrains public service network performance in complex, real-world settings. Drawing from this theoretical foundation and prior research, the study develops and tests a series of hypotheses that link specific internal network features and external contextual factors to the degree to which CoC networks prioritize Permanent Supportive Housing (PSH) as part of their service strategy. These hypotheses provide the analytical basis for identifying how combinations of conditions affect network performance, offering both theoretical insight and practical implications for improving collaborative responses to homelessness.

2.1. Nonprofit Leadership

Ansell and Gash [13] emphasized the role of leadership in improving collaborative network outcomes. The type of organization that leads the collaborative network significantly affects how the network initiates, performs, and sustains. Their collaborative governance theory stresses the need to engage diverse non-state actors like nonprofit and community members to contribute their unique resource, skills, experience, and perspective for solving public and social issues through collective decision making and problem solving [15]. In this context, the type of lead agency that manages and leads this kind of diverse network also needs to be diverse and inclusive with members from different backgrounds.

Public service network that are led by nonprofits and those that are led by government agencies, will have different strategies to manage network, achieve network mission, mobilize resource and expertise and solve problem and conflict [16]. Nonprofits are also increasingly becoming a choice to lead the public service network to deliver public goods and services, primarily in human and social services like homelessness, education, and health care [7]. A study of nonprofits' role in homeless networks, found that nonprofits are key actors in delivering the federal homeless policy and that they take coordination and leadership roles consolidating the efforts of the entire homeless network working to reduce homelessness in the community [17]. Another study of nonprofit contracting in providing elderly service, state that nonprofits significantly mitigate conflicts and tensions between the community and the government since they can relate to community values better than the government [18]. Collaborative governance processes that involve nonprofits therefore lead to improved services through trust within the community and knowledgeable leadership [19].

With their proximity to the community, skills, and flexibility, nonprofit can be considered a network partner that has a unique set of distinctive characteristics and skill set to pool resources, skills, and expertise not only from the organization but also from the community by promoting community engagement [20] in solving the community problems. We therefore hypothesize the following as our first hypothesis.

Hypothesis 1. *CoC networks led by nonprofit organizations will have a higher proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.2. Board Member Size

Ansell and Gash [13] establish that increased collaborative network performance can be achieved by including many diverse organizations, actors and stakeholders of broad and diverse backgrounds, skills, and expertise. Including such multiple actors enables legitimacy in the collaboration and effective mobilization of power, resources, and expertise. Other studies consider network size as a significant condition for assessing collaboration network processes, outcomes, and effectiveness. In a study of public-nonprofit collaboration in homeless services, it was found that the network size significantly impacted the network's capacity to secure federal grants [20]. Their study found that a network that can engage many organizations has a greater capacity to manage service networks and has positive network performance. More extensive networks can serve as a proxy of professionalization to engage in specialized homeless policies [9], will have a greater capacity to mobilize resources, skills, and expertise and manage the network for better outcomes. HUD has specific requirements for the CoC's composition of board members including that the CoC board must include organizations or projects that serve homeless within the CoC's geographic area and that it must have at least one homeless or formerly homeless person in the board [18]. However, the collaboration between multiple actors may also result in coordination and communication challenges. To improve interagency challenges, regular meetings, and the creation of unified policies may help standardize communication and operational procedures [21]. Additionally, it will help to optimize the maximum value out of diverse board member expertise. We test the board member sizes' effect on the PSH unit availability by developing the following hypothesis.

Hypothesis 2. *CoC networks with a greater number of board members will have a higher proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.3. Federal Funding

Provan and Milward [6] established that when a network operates in an environment with rich resources, the network effectiveness of such a network improves significantly from low to high. Resources are critical for collaborative performance success [22]. A of cross-sector health service for the homeless, found that collaborative service models like the Continuum of Care (CoC) networks help the community to pool resources to provide medical and health service needs of the homeless individuals [23].

The federal funding by HUD is the primary source of funds for CoCs, that helps CoC and provide critical homeless services such as permanent supportive housing, rapid rehousing, and emergency shelter. Without the significant HUD resources, CoCs face resource deficit in their efforts to address homelessness [11].

We hypothesize the following to test its effect on the PSH units

Hypotheses 3. *CoC networks that receive higher levels of federal funding will have a higher proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.4. Political Climate

The political climate, along with the policies it produces, can significantly influence the performance of collaborative networks [13,22]. These system contexts are recognized as significant conditions or elements affecting collaborative governance and its performance.

Administrative, legal, and policy conditions affect the collaborative governance process [24]. Power and political dynamics within levels of government and communities also

affects the collaborative governance process and outcomes [25]. Solid political support for addressing homelessness may result in more funding that adequately funds the CoC programs in addressing homelessness. While, in a less supportive political climate, there may be limited funding which poses challenges for CoCs to meet the demands of people experiencing homelessness.

CoC may have challenges if the political climate of their area restricts the development of affordable housing or imposes zoning regulations that will seriously limit the placement of homeless shelters and supportive housing. The political climate also helps shape the public's perception of their support for effective homelessness solutions [26].

Various political ideologies have different policy priorities, goals and strategies for resource allocation that favor or restrict social equality and shape governance [11]. The political climate can have a significant effect on network performance. We develop hypotheses 4 to test this.

Hypotheses 4. *CoC networks operating in regions with more favorable political climates toward homeless services will have a higher proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.5. Gross Household Income

Gross household income is the total income of all the family members before tax and any other deductions, including income from all sources each living in the household receives. Gross household income is often used in housing contexts such as housing affordability and homelessness rates and is an essential community-level determinant of homelessness [13]. Gross household income can significantly impact the performance of CoC and the homelessness rate in the area. The level of gross household income directly affects the homelessness rates. A low level of gross household income can contribute to higher poverty levels, leading to increased homelessness for both individuals and families as they may struggle to afford housing or rental and mortgage payments which can put them at eviction or foreclosure risk. This can lead to a greater homeless population with low incomes requiring more CoC service in these regions. The gross household income of the region where CoC operates can also impact on the funding and resources for homeless services, which will impact their performance. Lower-income areas may not have significant resources, struggle to meet the homelessness reduction goals and perform poorly as they are constantly challenged compared to high-income areas [11]. They may therefore need help to secure resources, funding, and federal support if their performance is not as expected. We develop hypotheses to test if gross household income affects the PSH unit's availability.

Hypotheses 5. *CoC networks operating in regions with higher median household income will have a higher proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.6. Median Rent

A national level data by NLIHC suggests that a 10% rise in median rent results in a 13.6% increase in homelessness in urban areas [26]. High rent put the vulnerable population at higher risk homelessness, increasing the demand of PSH services. The ability to find, secure and afford rent in each community also affects the CoC network performance and the length of time individuals stay and rely on the homeless services provided by the CoC. The median rent shows the average cost of housing units in a particular area. High median rent of a particular area means higher housing costs; this may pose affordability challenges for the homeless population [11], even with the CoC assistance, who have themselves faced

the challenges of a smaller pool of housing availability in these areas and struggle to find appropriate housing placements for people without homes which contributes to increased homelessness [11].

In areas with high median rent, there might be a shortage of supply in affordable housing units [26]. This may create longer waitlists for CoCs and make it more challenging to find housing placements. Due to this, the CoC network in high-rent areas may not be able to meet the demand of the homeless population as effectively as the CoC network in relatively low-rent areas, which can affect the CoC network performance. Hypotheses 6 is developed to test this effect.

Hypotheses 6. *CoC networks operating in regions with higher median gross rent will have a lower proportion of Permanent Supportive Housing (PSH) beds relative to total homeless housing capacity.*

2.7. Political Climate and Federal Funding: Interaction Effect

High performing CoCs are seen to benefit from political support for housing initiatives and stronger nonprofit partnerships [18]. They are mostly Democratic leaning regions. In contrast, low-performing CoCs which are mostly Republican-leaning areas may deprioritize long-term PSH initiatives. In democratic regions, PSH services work more efficiently in communities where there is local support and political will to implement PSH services to tackle homelessness. Building relationships with the political leadership in the community was seen to have a significant impact in getting support for PSH projects, specifically on collaboration on finding solutions for homelessness issues and ease of implementation of that solution with least political barriers [24]. Including the effect of political climate on federal funding as an interaction variable in the study is a strong choice because interactions between these two factors influence each other in a way that can significantly shape the homelessness outcomes and overall performance of the CoC network. The political climate of whether the leadership is progressive or conservative in homelessness policies can influence the allocation of federal funding or how effectively CoCs can diversify their resources with local government support and advocacy. For example, jurisdictions with more supportive political environments may use federal funds more efficiently by expanding services like Housing First, while less supportive climates might restrict how funds are used. Not all CoCs will be able to yield the same outcomes from federal funding due to local government and the political climate within which the CoCs operate.

By examining interaction, we can see how political support or rigidity can impact federal funding and its impact on CoC networks' ability to perform effectively. Similarly, federal funding is a resource-based variable within the CoC whereas political climate is an external system context variable. Exploring these together helps us understand not just what works (federal funding), but also under what conditions (favorable/unfavorable political climate) it works best. Increased federal funding does not necessarily always mean high network performance as it could be influenced by external systemic or structural variable like political climate that may expand or restrict the ability of CoC to maximize and diversify these funding effectively. Introducing interaction terms often improves the predictive power of the model and improves model accuracy during data analysis by reflecting real-world situations and complexity. For data analysis, a model with and without interaction variables is used for this study, as well to help make findings more reliable and more actionable for policymakers, CoCs and network stakeholders, especially when advocating for more favorable political environments to support HUD initiatives of increased funding to improve homelessness services.

We test this interaction effect with hypotheses 7.

Hypotheses 7. *The effect of federal funding on the proportion of PSH beds is stronger in CoCs operating in more favorable political climates.*

This study includes two control variables: the size of the homeless population and the proportion of non-white homeless in each region. These variables account for essential contextual factors that may influence the availability of PSH units. Larger homeless populations are associated with greater housing needs and often receive more federal funding, particularly in areas with higher rates of chronic homelessness [27,28]. Controlling for this variable helps ensure that variation in PSH availability is not simply a reflection of underlying homelessness rates. Racial diversity, measured as the proportion of non-white homeless, is also a critical factor given the well-documented racial disparities in homelessness and housing access. Black and Indigenous populations experience homelessness at disproportionately high rates, with Black individuals comprising 13% of the U.S. population but 39% of the homeless population [29]. Structural racism in housing policies and practices, such as zoning restrictions and rental discrimination, can shape service access and PSH placement [30,31]. Including these controls strengthens the analysis by helping to isolate the effects of key independent variables, such as political climate and federal funding, and improves the validity of the study's findings. Figure 1 depicts the theoretical framework of our study.

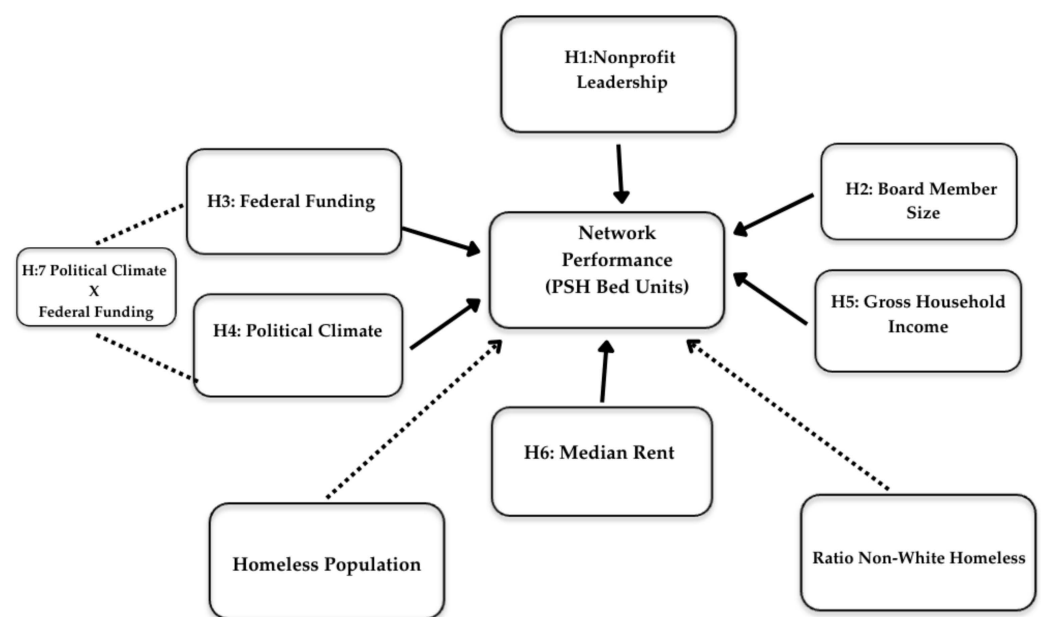


Figure 1. Theoretical Framework.

3. Methodology

This study employs quantitative, cross-sectional research design methods to examine the internal network factors and external context factors that influence the CoC network performance. Our unit of analysis for the study is the individual CoC homeless service networks with the N of 343. We exclude the Balance of State (BoS) CoCs due to their aggregated structure covering large areas and multiple cities within a state. The dependent variable, the CoC network performance is measured by PSH bed units' availability.

3.1. Data Sources and Collection

Data was collected from multiple reliable sources to ensure validity and reproducibility (Table 1). HUD's Housing Inventory Count (HIC) and Point-in-Time (PIT) data from HUD data repository for 2023 were used for dependent and control variables. HUD's CoC Program funding awards (FY2023) provided financial data, while CoC governance documents and direct correspondence with local contacts were used to obtain board size and lead-agency type. Socioeconomic data (household income, median rent, political orientation) were merged at the CoC level using FIPS codes, drawing on the U.S. Census Bureau and HUD CoC Dashboard reports (2020/2023). To address missing governance data, direct email correspondence with CoC representatives was conducted. For political orientation, regional outcomes from the U.S. House of Representatives and Census Bureau were used. Table 1 shows the data sources and metrics used to capture the performance outcomes for CoC networks. It provides an overview of where each variable's data is collected to ensure a transparent and traceable methodology for the study.

Table 1. Data sources for the measurement of dependent and independent variables.

Variables	Measurement	Data Source	Year
Dependent Variable			
Network Performance (CoC)	PSH Bed Unit Availability	HUD Website [Point-in-Time (PIT) and Housing Inventory County (HIC)]	2023
Independent Variables			
Nonprofit Leadership	Type of leadership (nonprofit or government) (Nonprofit = 1, Government = 0)	CoC websites Correspondence with CoC point of contact (via email)	2023
Board Member Number	Number of CoC board members	CoC websites (Governance Charter)	2023
Federal Funding	HUD funding received by each CoC	HUD Website (FY-2023 CoC Award)	2023
Political Climate	Regional political orientation (Democratic = 1, Republican = 0)	United States Census Bureau Data 2020 Office of the Clerk (U.S. House of Representatives)	2020 2023
Gross Household Income	Gross Household Income of the region CoC operates (FIPS code to merge data of CoCs covering multiple counties)	United States Census Bureau Data 2020 HUD Website (CoC Dashboard Report 2023)	2020/2023
Median Rent	Median of the region in which a CoC operates (FIPS code to merge data of CoCs covering multiple counties)	United States Census Bureau Data 2020 HUD Website (CoC Dashboard Report 2023)	2020/2023
Homeless Population	Total Homeless Population of each CoC	HUD PIT Count 2023	2023
Ratio of Non-White Homeless	Non-White Homeless People in each CoC	HUD PIT Count 2023	2023

The performance of the CoC network, which is the measure of dependent variable network performance is evaluated based on the bed unit availability for permanent supportive housing services which is derived from the HUD (2023) Housing Inventory Count (HIC) dataset. Network size measured by network board member size, network leadership measured by nonprofit leadership in the CoC, network funding measured by federal funding that CoC receives from HUD, the political climate where the CoC operates measured by the political orientation in the region where the democratic and republican are recorded using dummy variables coding zero for those CoC areas that are democratic and coding one for those CoC areas are republican. Socioeconomic factors are measured by gross household income and median rent which are merged using FIPS code for those CoCs that

cover multiple counties. The data for control variables—homeless population of each CoC and Non-white population of each CoC—is derived from the HUD Point-In-Time (PIT) data of 2023.

3.2. Data Analysis

To conduct data analysis, first, multicollinearity among the independent variables is assessed using collinearity diagnostics and a correlation matrix. This step ensures the reliability of the regression models by identifying any high correlations that could distort the results. Independent variables with acceptable levels of multicollinearity are included in subsequent data analyses for an exploratory data analysis (EDA). EDA is performed using descriptive statistics to determine data variability, potential outliers, and missing data. This step helps understand the data, helping to address the data variability issue, potential outliers, and other transformations of the data as needed to ensure robustness in subsequent modeling, which is conducted with a regression model. For instance, for the variables that exhibit a high level of skewness—funding, gross household income, and median rent—a log transformation is applied for their normal distribution. Similarly, categorical variables—lead agency and political climate—are coded as dummy variables for inclusion in the regression model. The data have a sample size of 343 CoC networks across the United States, excluding Balance of State (BoS) CoCs due to their aggregated structure, which does not align with the study's unit of analysis. Each CoC represents the unit of analysis, providing a localized perspective on network performance and characteristics.

Finally, two regression models are developed using the Ordinary Least Squares (OLS) method to explore the relationship between the dependent and the independent variables. Model 1 includes all explanatory (independent) variables selected for the study to test their relationships and statistical significance, along with our control variables—the homeless population size and ratio of non-White population—to isolate the effects of independent variables for more robust results. Model 2 adds interaction variables (Federal funding and political climate) to the variables in Model 1 to explore if they influence PSH units and the overall model. Statistical significance using p -values ($p < 0.01$) is used to identify independent variables with strong explanatory power over the dependent variable. The entire data analysis is conducted using the SPSS software (version 29.0.2.0), which facilitates the generation of collinearity diagnostics, descriptive statistics, and regression models.

Table 2 shows a correlation matrix indicating the relationship between the dependent variable and the independent variable for our analysis. The correlation table shows that most correlations between the variables are weak or moderate (less than 0.5), with only the correlation between gross household income and median rent being slightly higher than 0.5. However, the collinearity statistics show tolerance values close to 1 and VIFs less than 5 for both these variables, which is an acceptable level for the inclusion of these independent variables in our analysis.

Table 3 shows the collinearity statistics (the tolerance value and Variance Inflation Factor (VIF)) to determine if any of the independent variables are correlated with each other to avoid the problem of multicollinearity. The table assesses the multicollinearity between the independent variables, which is a high correlation between independent variables that can disrupt the regression analysis and results. It shows the tolerance values and Variance Inflation Factors (VIFs) of the variables, where tolerance values close to 1 indicate low multicollinearity and values near 0 indicate high multicollinearity. VIFs below 5 indicate an acceptable range of multicollinearity that would not disrupt the regression results.

Table 2. Correlation matrix of dependent, independent, and control variables.

Variables	PSH Bed Units	Nonprofit Leadership	Board Member Size	Federal Funding	Political Climate	Gross Household Income	Median Rent	Homeless Population	Ratio of Non-White Homeless
PSH Bed Units	1.0	−0.057	0.157	0.422	0.222	0.084	0.16	0.417	0.166
Nonprofit Leadership	−0.057	1.0	−0.088	−0.161	−0.313	−0.226	−0.261	−0.164	−0.109
Board Member Number	0.157	−0.088	1.0	0.213	0.183	0.035	0.054	0.2	0.088
Federal Funding	0.422	−0.161	0.213	1.0	0.472	0.152	0.306	0.694	0.389
Political Climate	0.222	−0.313	0.183	0.472	1.0	0.236	0.385	0.373	0.362
Gross Household Income	0.084	−0.226	0.035	0.152	0.236	1.0	0.67	0.145	0.077
Median Rent	0.16	−0.261	0.054	0.306	0.385	0.67	1.0	0.395	0.103
Homeless Population	0.417	−0.164	0.2	0.694	0.373	0.145	0.395	1.0	0.097
Ratio of Non-White Homeless	0.166	−0.109	0.088	0.389	0.362	0.077	0.103	0.097	1.0

Table 3. Collinearity statistics (VIF and tolerance value).

Variables	VIF	Tolerance
Nonprofit Leadership	1.161	0.861
Board Size	1.053	0.949
Federal Funding	1.337	0.748
Political Climate	1.484	0.674
Gross Household Income	1.831	0.546
Median Rent	2.073	0.482
Homeless Population	2.294	0.436
Ratio of Non-White Homeless	1.350	0.741

VIF is a reliable statistic for checking for multicollinearity because it accounts for the cumulative effects of all variables in the model, unlike a correlation matrix, which only indicates pairwise relationships. Similarly, a high correlation between any two variables does not necessarily mean that they cause a multicollinearity problem in the model.

For the control variables, although they show moderate collinearity with the independent variables in the collinearity matrix, we include them in the study, as they have acceptable VIFs and tolerance values. Additionally, the control variables are included to account for factors that may have confounding effects on the dependent variable. Although they may correlate with the independent variable to some extent, which is deemed acceptable, as justified by the VIF, the primary purpose of the control variables is to isolate the effects of the independent variables on the outcome.

All the independent variables, including the control variables, have an acceptable collinearity, where the tolerance value is closer to 1 than 0 and the VIF is less than 5. The independent variables do not have a concerning level of multicollinearity and are acceptable for inclusion in the analysis.

The second step, descriptive statistics, is deployed to help summarize our data and provide an understanding of the variable distribution (median and mean) and variability (standard deviation). It helps us understand the baseline characteristics of our independent

variables—board member number, federal funding, gross household income, and median rent, and if they are good choices as independent variables. It also helps identify the quality of the data and identify potential outliers and patterns in the data. For the categorical variables of leadership and political climate, dummy coding is performed prior to the data analysis. For leadership, nonprofit leadership is coded as 1 and government leadership as 0. For the political climate, Democratic regions are coded as 1 and Republican regions as 0. We also deploy a log transformation for the variables of funding, gross household income, and median rent due to the high positive skewness of the data. Table 4 shows the descriptive analysis of the study.

Table 4. Descriptive statistics.

Variable	Range	Minimum	Maximum	Mean	Std. Error	Std. Deviation	Variance
PSH Bed Units	8.24	1.39	9.63	5.7231	0.08032	1.45914	2.129
Nonprofit Leadership	1.0	0.0	1.0	0.5423	0.02694	0.49894	0.249
Board Size	36	3	39	15.5	0.362	6.71	45.028
Federal Funding	8.24	10.82	19.06	14.839	0.07935	1.46751	2.154
Political Climate	1.0	0.0	1.0	0.4548	0.02693	0.49868	0.249
Gross Household Income	3.6	10.5	14.1	11.1783	0.01613	0.29821	0.089
Median Rent	2.81	6.53	9.34	7.1076	0.01699	0.31461	0.099
Homeless Population	7.38	4.01	11.39	6.4968	0.06067	1.12366	1.263
Ratio of Non-White Homeless	90.41%	0.00%	90.41%	45.0622%	1.06857	19.79018	391.651
Valid N (listwise)							

The descriptive analysis helped identify large variations in the data, potential outliers, and skewness and variability, in addition to treating them with log transformation to reduce the skewness and balancing the categorical variables by dummy coding them. The data are normally distributed and suitable for inclusion in the next and final step of the data analysis, the regression analysis.

The ordinary linear regression technique is deployed to assess the strength and direction between the multiple independent variables and the continuous dependent variable. Ordinary Least Squares (OLS) regression is deployed to determine the effect of each of these internal and external CoC conditions on their performance. The SPSS software was used to run the analysis. It allows one to see the unique contribution of each independent variable as a predictor of the dependent variable. For example, we can determine how board membership size influences network performance, independent of federal funding or leadership type. We developed two models for regression—first, with the internal and external conditions together, and second, adding the interaction variables, federal funding and political climate, as the predictors for CoC network performance.

3.3. Ethical Consideration

The study uses publicly available secondary datasets (HUD, Census Bureau, CoC websites). No individual or personally identifiable data were used; therefore, Institutional Review Board (IRB) approval was not required.

4. Results

Table 5 shows the findings for the two models tested. Both models show statistical significance. For Model 1, the relationship between PSH bed units and political climate is statistically significant, where $r = 0.216$, $p < 0.001$. This indicates that the political climate that is coded as “1” for CoCs with a favorable political climate is associated with more PSH units. Similarly, the PSH units also seem to have a positive relationship with federal funding, where $r = 0.435$, and this is statistically significant at $p < 0.001$. This suggests that increased federal funding is significantly associated with more PSH units. A similar

finding is seen between PSH bed units and board member number ($r = 0.157$, $p = 0.004$), indicating the statistical significance of large board sizes being associated with more PSH units. High median rents are associated with fewer PSH bed units, with $r = -0.160$ and statistical significance at $p = 0.003$. For nonprofit leadership, contrary to our hypotheses, we find that $r = -0.057$, indicating a negative association between PSH units and nonprofit leadership, with no statistical significance at $r = 0.292$. This suggests that nonprofit as a lead agency (which is coded as 1) has no significant impact on PSH bed units. Gross household income has no statistical significance at $r = 0.084$, $p = 0.120$, which suggests that gross household income does not have any significant effect on PSH bed units. Regarding the control variables, the homeless population and the ratio of the non-White population, both are statistically significant at $p < 0.001$ and $p = 0.002$, respectively. The overall model has a good fit, with a high F-statistic at 13.080 and $p < 0.01$ and moderate predictability at $r = 0.216$. For Model 2, the interaction variables of federal funding and political climate are added to the analysis to determine their interplay's effect on the overall model. This shows statistical significance at $r = 0.265$ and $p < 0.001$, which means that the interaction variable influences PSH bed units. It also improves the model considerably, with $r = 0.237^{***}$ and $p \leq 0.001$; the F-statistic is 11.37, suggesting a good model fit.

Table 5. Regression analysis results.

Independent Variables	PSH Bed Units	
	Model 1	Model 2
Nonprofit Leadership	−0.057 (0.292)	−0.057 (0.292)
Board Member Number	0.157 *** (0.004)	0.157 *** (0.004)
Federal Funding	0.435 *** (<0.001)	0.427 *** (<0.001)
Political Climate	0.251 *** (<0.001)	0.226 *** (<0.001)
Gross Household Income	0.084 (0.120)	0.083 (0.120)
Median Rent	−0.160 *** (0.003)	−0.161 *** (0.003)
Homeless Population	0.417 *** (<0.001)	0.416 *** (<0.001)
Ratio of Non-White Homeless	0.166 *** (0.002)	0.169 *** (0.002)
Political Climate XFederal Funding	−	0.265 *** (<0.001)
Observation	342	340
R-Squared	0.216	0.237
F-Statistics	13.080 ***	11.373 ***

*** $p < 0.01$ Two-tailed test.

The results of the regression analysis offer a clearer understanding of the factors that shape the housing performance that was measured by PSH services across CoC networks. Among the internal organizational characteristics, board size emerges as a significant predictor. Across both models, CoCs with larger boards tend to provide more PSH units. This supports the idea that broader governance structures may help networks mobilize resources and pursue comprehensive strategies more effectively.

However, the type of lead agency, whether a nonprofit or a government entity, does not appear to influence PSH availability in a meaningful way. Contrary to expectations, nonprofit leadership does not show a statistically significant relationship with PSH unit provision in either model. This finding suggests that the structural advantages typically associated with nonprofit leadership may not translate directly into differences in housing outcomes.

Federal funding, on the other hand, shows a robust and consistent effect. As hypothesized, CoCs that receive higher levels of federal funding report significantly greater PSH unit availability. This reinforces the critical role that direct financial resources play in enabling local networks to expand housing services. Interestingly, political orientation also emerges as a significant predictor. CoCs operating in communities with more progressive political climates—often marked by a higher proportion of Democratic voters—are

associated with a higher number of PSH units. This suggests that community values and political support for social welfare programs can meaningfully shape how CoCs prioritize housing strategies.

Economic indicators present a mixed picture. Gross household income in a region does not appear to have a significant impact on PSH availability, indicating that broader income levels may not directly affect the implementation of housing-first strategies. In contrast, median rent is negatively associated with PSH unit availability. CoCs in areas with higher housing costs tend to provide fewer PSH units, suggesting that affordability challenges may limit the feasibility of expanding supportive housing.

Lastly, the analysis supports an interaction effect between political climate and federal funding. CoCs in politically supportive regions not only tend to offer more PSH units but also receive higher levels of federal funding. This implies that political context may facilitate access to resources and influence how effectively those resources are deployed to support vulnerable populations.

5. Discussion

This study aims to understand the internal and external factors that shape the performance of public service networks, specifically CoC networks providing homelessness services across the United States. Drawing collaborative governance theory by Ansell and Gash [13] and Emerson's integrative framework [10], this research integrates both internal network dynamics and external system contexts to explain variation in CoCs' capacity to provide Permanent Supportive Housing (PSH). The findings offer several important theoretical and practical insights into the functioning of collaborative service networks operating in complex policy environments.

Consistent with collaborative governance theory, internal network characteristics, particularly board size, emerged as a significant predictor of PSH availability. This supports the argument that a broader and more inclusive governance structure contributes to network effectiveness [13]. Larger boards may increase CoC's ability to draw upon a diverse set of stakeholders, expanding access to resources, knowledge, and community partnerships. These results align with prior findings that broader stakeholder inclusion is associated with improved collaborative performance and greater capacity to secure external support [16]. In this case, a larger and more representative board structure may play a direct role in guiding resource decisions and setting housing priorities within the network.

However, the finding that nonprofit leadership does not significantly affect PSH outcomes challenges prevailing assumptions about the advantages of nonprofit-led collaboration in human services. While nonprofits are often positioned as more flexible and community-embedded actors [17,18]. Their formal leadership status in CoC networks did not predict housing outcomes in this analysis. This suggests that leadership type alone may not be a sufficient driver of performance, and that other elements, such as network cohesion, decision-making processes, or political support, may mediate or moderate its effects. This nuance calls for further research into the relational and procedural dynamics of nonprofit-led governance in collaborative networks.

Perhaps the strongest and most consistent finding was the significant effect of federal funding on PSH bed availability. This reinforces the theoretical premise that resource availability is foundational to collaborative performance [6,22]. In line with expectations, CoCs with greater federal support were better equipped to expand permanent housing options for the homeless. Yet this effect was not uniform across contexts. The interaction analysis revealed that the influence of funding was significantly enhanced in regions with politically supportive climates. In other words, federal funding was most effective when coupled with a favorable political context. This finding directly supports Emerson's argument that external

system context plays a critical role in shaping collaborative outcomes, not just by providing constraints or opportunities, but by moderating the effects of internal resources [10].

Political climate alone was also a significant and independent predictor of network performance. CoCs located in regions with stronger support for progressive policies, typically indicated by higher shares of Democratic voters, were more likely to provide PSH. These findings align with previous work showing that political orientation shapes public support for redistributive policies and housing-first approaches [11,15]. The results highlight the role of political environments in either facilitating or constraining the implementation of evidence-based solutions to homelessness. Supportive political climates may result in reduced regulatory barriers, greater public legitimacy, and more flexible policy implementation, all of which can enhance a network's ability to expand PSH services.

Among the external economic conditions, the analysis found that median rent was significantly associated with PSH availability, but in the opposite direction. CoCs in high-rent areas had lower PSH bed availability, likely due to affordability challenges and constraints in the housing supply. This supports prior studies linking housing market pressures to service constraints [26]. The cost and scarcity of rental housing in these areas may limit the feasibility of acquiring units for PSH, despite the demand. Interestingly, gross household income did not predict PSH performance, suggesting that broader economic affluence in a region may not directly translate into improved housing outcomes for homeless populations. This highlights the complexity of socioeconomic factors and calls for further disaggregation of economic indicators in future research.

These findings also underscore the utility of the system context framework for understanding public service network performance. Emerson argue that networks do not operate in a vacuum but evolve within shifting and sometimes volatile system environments. This study validates that perspective, showing how structural factors like political orientation and housing costs shape collaborative capacity and influence how resources are mobilized [10]. The interaction between political climate and funding availability illustrates how system context can amplify or diminish the effectiveness of internal resources.

Taken together, the results affirm the value of a dual-theoretical approach to studying collaborative governance. Internal network factors such as board size remain central to understanding network capacity and performance. However, these internal features must be interpreted within their broader political and economic contexts. Where system conditions are supportive, collaborative networks are more likely to convert internal resources and structures into tangible programmatic outcomes. Where these conditions are hostile or restrictive, even well-structured networks with significant resources may struggle to perform effectively.

This study contributes to the broader literature on public service network performance by demonstrating that variation in homelessness service outcomes is not simply a function of how networks are organized, but also of where they are situated. These findings offer practical implications for policy and network design. First, they suggest that federal funding strategies should consider local political and economic conditions to ensure that resources are directed where they are both needed and likely to be used effectively. Second, they highlight the importance of inclusive governance structures, particularly in large or diverse service regions. Finally, the results call attention to the potential value of advocacy and political engagement in building local support for housing-first strategies.

In sum, this research affirms and extends collaborative governance theory by demonstrating how internal and external factors jointly shape public service network performance. It calls for continued empirical attention to the interplay between network structure, political climate, and resource context, particularly in human and social service domains like homelessness, where collaboration is not just a strategic choice, but a functional necessity.

6. Conclusions

Achieving sustainable housing solutions and improved network performance requires more equitable practices, innovative and alternative funding strategies, inclusive governance practices, effective leadership that drives these initiatives through community collaboration, and policies aligned with community needs to promote community engagement. This study contributes to this goal by providing a foundation for evidence-based policy reform and capacity-building strategies to enhance the effectiveness and efficiency of CoCs across diverse contexts and challenges.

This study contributes to the field of public service network performance research by conducting a statistical analysis to understand how human service networks, such as CoC networks for homelessness, can enhance their performance through collaborative governance, strategic resource use, and mitigation of external challenges. Through the identification of both enabling factors that improve network performance and constraining factors that hinder high network performance, this research offers practical and proven recommendations for improving CoC networks to provide stable, long-term, effective, efficient, timely, and appropriate services for the vulnerable homeless population that needs them.

Federal policymakers should recognize that funding effectiveness depends on local political and housing market conditions. Targeted technical assistance or incentives may be needed to ensure equitable outcomes across diverse political contexts. Local CoCs may consider strategic board composition to maximize stakeholder engagement and resource mobilization without introducing coordination inefficiencies. Housing policy integration is critical, such as addressing structural housing market barriers (e.g., through zoning reform or affordable housing subsidies), which is necessary to complement CoC-level governance and funding strategies.

While this study provides empirical evidence on factors influencing PSH unit availability and offers practical and policy insights for improving CoC performance, it has several limitations. First, the analysis relies on cross-sectional data from 2023, supplemented with census data from 2020. Although this ensures consistency in variable measurement, it limits the ability to capture temporal changes, causal dynamics, and the effects of evolving governance structures or lead agency assignments. A longitudinal design could better illuminate how such changes shape performance over time. Second, the use of OLS regression assumes linear relationships, homoscedasticity, and independence of errors. While suitable for the current research questions, these assumptions may not fully capture the complexity of network dynamics. Future research could apply more advanced techniques, such as multilevel modeling or structural equation modeling, to explore nested data structures, indirect effects, and more nuanced variable interactions. Finally, the model incorporates a limited set of independent variables, which raises the possibility of omitted variable bias. Important factors such as income inequality, racial disparities, leadership characteristics, and regional variations were not included due to data constraints but may meaningfully affect PSH outcomes. Incorporating such variables in future studies would provide a more comprehensive understanding of network performance drivers.

Future studies could employ longitudinal designs to assess causal relationships, examine optimal governance configurations (e.g., board size thresholds), and incorporate qualitative methods to capture political and organizational dynamics more deeply. Comparative studies across policy sectors (e.g., health, housing, disaster response) could also extend the generalizability of these findings to other collaborative governance networks.

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