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# Where to Start? Participatory Systems Mapping for Place-Based Service Integration in the City of Casey

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**Abstract**

Place-based approaches have gained significant attention as a means of addressing entrenched disadvantage through collaborative, locally responsive service delivery, yet implementation has yielded mixed results and the systemic factors that facilitate or impede inter-organisational collaboration remain inadequately understood. This study applied participatory systems mapping as part of a systemic inquiry to identify leverage points for place-based integrated service delivery in the City of Casey, an outer-metropolitan municipality in Melbourne, Australia. Twenty-one representatives from the Casey Futures Partnership engaged in group model building workshops, co-producing a causal loop diagram containing 33 factors and 104 directional connections. The resulting map was analysed using a blended analytical approach combining network metrics with the Action Scales Model. Funding availability and criteria emerged as the most central factor within the system, while belief-level factors, including territorial behaviour and resource and collaboration mindset, were found to be substantially shaped by upstream structural conditions. Factors combining network influence with deeper system positioning and amenability to local action included awareness of community needs and priorities, trust and willingness to collaborate from funders, inter-organisational communication, and advocacy effectiveness. The findings support multi-level place-based approaches that address underlying beliefs and structural conditions alongside operational improvements.

**Keywords:** place-based approaches; participatory systems mapping; group model building; service integration; leverage points; Action Scales Model

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## 1. Introduction

Local government and community service organisations (CSOs) operate at the interface of diverse community needs, complex funding environments, and the particular history and conditions of place. Communities experiencing disadvantage often face multiple, interrelated problems—including housing stress, unemployment, family breakdown, and health inequities—that do not respect organisational boundaries or funding silos [1]. These intersecting factors culminate in complex interactions that challenge conventional approaches to service delivery. These 'wicked problems' defy clear problem definitions, possess no definitive solutions, and involve contested values and evolving interdependencies [2,3].

Place-based approaches have gained significant attention across jurisdictions as a means of addressing entrenched disadvantage and complex problems through collaborative, locally responsive service delivery [4,5]. Place-based approaches are typically

characterised by collaboration between multiple stakeholders, community inclusion in decision-making, responsiveness to local priorities, and efforts to address complex issues within a specific geographic location [1,6]. Rather than delivering standardised services determined by central authorities, place-based models seek to mobilise resources around local contexts, individuals, and community needs, facilitating continuous adaptive learning rather than prescriptive one-size-fits-all solutions [7].

Despite the intuitive appeal of place-based approaches, implementation has yielded mixed results across different contexts. While most place-based initiatives demonstrate at least some positive outcomes, evidence of sustained population-level impact remains limited, with evaluation design limitations, changing contextual factors, and insufficient implementation timeframes frequently cited as contributing factors [8,9].

A key feature of place-based approaches is service integration. Service integration is the coordination of services across organisational boundaries to provide more coherent, person-centred support to individuals and communities [10]. Integration can occur at multiple levels, from case-level coordination between individual workers, to programme-level partnerships, to system-level alignment of funding, governance, and accountability structures [11,12]. The benefits of integration are well-documented: reduced service duplication, improved client outcomes, more efficient resource utilisation, and enhanced capacity to address complex, multi-factorial problems [10,13]. Yet, achieving meaningful integration remains challenging.

Much existing research on service integration has focused on specific issue areas, such as examining how services can better coordinate around particular client cohorts in mental health, child protection, or family violence [12,14]. This issue-based framing can obscure the higher-level systemic factors that span organisations operating in place. Studies consistently identify barriers including fragmented funding arrangements, incompatible information systems, professional siloes, competitive dynamics between organisations, and misaligned accountability requirements [15,16]. Less examined are the deeper factors—organisational cultures, mindsets, and underlying beliefs about collaboration—that shape whether integration initiatives in place-based approaches succeed or fail.

Systems thinking provides the means to explore these factors. Rather than reducing problems to isolated components amenable to linear solutions, systems thinking emphasises holistic analysis, understanding of feedback loops, and acknowledgement of the emergent properties that arise from interactions between system elements [17,18]. A systems view acknowledges that interventions in one part of a system may produce intended and unintended consequences elsewhere, and that sustainable change often requires addressing underlying structures and mental models rather than surface-level symptoms [19].

There are many ways in which systems thinking can be applied, with participatory approaches to systems mapping, including group model building, engaging diverse stakeholders in collectively constructing system representations [20,21]. Such approaches are often applied to causal loop diagrams (CLDs), which are a specific means of visually representing factors influencing a phenomenon of interest and the causal connections between them [22,23]. This participatory dimension draws on distributed knowledge that no single actor possesses, surfaces implicit assumptions and competing perspectives, and builds shared understanding and ownership of the resulting analysis [24]. Research indicates that group model building can improve communication among stakeholders, create consensus around system dynamics, and generate commitment to collective action [24–26].

Systems methods have been applied to specific topic areas such as youth mental health [20,21], sleep health [27], land-use planning [20], determinants of wellbeing [28], and energy policy [29]. However, these applications have typically focused on a single issue or population cohort. Their application to the cross-cutting systemic factors that shape service

integration within place remains underexplored. This is a significant gap. If place-based approaches are to move beyond identifying barriers towards understanding the dynamic relationships between them, methods capable of capturing interconnections, dynamics, and multi-level interactions are needed.

This paper addresses that gap through a case study from the Casey Futures Partnership (CFP), a collaboration between local government and CSOs in the City of Casey, a large and rapidly growing municipality in outer south-eastern Melbourne, Australia. As an emerging partnership seeking to understand the systemic factors influencing its capacity to achieve integrated service delivery, the CFP provided an empirical context in which to apply participatory systems mapping. Two research questions guided the study: (1) What factors influence place-based service integration in the City of Casey? (2) What are the priority leverage points for action?

To address these questions, we used group model building techniques to develop a causal loop diagram representing the collective understanding of CFP members. The resulting map was analysed using a blended approach combining network metrics [30] and the Action Scales Model (ASM) framework [31] to identify potential leverage points for intervention. Beyond generating locally relevant insights, the study aims to demonstrate an approach that can be replicated in other place-based contexts. The paper is structured as follows. Section 2 describes the study context, the participatory systems mapping and group model building approach, the workshop design, and the analytical framework used to identify leverage points. Section 3 presents the results, including the network structure of the systems model and integrated leverage point analysis. Section 4 discusses the findings in relation to existing literature and addresses methodological contributions and limitations. Section 5 concludes the paper and identifies directions for future research.

## 2. Materials and Methods

This section describes the study context, the participatory systems mapping approach adopted, the workshop design and participant profile, the process by which group maps were consolidated into a single systems representation, and the analytical framework used to identify leverage points combining social network analysis metrics and the ASM.

### *2.1. Case Study: The City of Casey and the Casey Futures Partnership*

The City of Casey is one of Australia's largest and fastest-growing municipalities, located approximately 35 km south-east of Melbourne's central business district. With a population now exceeding 400,000 residents, Casey comprises a mix of long-established suburbs and rapidly developing growth-corridor communities [32]. While the municipality continues to experience significant expansion—particularly in the remaining growth areas—many of Casey's most pronounced socio-economic challenges are concentrated in its older, established suburbs. These areas have historically recorded lower levels of educational attainment, higher unemployment, and greater reliance on income support, reflecting forms of disadvantage that have accumulated over time [33].

At the same time, growth-corridor suburbs face a different set of pressures associated with rapid population increase, including infrastructure lag, emerging service demand, and the need for timely access to transport, education, health, and community facilities. Forecasts indicate that Casey's population will continue to grow substantially over the next two decades, reaching approximately 614,000 residents by 2046, with much of this growth occurring in these new development areas [32].

The Casey Futures Partnership (CFP) is an initiative of the CSO Growth and Attraction Framework, which brings together the City of Casey (local government) with multiple CSOs delivering services across the municipality. Member organisations vary in size, scope, and

focus, including large multi-service providers, specialist services, community development, and volunteer-based organisations. The CFP provides a vehicle for collective planning, coordination, and advocacy, with an underlying premise that collaboration among service providers can improve outcomes for Casey residents beyond what individual organisations can achieve in isolation. This is achieved through collaborative efforts to address service gaps, plan solutions, implement strategic frameworks, advocate for better health outcomes, foster networking, map services, and build capacity.

At the time of the workshop, the CFP was in an early developmental phase, establishing shared purpose, working norms, and initial projects. Systems mapping served as early-stage infrastructure to enhance collective sense-making, reveal feedback structures, and create a basis for targeted action [25]. It also allowed the partnership to surface authorising environment constraints (e.g., funding criteria, reporting regimes) and to identify where the Council and partners could mobilise influence.

### 2.2. Approach to Participatory Systems Mapping

This study applied a participatory systems mapping approach as part of a systemic co-inquiry design. Co-inquiry was proposed by John Heron and expanded on by Peter Reason. Heron, a philosopher and educator, developed co-operative inquiry as a form of participatory action research in which all participants are co-researchers, jointly designing and conducting the inquiry and making sense of its outcomes [34]. Reason, a professor of action research at the University of Bath, extended this framework and placed it within a broader tradition of collaborative, participative knowledge production [34]. In short, it involves researching with people, rather than on people [34]. Systemic co-inquiry is a particular form of co-inquiry which draws on systems theories, methodologies, and techniques [18]. A defining feature of systemic co-inquiries is their adaptability: there is no single correct approach, nor must they follow a predetermined timeline. They can serve as groundwork for future initiatives, operate concurrently with existing programmes, or be woven into project activities, with their duration shaped by participant engagement rather than external constraints [35].

Systemic co-inquiry has been used to explore questions of complexity such as water governance [36], and recently in place-based contexts such as land-use planning [20]. It is an investigative process that is open to changing situations and drawing on different frameworks as the work progresses [18]. We drew on a systemic co-inquiry design to position participants as co-researchers [34] as an essential dimension in this context as no single actor holds the complete picture. This was coupled with group model building processes and causal loop diagramming techniques adapted for the CFP context. Group model building is a facilitated process engaging stakeholders in collectively representing their understanding of a complex problem, using visual mapping tools to externalise and integrate diverse perspectives [24,26].

The approach was designed to be accessible for participants, who were predominantly senior managers and program coordinators with operational expertise in service delivery, but varying familiarity with systems concepts. Given that systems mapping can be conceptually demanding—particularly for those unfamiliar with feedback dynamics and causal reasoning—the research team implemented measures to support engagement. Prior to the workshop, participants received briefing materials introducing key systems thinking principles. The workshop itself was structured to build understanding progressively, moving from individual reflection following a short primer on the process, to small group discussion on the factors of relevance, to the collective mapping process itself.

### *2.3. The Systems Mapping Workshop*

A four-hour in-person workshop was held with 21 participants drawn from across CFP member organisations, with representation from large multi-service providers, specialist services, community development organisations, volunteer-based organisations, and local government. Participants occupied a range of roles including senior managers, program coordinators, and service delivery leads, providing perspectives from both strategic and operational levels. Eighteen participants attended in person, with an additional three joining online through a hybrid format supported by dedicated facilitation.

Of the 20 member organisations comprising the CFP at the time, representatives from 15 attended, with some organisations having more than one participant. In total, 31 individuals were invited; the 21 who attended did so voluntarily, having received prior information about the workshop's purpose, process, and intended use of outputs. This constitutes a self-selected purposive sample drawn from the wider relevant stakeholder group—an approach appropriate to the co-inquiry approach we adopted, which requires that those most knowledgeable about the system under investigation are the ones to be involved in its representation [34]. Vennix [37] identifies groups of 15–25 as appropriate in group model building as enough diverse perspectives can be included while remaining manageable for the facilitated process. As such, the workshop was able to bring together enough participants to build a shared understanding among the CFP partners whose relationships and interactions constitute the system of focus.

The workshop session opened with a 20 min, accessible presentation designed to introduce systems thinking approaches and establish the framing for the day's activities. This presentation covered the rationale for systems mapping, foundational principles of systems thinking, boundary setting, stakeholder engagement, mapping techniques, and the basics of causal loop diagramming. An overview of the workshop workflow followed, providing participants with clarity about what to expect. Participants also received an accompanying information sheet summarising key concepts and practical guidance from the presentation.

Following the introductory session, participants were divided into three in-person table groups, with online attendees forming a fourth group. Each group was presented with the central prompt: 'What are the barriers and enablers to integrated place-based service delivery in Casey?' Participants first reflected individually on their experience, then discussed collectively to identify what they regarded as key factors. Importantly, these factors were to be framed as causal variables that could operate in either direction (that is, as potential enablers or barriers depending on context) rather than as inherently positive or negative states.

The next step involved plotting identified factors on butcher's paper and drawing connections between factors that represented influence relationships. Connections were marked with '+' or '−' to capture whether the relationship was one of positive influence (variables moving in the same direction) or negative influence (variables moving in opposite directions). This exercise prompted substantial discussion within groups, requiring participants to articulate and negotiate their understanding of how different factors related to one another within the system.

Following a lunch break, groups revisited their systems maps, using this as an opportunity to clarify relationships and discuss patterns of interconnectedness that had become visible through the mapping process. Facilitators circulated among the discussion tables throughout, providing guidance and answering questions about the mapping process. In total, three physical maps were produced on butcher's paper, and one virtual map was produced using the Miro platform (https://miro.com/) by the online group. See Figure 1

for a raw output produced by one of the groups, depicting the range of factors that they identified and the associated connections between them.

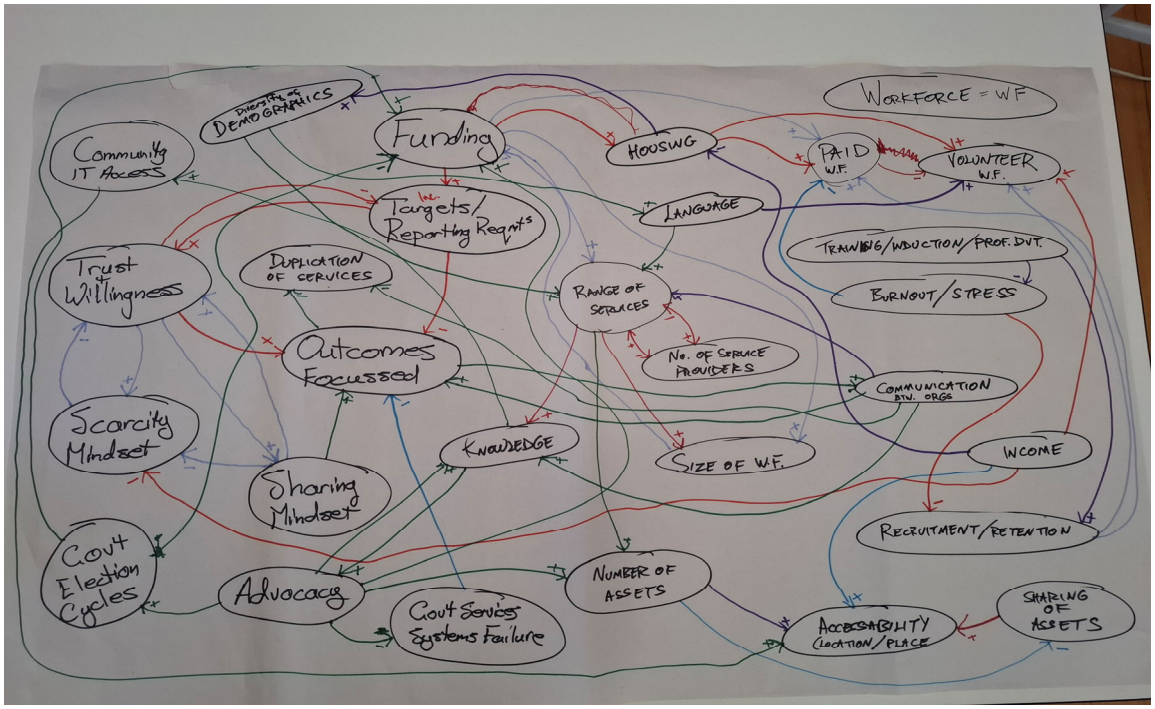



**Figure 1.** Example raw output map from one of the groups in the workshop, depicting the factors and associated connections. Colours of the lines reflect the polarity of the connections.

### *2.4. Transcribing and Consolidating the Maps*

Following the workshop, each of the four group maps was transcribed into spreadsheets to consolidation. Every factor and connection from each map was documented, enabling cross-map comparison. This stage required extensive quality assurance, checking that the recorded content accurately reflected group intent and that positive and negative influences were correctly represented. Facilitator notes proved essential for clarifying ambiguous entries. Most wording adjustments as part of the process involved reframing factors initially expressed as barriers (for example, 'not enough funding'), as neutral variables ('funding availability') to standardise terminology across maps. Other adjustments were language based, such as adding the word "approach" after the variable "outcome focused" to support consistent interpretation of the concept.

The next phase involved consolidating the four maps into a single composite representation, following an approach consistent with other participatory systems mapping studies [28,38,39]. Consolidation proceeded through iterative thematic analysis: factors from each map were first compared to identify conceptual overlaps, then clustered into unified codes at a consistent level of specificity. For example, factors relating to workforce capacity, staffing levels, and volunteer availability across different maps were consolidated into 'Paid and volunteer workforce size'.

Where maps contained factors that appeared similar but reflected meaningfully different concepts, these were retained as distinct variables. Relational connections were preserved and merged where multiple groups had identified the same causal relationship; where groups identified conflicting relationship directions, facilitator notes and the original mapping discussions were consulted to resolve ambiguities.

Consistent with the co-inquiry orientation of the study, consolidation was undertaken collaboratively by the research team through ongoing dialogue rather than independent

parallel coding. This involved independent review by authors MH and JL of the maps and identified possible groupings, which were then compared jointly, and discussed until agreement was reached, ensuring reliability. This collaborative approach was essential given the diversity of ways that participants framed factors. For example, some maps used organisationally specific terms, others general terms, meaning joint interpretation was necessary to ensure conceptually related factors were appropriately consolidated and that distinctions between genuinely different concepts were retained. As Vennix [37] argues in the foundational group model building literature, the modeller's role in facilitating shared meaning-making during consolidation is inseparable from the analytical process itself. This means independent parallel coding would risk imposing external categories on participant generated concepts.

The draft consolidated map was then shared with workshop participants via an interactive Kumu link—Kumu is a web-based network visualisation platform—enabling them to explore the full draft map, interrogate individual factors and connections, and verify that their group's contribution was accurately reflected. An optional 60 min in-person walkthrough session was subsequently held, attended by 10 participants, in which the research team guided participants through the map and invited further feedback. This member-checking process served as the primary quality assurance mechanism for the consolidation, consistent with the co-inquiry orientation of the approach. No factors were added or removed. Two connections were removed, and three others added to better reflect understandings of influence between factors. The final consolidated map contained 33 unique factors and 104 directional connections, forming a shared systems representation co-produced with the 21 workshop participants. For ease of navigating the map, an interactive version of the final maps are available via a perpetual Kumu link housed via GitHub here: mphealey17.github.io/Casey-ASM (accessed on 26 March 2026) or by contacting the author.

### *2.5. Analytical Framework: Integrating Network Analysis and Leverage Point Analysis*

To identify potential leverage points for intervention, the study employed a blended analytical approach combining network analysis centrality metrics [30,40] with the Action Scales Model (ASM) [31]. This triangulation was designed to take advantage of the complementary strengths of quantitative network measures and qualitative systems change frameworks while addressing the critiques that network metrics alone fail to account for content meaning and intervention feasibility [22]. This blended analytical approach aligns with recent applications in whole-systems research. Brinkley et al. [39] employed a similar two-phase process in their study of physical activity promotion in Suffolk, using network analysis markers alongside the ASM to identify leverage points, which were then validated through participatory workshops with system stakeholders. Although, as described in the introduction, in Brinkley et al. [39] the focus is on physical activity within a place (Suffolk), whereas our focus here is on the broader opportunities for service integration across many different issue areas.

The ASM provides a complementary interpretive framework by categorising factors according to their 'depth' within the system [31]. The ASM aligns with other leverage-focused frameworks, including Donella Meadows' influential work on leverage points [17], Senge's Iceberg Model [19], and the Intervention Level Framework [41], and was developed for people working in practice. Like these other frameworks, the ASM posits that interventions targeting deeper levels (goals and beliefs) offer greater potential for sustained system change, though they are typically more difficult to influence than surface-level events. The ASM describes four levels: events (observable behaviours and outcomes), structures (patterns, relationships, and information flows that produce events), goals (explicit targets

and ambitions driving system behaviour), and beliefs (foundational norms, values, and attitudes that shape goals and structures). We selected the ASM for this study in part because of Brinkley et al.'s [39] experience and the opportunity to extend the approach from an issue-focused area to that of wider service integration, but also because of the simplicity of the four levels in the ASM itself in both the classification and in the communication of the results back to the CFP members.

The classification of factors into ASM levels was performed by the research team using the four-level definitions described above and supported by the guidance and examples in Nobles et al. [31]. For each factor, the team assessed whether it represented an observable behaviour or outcome (event), a pattern, relationship, or information flow that produces events (structure), an explicit target or ambition driving system behaviour (goal), or a foundational norm, value, or attitude that shapes goals and structures (belief). Where a factor's classification was ambiguous—for instance, factors sitting at the boundary between structures and beliefs—the team discussed the factor's role within the broader causal map to determine the most appropriate level. The resulting classifications were presented to participants during the member-checking process described in Section 2.4, where participants had the opportunity to challenge or suggest revisions to the assignments.

Concurrently, network analysis calculated the in-degree (the number of incoming connections to a factor) and out-degree (the number of outgoing connections from a factor) for each variable in the consolidated map [40]. Factors with high out-degree and low in-degree represent potential intervention points—variables that influence many other factors but are themselves less determined by other elements in the system. Such factors may offer leverage because changes to them can propagate through multiple pathways [42].

Degree centrality—one of the most fundamental and widely used measures in network analysis [30,43]—was selected as the primary network metric for this analysis for both conceptual and methodological reasons. In directed causal networks such as the one we developed, in-degree and out-degree—which are the sub-total measures of degree centrality reflecting direction of the connection—offer an intuitive interpretation aligned with the study's purpose. That is, factors with high out-degree and low in-degree represent variables that influence many other parts of the system while being relatively less determined by them and therefore represent plausible points of intervention [43]. This directional logic for interpretation is suited to the practitioner-oriented intent of the analysis, as it corresponds to how organisations may reason about where to focus effort.

Betweenness centrality, which identifies the factors that sit between other pairs of factors, [40] was also calculated. The underlying idea here is that if a factor sits between other factors—'bridging' them—then that factor may have greater leverage to exert. However, recent methodological work has raised significant concerns about the application and reliance on betweenness and closeness centrality to interpret causal loop diagrams. Crielaard et al. [22] identified six fundamental conflicts between the assumptions underlying these metrics and the properties of CLDs, including the inability for betweenness and closeness centrality to account for feedback loops, cross-domain interactions, and the assumption that causal influence necessarily follows the shortest path. In short, they concluded that using these metrics to identify leverage points in CLDs can lead to false inference. Our use of degree centrality, while subject to its own limitations, avoids several of these conflicts—particularly the shortest path assumption—and provides a more transparent and interpretable foundation for the co-occurring analysis with the ASM framework.

Each of the 33 factors was categorised according to the four ASM levels. During the process we noted that some factors—for example, inter-organisational practices shaped by underlying norms—sat at the boundary between structural and belief-level classifications. In such cases we assigned the level that best reflected the factor's primary function within

the map. These were then verified as part of the sense-checking with participants. This categorisation enabled analysis of where change efforts might be most effectively targeted and why the system generates the outcomes it does.

The co-occurring interpretation process followed these steps: (1) initial ranking of factors by total degree (combined in-degree and out-degree); (2) ordering by ASM level; (3) review of sub-degree patterns (examining in-degree and out-degree separately); and (4) assessment of intervention feasibility. This last step acknowledged that not all high-influence factors are amenable to direct action by the CFP—some represent contextual conditions that shape the system but cannot readily be changed by local actors. This is a crucial element of the approach to leverage point analysis in place-based approaches and recognises that the power to leverage may not sit with those working in place (e.g., the CFP) but instead sit with those operating at other levels [6].

## 3. Results

This section presents the outputs of the participatory systems mapping process. It begins with an overview of the consolidated systems map, then details the individual factors and their network metrics, before presenting the integrated leverage point analysis combining network centrality with the ASM.

### *3.1. Overview of the Systems Map*

The participatory systems mapping process identified 33 distinct factors and 104 directional connections influencing place-based service integration in Casey (see Figure 2).

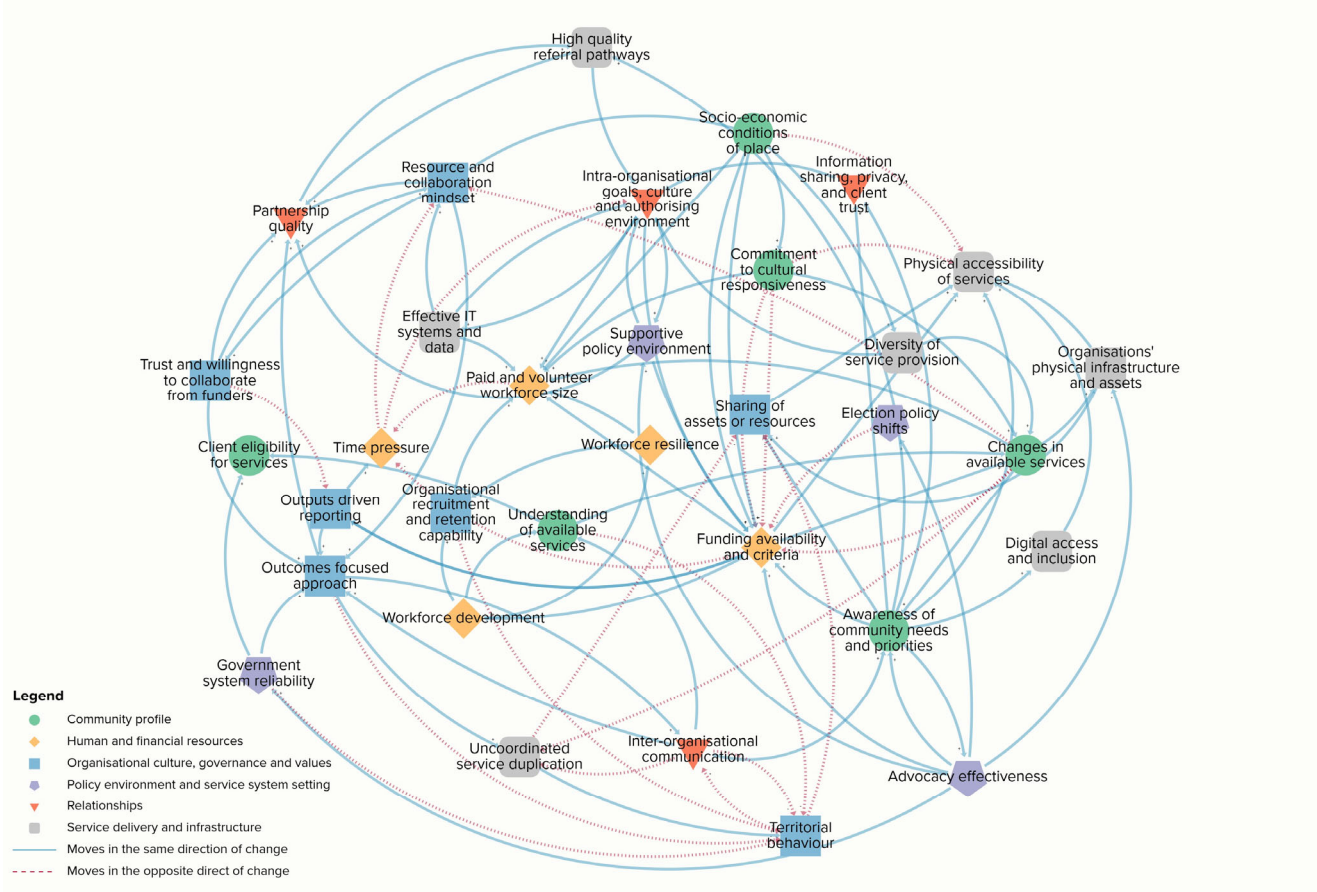



**Figure 2.** Participatory systems map of the factors influencing place-based service integration in the City of Casey.

The factors were inductively organised into categories based on their substantive focus or intent within the network, rather than being determined prior. These were verified with participants, though they are only intended to help with interpreting the map itself—they are not used for the analysis of leverage points. There were six thematic categories: Community Profile (six factors relating to the characteristics and conditions of the local population and place); Human and Financial Resources (five factors concerning people, skills, and funding); Organisational Culture, Governance and Values (seven factors relating to norms, behaviours, and authorising environments); Policy Environment and Service System Setting (four factors concerning wider policy and political contexts); Relationships (four factors relating to inter-organisational and interpersonal connections); and Service Delivery and Infrastructure (seven factors concerning the design, scope, and accessibility of services).

The systems map visualises connections using two types of relationships, solid connections and dashed connections. These connection types allow the map to represent both reinforcing dynamics (where change amplifies) and balancing dynamics (where change moderates or counteracts). These are defined as follows: Solid connections indicate that a change in the originating factor produces change in the same direction at the receiving factor—for example, an increase in partnership quality increases high-quality referral pathways. Dashed connections indicate that change in the originating factor produces change in the opposite direction—for example, a decrease in funding availability increases time pressure.

### *3.2. Factors, Descriptions, and Analytical Measures*

Table 1 presents the 33 factors, thematic categories, ASM classifications, and network metrics (in-degree and out-degree). Factors are ordered by total degree (combined in-degree and out-degree) to highlight those with the most connections within the system.

Network analysis metrics revealed considerable variation in how factors were positioned within the system. The factor with the highest total degree was 'Funding availability and criteria' (18 connections: 10 in-degree, eight out-degree), indicating its centrality to the system—both influenced by many factors and influencing many others in turn. However, its high in-degree suggests that funding availability is itself substantially determined by other system elements, potentially limiting its tractability as a direct intervention point for local actors.

More promisingly from an intervention perspective are factors with high out-degree relative to in-degree—that is, factors that influence many other elements while being less determined by the system. 'Awareness of community needs and priorities' emerged as particularly influential (eight out-degree, three in-degree), suggesting that efforts to improve shared understanding of local needs could propagate through multiple pathways. Similarly, 'Socio-economic conditions of place' (eight out-degree, one in-degree) exerts substantial influence but represents a contextual factor largely outside the CFP's direct control.

Among factors more amenable to direct action, 'Advocacy effectiveness' (six out-degree, one in-degree) demonstrated a particularly favourable ratio of influence exerted to influence received, with outgoing connections to 'Funding availability and criteria', 'Supportive policy environment', 'Changes in available services', and 'Awareness of community needs and priorities'. 'Trust and willingness to collaborate from funders' (four out-degree, one in-degree) and 'Commitment to cultural responsiveness' (four out-degree, one in-degree) also exhibited favourable ratios, though with fewer total connections. These patterns suggest potential intervention points where targeted action could generate broader system effects, with 'Advocacy effectiveness' offering the widest structural reach and the belief-level factors offering depth within the system.

**Table 1.** Factors influencing place-based service integration in Casey, including descriptions, thematic categories, Action Scales Model classification, and network metrics.

| Factor | Category | ASM Classification | Degree | Indegree | Outdegree |
|---|---|---|---|---|---|
| Funding availability and criteria | Human and financial resources | Structures | 18 | 10 | 8 |
| Awareness of community needs and priorities | Community profile | Beliefs | 11 | 3 | 8 |
| Paid and volunteer workforce size | Human and financial resources | Structures | 11 | 9 | 2 |
| Resource and collaboration mindset | Organisational culture, governance and values | Beliefs | 10 | 7 | 3 |
| Territorial behaviour | Organisational culture, governance and values | Beliefs | 10 | 7 | 3 |
| Changes in available services | Community profile | Events | 10 | 4 | 6 |
| Intra-organisational goals, culture and authorising environment | Relationships | Goals | 10 | 6 | 4 |
| Physical accessibility of services | Service delivery and infrastructure | Events | 9 | 8 | 1 |
| Socio-economic conditions of place | Community profile | Events | 9 | 1 | 8 |
| Outcomes-focused approach | Organisational culture, governance and values | Goals | 9 | 5 | 4 |
| Commitment to cultural responsiveness | Community profile | Beliefs | 5 | 1 | 4 |
| Advocacy effectiveness | Policy environment and system setting | Structures | 7 | 1 | 6 |
| Inter-organisational communication | Relationships | Structures | 7 | 2 | 5 |
| Time pressure | Human and financial resources | Events | 5 | 3 | 2 |
| Outputs driven reporting | Organisational culture, governance and values | Goals | 5 | 3 | 2 |
| High quality referral pathways | Service delivery and infrastructure | Structures | 6 | 3 | 3 |
| Partnership quality | Relationships | Structures | 6 | 4 | 2 |
| Trust and willingness to collaborate from funders | Organisational culture, governance and values | Beliefs | 5 | 1 | 4 |
| Sharing of assets or resources | Organisational culture, governance and values | Structures | 5 | 4 | 1 |
| Supportive policy environment | Policy environment and system setting | Structures | 5 | 2 | 3 |
| Uncoordinated service duplication | Service delivery and infrastructure | Structures | 5 | 3 | 2 |
| Understanding of available services | Community profile | Structures | 5 | 2 | 3 |
| Effective IT systems and data | Service delivery and infrastructure | Structures | 4 | 1 | 3 |
| Government system reliability | Policy environment and system setting | Structures | 4 | 1 | 3 |
| Organisational recruitment and retention capability | Organisational culture, governance and values | Structures | 4 | 2 | 2 |
| Organisations' physical infrastructure and assets | Service delivery and infrastructure | Structures | 4 | 2 | 2 |
| Workforce development | Human and financial resources | Structures | 4 | 1 | 3 |
| Diversity of service provision | Service delivery and infrastructure | Structures | 3 | 1 | 2 |
| Information sharing, privacy, and client trust | Relationships | Structures | 3 | 2 | 1 |
| Workforce resilience | Human and financial resources | Structures | 3 | 1 | 2 |
| Client eligibility for services | Community profile | Events | 2 | 2 | 0 |
| Digital access and inclusion | Service delivery and infrastructure | Events | 2 | 1 | 1 |
| Election policy shifts | Policy environment and system setting | Events | 2 | 1 | 1 |

### *3.3. Action Scales Model*

The ASM classification revealed that most identified factors (16 of 33) operated at the structural level—the patterns, relationships, and information flows that produce observable events. Seven factors were classified as events (including 'Changes in available services', 'Physical accessibility of services', and 'Time pressure'), three as goals ('Intra-organisational goals, culture and authorising environment', 'Outcomes-focused approach', and 'Outputs driven reporting'), and five as beliefs ('Awareness of community needs and priorities', 'Commitment to cultural responsiveness', 'Resource and collaboration mindset', 'Territorial behaviour', and 'Trust and willingness to collaborate from funders').

The belief-level factors are particularly noteworthy given the ASM's premise that interventions at deeper system levels offer greater potential for sustainable change. 'Territorial behaviour'—characterised as organisations acting competitively to protect their own resources or influence—had a notably high in-degree (seven) and moderate out-degree (three), indicating that it is substantially shaped by other system dynamics and itself influences several downstream factors. This suggests that territorial behaviour may be symptomatic of deeper systemic pressures, particularly those related to funding competition and organisational survival.

'Resource and collaboration mindset'—the orientation of organisations toward sharing resources and working collectively—displayed a contrasting pattern (seven in-degree, three out-degree), again, being substantially influenced by other factors. Both 'territorial behaviour' and 'resource and collaboration mindset' appear to be shaped by similar upstream factors, including funding availability, supportive policy environment, and intra-organisational goals. This suggests that belief-level change may require addressing the structural conditions that reinforce competitive or collaborative orientations.

### *3.4. Integrated Leverage Points Analysis*

Integrating the network analysis and ASM findings, several factors emerged as potential leverage points warranting attention from the CFP. These were selected based on their: (a) position within the network (favourable out-degree to in-degree ratio); (b) depth within the system (operating at goal or belief levels); and (c) feasibility of influence by local actors (not entirely determined by external contextual factors). See Figures 3 and 4 for visual summaries.

Awareness of community needs and priorities. This belief-level factor demonstrated the highest out-degree among belief-level factors (eight) with moderate in-degree (three). It represents the extent to which communities, organisations, and funders recognise and understand local needs and priorities. Improved shared awareness could influence multiple downstream factors including 'Changes in available services', 'Diversity of service provision', and 'Advocacy effectiveness'.

Trust and willingness to collaborate from funders. This belief-level factor had low in-degree (one) but moderate out-degree (four), suggesting it is relatively independent of other system factors while influencing several important elements including 'Funding availability and criteria' and 'Supportive policy environment'. While funders are external to the CFP, targeted advocacy and demonstration of collaborative value may influence funder orientations over time.

Inter-organisational communication. This structural factor had moderate in-degree (two) and relatively high out-degree (five), influencing 'Partnership quality', 'High quality referral pathways', 'Understanding of available services', and 'Uncoordinated service duplication'. Improving communication between organisations represents a tractable intervention that could generate multiple beneficial effects.

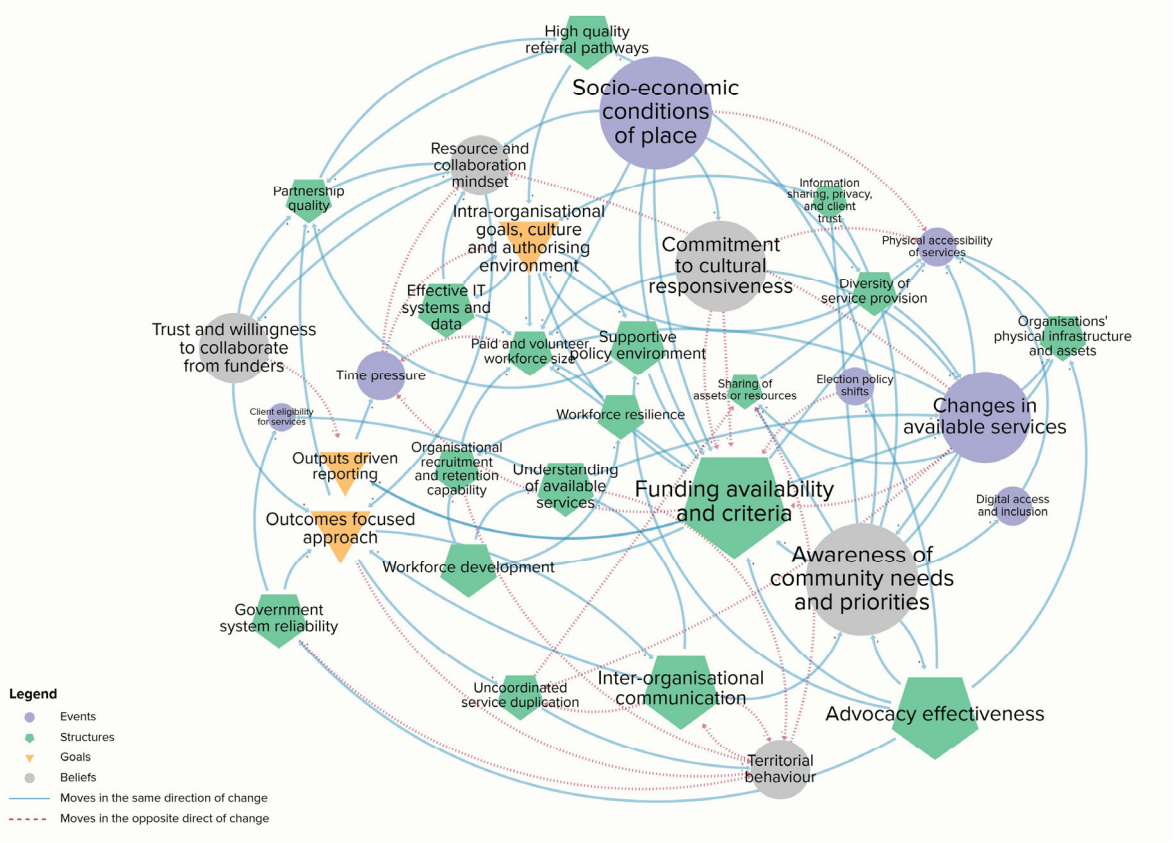



**Figure 3.** Participatory systems map with factors sized by out-degree and coloured by ASM level.

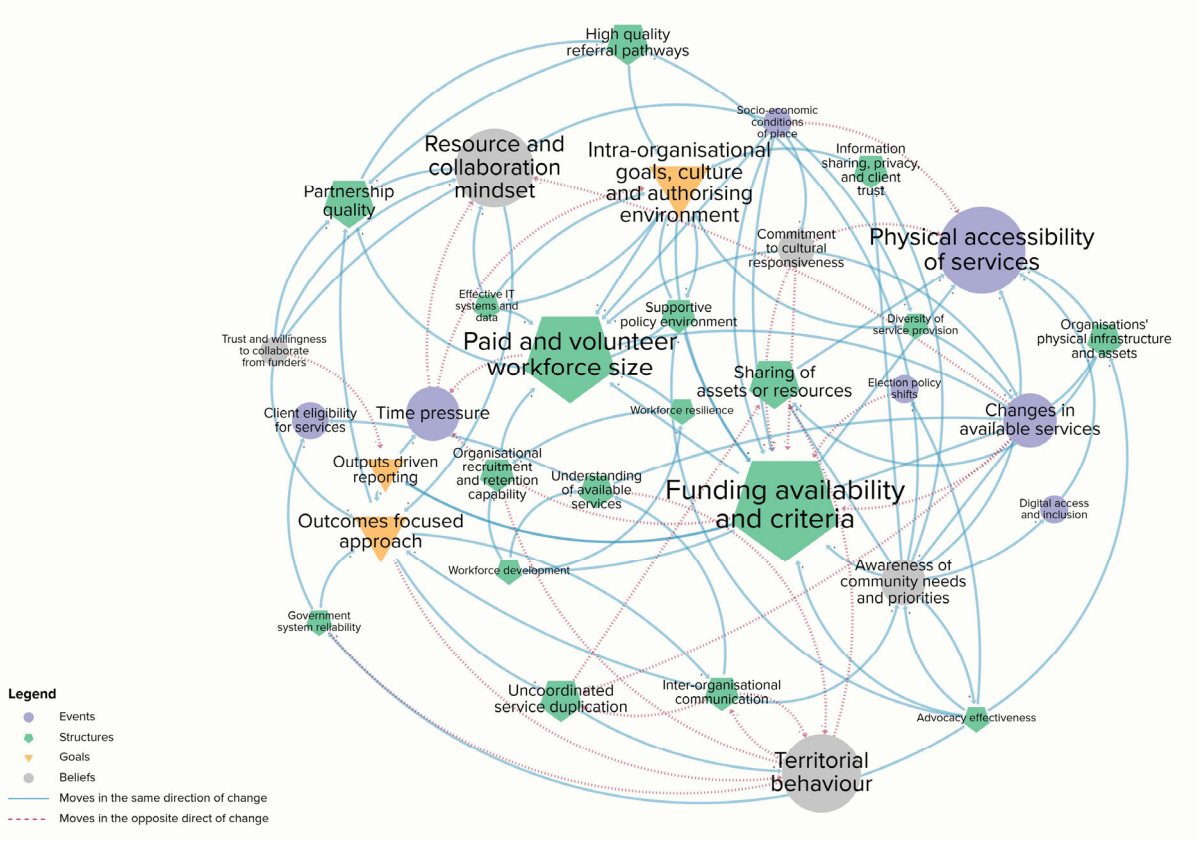



**Figure 4.** Participatory systems map with factors sized by in-degree and coloured by ASM level.

Outcomes-focused approach. This goal-level factor (five in-degree, four out-degree) represents an emphasis on achieving and demonstrating meaningful results for communities. It influences 'Partnership quality', 'Workforce development', and 'Workforce resilience', while being influenced by factors including 'Funding availability and criteria' and 'Intra-organisational goals'. Strengthening outcomes-focused practice could shift organisational attention from competitive service delivery toward collaborative impact.

Advocacy effectiveness. This structural factor had low in-degree (one) but high out-degree (six), influencing 'Funding availability and criteria', 'Supportive policy environment', 'Changes in available services', and 'Awareness of community needs and priorities'. Collective advocacy by the CFP could potentially influence external factors that shape the operating environment for service integration.

To examine the sensitivity of the analysis to metric selection, betweenness centrality was also calculated for all 33 factors (see Table A1 in the Appendix A for these results). The overall rank ordering showed moderate agreement with degree centrality (Spearman $\rho = 0.70$), and the two highest-ranking factors—'funding availability and criteria' and 'awareness of community needs and priorities'—were consistent across both metrics. However, notable divergence was also observed. 'Inter-organisational communication', which ranked outside the top ten by total degree, was the third highest-ranking factor by betweenness centrality, suggesting it occupies a mediating position between other factors despite fewer direct connections. Conversely, 'paid and volunteer workforce size' ranked highly on in-degree but lower on betweenness, reflecting its role as a downstream recipient of causal influence rather than a mediator within the broader network structure.

These patterns are broadly consistent with Crielaard et al.'s [22] finding that different network metrics foreground different aspects of systems structure. Importantly, some of the key factors identified as leverage points in this study via degree centrality and ASM depth, were consistent with those highlighted by betweenness centrality, lending additional confidence to the analysis while also reinforcing the value of interpreting network metrics alongside qualitative frameworks rather than relying on any single metric in isolation.

## 4. Discussion

This section interprets the findings in relation to existing literature, discusses their implications for place-based practice, considers the methodological contributions and affinities of the approach, and addresses the study's limitations.

### *4.1. Factors Influencing Place-Based Service Integration in Casey*

Two questions guided this study. The first—'what factors influence place-based service integration in the City of Casey?'—is addressed through the systems map co-produced in this study. The map identified 33 factors operating with 104 directional relationships (Figure 2; Table 1). These factors align with many of the conditions identified in the broader place-based literature as requirements for effective collaboration [44,45], while also surfacing dynamics—particularly the role of belief-level factors in mediating conditions—that are less visible in studies focused on discrete barriers to integration [15,16].

The second question—'what are the priority leverage points for action?'—is addressed through the integrated analysis combining network metrics with the ASM (Section 3.4). This analysis identified factors that are both structurally influential within the network and positioned at deeper levels of the system, where changes are more likely to produce sustained effects. However, this answer should not be seen as definitive—the leverage point analysis establishes candidates but does not establish the amenability or the feedback dynamics that might propagate [22,39]. Thus, the analysis is hypothesis generating—potentially suitable for use in planning processes such as for theory of change—but is not prescriptive. The

priority leverage points identified should be tested through iterative action and ongoing evaluation as the CFP's work progresses.

Several observations emerge from the analysis that have implications for how the CFP, and other place-based initiatives, might approach their work. First, the centrality of funding-related factors within the system is striking but not surprising. 'Funding availability and criteria' had the highest total degree of any factor, and 'Trust and willingness to collaborate from funders' emerged as a significant belief-level factor. This reflects the well-documented influence of funding arrangements on service integration [1,11]. However, the map reveals nuance beyond the simple observation that 'more funding helps'—it suggests that how funding is structured (including criteria, time horizons, and accountability requirements) and the underlying orientations of funders toward collaboration shape multiple downstream dynamics.

Research on Australian place-based approaches has identified that Treasury and Finance reporting requirements pose significant limitations for joined-up funding, while short-term funding cycles are particularly destructive because trust-building takes time and organisations often only reach full operational effectiveness midway through funding periods [1]. The presence of multiple funders can create additional burdens through differing confidentiality rules, delegation levels, and accountability frameworks.

Second, the prominence of belief-level factors in shaping system dynamics warrants attention. 'Territorial behaviour' and 'Resource and collaboration mindset' represent opposing orientations that fundamentally shape how organisations engage with one another. The map suggests these are not simply individual organisational characteristics but are substantially shaped by systemic conditions—particularly funding competition, policy settings, and organisational goals. This aligns with research on competitive dynamics in the not-for-profit sector, which has documented how funding arrangements can incentivise territorial behaviour even among organisations with compatible missions [1,11,15].

Notably, research has found that transitions to competitive tendering arrangements can have detrimental effects on collaborative culture, with leaders sometimes blocking partnerships working by defending territorial or organisational interests. This suggests that territorial behaviour should be understood not as an inherent organisational trait but as a rational response to systemic pressures that can be addressed through changes to funding structures and collaborative governance arrangements [1,11].

Third, the map highlights the importance of relationship and communication factors that operate somewhat independently of resource constraints. 'Inter-organisational communication' and 'Partnership quality' emerged as influential structural factors that are amenable to local action regardless of external funding environments. This suggests that the CFP can make meaningful progress on service integration through relational work, even while advocating for more supportive external conditions.

### *4.2. Implications for Place-Based Practice*

The findings support a multi-level approach to strengthening place-based service integration. At the belief level, efforts to build shared awareness of community needs and foster collaborative orientations among organisations may yield substantial downstream benefits. This could involve regular joint needs assessment processes, shared community engagement activities, and structured opportunities for cross-organisational learning. Such activities address multiple leverage points simultaneously while building the relational foundations for deeper integration.

At the structural level, investing in inter-organisational communication infrastructure appears valuable given its influence on multiple downstream factors. This might include shared information systems, regular communication forums, and protocols for coordinated

referral pathways. The map suggests that improved communication could reduce uncoordinated service duplication while enhancing partnership quality—addressing both efficiency and effectiveness concerns.

At the goal level, promoting outcomes-focused approaches rather than outputs-driven reporting could shift organisational attention toward collaborative impact. This represents a potentially challenging shift given that funding accountability requirements often emphasise outputs, but the map suggests that outcomes-orientation influences partnership quality and workforce factors in ways that may ultimately serve organisational interests as well as community outcomes.

Perhaps most importantly, the analysis highlights the value of collective advocacy targeting the external conditions that shape local service integration. The relatively high out-degree of 'Advocacy effectiveness' suggests that CFP efforts to influence funders, policymakers, and system architects could generate substantial effects across multiple factors. This advocacy might focus on funding arrangements that enable rather than impede collaboration, policy settings that support place-based approaches, and accountability frameworks that reward integrated service delivery.

### *4.3. Methodological Contributions and Considerations*

This study contributes a novel application of participatory systems mapping to the challenge of place-based service integration. The combination of network metrics and the ASM provides a blended analytical approach that addresses some limitations of using either framework alone. Network metrics identify structurally significant factors but do not distinguish between surface-level events and deeper systemic drivers. The ASM provides this depth dimension but does not quantify the relative influence of factors. Together, they enable identification of factors that are both quantitatively significant and qualitatively meaningful as potential intervention points.

To appreciate this methodological contribution, it is useful to consider the analytical approaches that place-based initiatives typically employ to understand their operating environment and identify priorities. Partnerships commonly rely on needs assessments, stakeholder consultations, strategic planning processes, and programme logic or theories of change to structure their collective work [1,6]. These processes are valuable for establishing shared directions, but tend to represent factors that influence collaboration as discrete items—barriers to be removed or enablers to be strengthened—rather than as a interconnected factors of a dynamic, place-based context. A needs assessment might identify fragmented communication and funding constraints as separate barriers; a theory of change might posit that improved communication leads to better coordination. What these approaches are less equipped to reveal is how funding structures shape organisational beliefs, which in turn reproduce the competitive dynamics that fragment communication in the first place.

The systems mapping approach used here made these relationships visible and analysable. In particular, it revealed that what practitioners often experience as fixed organisational culture—territorial behaviour, resistance to sharing—is better understood as a response to upstream systemic conditions, principally funding arrangements or contexts [1,11]. This insight, which emerged directly from the structure of the model and integrated leverage point analysis, would be difficult to surface through conventional planning approaches that treat each factor as independent of the others.

The participatory process itself generated value beyond the analytical outputs. Workshop participants reported that the mapping exercise helped them visualise interconnections that are often implicit in their work, and that the cross-organisational dialogue built understanding of different sectoral perspectives. This aligns with research on group

model building that emphasises process benefits alongside the value of the models produced [46,47].

The approach adopted also shares conceptual and methodological affinities with several adjacent fields that should be acknowledged. The CFP functions, in many respects, as a community coalition—an alliance of organisations collaborating in a specific context towards shared goals [48]. Community coalition research has increasingly emphasised that their structures and approaches vary based on local context, and that models which downplay this contextuality, such as acontextual applications of the collective impact approach, may not adequately account for the conditions that shape coalition effectiveness [48]. The systems maps produced in this work offer an empirical illustration of this insight. Specifically, the factors influencing service integration in Casey are configured in ways that reflect a multitude of contexts—local funding arrangements, organisational histories, and relational attitudes and dynamics that would differ in other areas. For example, the finding that coalition-like dynamics such as territorial behaviour and resource sharing are not fixed organisational traits but responsive to upstream structural conditions aligns with the emerging research emphasising the fit between collaborative structures and their environments [48].

Methodologically, the participatory systems mapping process does bear similarities to Net-Map, a participatory influence network mapping tool developed for multi-stakeholder governance processes [49]. Both approaches use facilitated group-based processes to surface implicit knowledge about causal or influence relationships, combine structural analysis with stakeholder perspectives, and seek to support strategic planning through shared visual representations. However, the approaches differ in key ways: Net-Map focuses on actor networks and the relationships between people and organisations, while the approach used here maps causal relationships between system factors with no distinct organisational affiliation. This distinction points to different analytical goals—Net-Map is designed to reveal who influences whom, while CLD-based systems mapping is designed to reveal what drives what. Maya-Jariego [50] offers a typology of network-based interventions that helps situate these different approaches, distinguishing between the selection of key players based on network position, segmentation into pre-existing groups, the analysis and development of inter-organisational networks such as community coalitions, and participatory uses of network visualisation to catalyse collective action. The present study draws on elements of the latter two categories, combining inter-organisational network analysis with participatory visualisation to support collective sense-making among coalition partners. The potential for cross-fertilisation between these traditions represents a productive direction for future methodological development in place-based research.

### *4.4. Limitations*

Several limitations should be noted. First, the systems map represents the perspectives of CFP member organisations and may not capture factors relevant to community service organisations not engaged with the CFP, and other stakeholders, including service users, funders, and policymakers. Expanding participation to include these perspectives could enrich the system representation.

Second, the map is necessarily a simplification of complex dynamics, and the process of consolidating four group maps into a single representation involved interpretive judgments by the research team. Two further sources of bias warrant explicit acknowledgement. As practitioners embedded in the Casey service system, participants brought deep contextual knowledge but also personal, professional, and organisational perspectives that may have rendered certain system dynamics—particularly those reflecting poorly on their own organisations—less visible in the collective map. The group model building process

mitigates this but does not eliminate this tendency, as facilitated group settings may also suppress dissenting views. Additionally, the researchers were engaged as facilitators and analysts by the City of Casey, which held a substantive role within the partnership. This relational context may have influenced what participants chose to raise in the workshop setting. These limitations are consistent with the broader challenges of participatory and practice-embedded research and reinforce the importance of the participant verification process undertaken in this study as a counterweight to these pressures.

Third, causal loop diagramming processes require participants to reason about directional causality, distinguish between positive and negative influence relationships, and consider feedback dynamics—ways of thinking that may be unfamiliar to practitioners whose expertise is operational rather than analytical. While the workshop design included scaffolding measures to support engagement (see Section 2.2), some degree of task misunderstanding is difficult to eliminate entirely in a single-session format. Participants may have conflated correlation with causation, overlooked indirect effects, or been influenced by recency and availability biases when identifying factors. The consolidation and member-checking processes provided opportunities to surface and correct such errors, but these are not exhaustive. Others adopting this approach should consider the cognitive demands of the mapping task in their study design, and how best to mitigate these risks with their approach to engagement.

Fourth, network metrics applied to causal loop diagrams have known limitations—connection counts do not capture loop dynamics or the relative strength of different relationships, and recent methodological critiques have argued that network metrics can lead to false inferences about leverage points because they cannot accommodate feedback loop structures or higher-order interactions between variables [22]. The deliberate selection of degree centrality over betweenness and closeness centralities, while based in the methodological considerations outlined in Section 2.5, means that factors occupying mediating positions within the structure may receive less analytical attention than their structural position warrants. Future research could explore other measures, such as eigenvector centrality—which Crielaard et al. [22] note has less restrictive assumptions and has been shown to correlate with causal influence in directed acyclic graphs. Other opportunities include the use of weighted network approaches, which may offer additional analytical depth when applied to participatory systems maps.

Fifth, the identification of leverage points does not automatically translate into effective intervention. Factors identified as influential may still prove difficult to change, and interventions may produce unintended consequences not captured in the map. The leverage point analysis should be understood as hypothesis-generating rather than definitively prescriptive [39]. Finally, the study represents a snapshot of system dynamics at a particular point in the CFP's development. As the partnership evolves and external conditions change, the relative importance of different factors may shift.

## 5. Conclusions

Place-based initiatives are often encouraged to collaborate, yet the systemic conditions shaping whether collaboration succeeds or fails remain poorly understood. This study demonstrates that participatory systems mapping can surface these dynamics in ways that support collective sense-making and strategic action. Through group model building with 21 representatives of the Casey Futures Partnership, a causal loop diagram containing 33 factors and 104 connections revealed that funding arrangements sit at the centre of the system—but crucially not simply as a resource constraint. Rather, funding structures shape organisational beliefs and orientations, influencing either territorial competition

or collaborative mindsets depending on how criteria, timeframes, and accountability requirements are configured.

The blended analytical approach—combining network metrics with the ASM—identified leverage points that are both systemically influential and amenable to local action: building shared awareness of community needs, fostering funder trust in collaboration, strengthening inter-organisational communication, and coordinating advocacy efforts. Critically, the analysis suggests that addressing surface-level structural barriers without attending to underlying beliefs may yield limited results; territorial behaviour and collaborative mindset are not fixed organisational traits but rational responses to systemic pressures that can be shifted through deliberate changes to funding and governance arrangements.

Beyond the specific findings for the City of Casey context, this study offers three contributions to the broader field of place-based systems change. First, it demonstrates that the drivers of place-based service integration operate across multiple system levels simultaneously. Surface-level structural barriers—such as fragmented communication or duplicated service delivery—are often symptomatic of deeper dynamics rooted in organisational beliefs and funding arrangements. This multi-level structure has implications for how place-based initiatives design interventions. In particular, strategies targeting only visible operational problems without attending to the belief-level conditions that reproduce them are unlikely to generate sustained change. This finding resonates with the emerging research on community coalitions, which argues that the fit between collaborative structures and their local context (or place) matter more than adherence to standardised models [49].

Second, the study shows that competitive and collaborative approaches within place-based partnerships are not intrinsic to an organisation, but rational responses to systemic conditions—particularly funding structures. This reframes common practitioner experiences about organisational culture as a fixed barrier to service integration and suggests that belief-level change may be achievable through deliberate restructuring of funding environments.

Third, the blended analytical approach, combining network metrics with the ASM, offers a replicable and accessible analytical framework for place-based collaborations seeking to identify leverage points for systems change. The comparison with betweenness centrality reported in Section 3.4 further supports the robustness of degree-based analyses when applied alongside qualitative frameworks, providing methodological guidance for future applications.

Practitioners seeking to apply this approach in other contexts should note the core methodological steps: a structured workshop with cross-organisational representation, small group causal mapping drawing on group model building, thematic consolidation, and participant review and verification. The approach can be adapted to different scales of place (e.g., neighbourhoods through to local government areas), timeframes, organisational representation mixes, and focus questions. The greatest time investments in replicating the approach are in the map consolidation, which requires consensus protocols commensurate with the number and diversity of produced maps, and participant validation to ensure accuracy. These are the primary means of quality assurance and require ongoing participant engagement.

While the specific configuration of factors and their interactions is context-dependent reflecting any particular place's histories, relational dynamics, and funding environment—several factors are likely to be common across places. In particular, the role of funding arrangements in shaping competitive or collaborative orientations reflects dynamics that can occur beyond the place-level: funding guidelines, delivery scope, and reporting requirements are typically set by state or national funders whose conditions apply uniformly across the places in which they invest [6]. The systemic pressure that funding exerts on organisa-

tional beliefs and behaviours—a central dynamic in the City of Casey—is therefore likely present wherever place-based collaborations exist within similar funding environments.

Other leverage points identified in this study, including shared awareness of community needs, inter-organisational communication, and funder trust, are also consistently identified as factors shaping service integration [13,15] and community coalition [46] literature. This study adds context-specific empirical evidence to these bodies of work, illustrating how such factors are configured within a particular place-based system. The consistency of these findings within the wider literature supports their potential transferability, while also reinforcing the case for comparative research across place-based contexts to examine how these dynamics vary.

The approach demonstrated here—participatory systems mapping analysed through a blended network and systems change framework—offers one such method, and its replication across diverse place-based contexts would provide the comparative evidence base needed to distinguish context-specific systemic configurations from the structural dynamics common to place-based collaboration more broadly. As place-based approaches continue to proliferate as responses to complex social problems, practitioners and policymakers need rigorous methods for understanding local system dynamics—not to produce definitive answers, but to generate actionable hypotheses and build the shared understanding necessary for collective action. Future research should track how systems evolve as interventions are implemented, compare dynamics across different place-based contexts, and include perspectives beyond service providers—particularly service users, funders, and policymakers whose actions shape the conditions within which local collaboration occurs.

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**Institutional Review Board Statement:** This study (Title: *Participatory Systems Mapping for the Casey Futures Partnership;* Reference Number: S00014) was reviewed by the Iris Ethics (EC00484) Human Research Ethics Committee and determined to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2025)* as relates to the exemption of need for ethical review.

**Informed Consent Statement:** Participants received information about the scope, purpose, and intended use of workshop outputs with their invitation to attend, and this information was reiterated verbally at the commencement of the session. Verbal informed consent was obtained from all participants prior to the workshop, consistent with the *National Statement on Ethical Conduct in Human Research*'s (NHMRC, 2023) guidance that consent strategies should be proportionate to a project's risks and ethical sensitivity, and that written consent documents are not the sole appropriate strategy for obtaining consent (paragraphs 3.1.24–3.1.25). Participants were informed that only collective outputs would be used, that no individual contributions would be identifiable, and that they could withdraw at any time during the session.

**Data Availability Statement:** The primary data generated by this study—the consolidated systems map including all factors, descriptions, Action Scales Model classifications, and network metrics—are presented in Table A1 of this article. The original workshop maps from which the consolidated map was derived are not publicly available as they were produced as collective outputs during a facilitated participatory process and were superseded by the validated consolidated map. No individual-level data were collected during this study.

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**Conflicts of Interest:** M.H. is a Director and J.L. is an employee of First Person Consulting, which was engaged by the City of Casey under a paid consultancy to facilitate the participatory systems mapping process described in this study. V.H. is an employee of the City of Casey. The consultancy funded the facilitation of the workshops but did not fund the analysis or writing of this manuscript. The City of Casey as commissioner of the workshops, had no role in the design of the study, the analysis or interpretation of data, the writing of the manuscript, or the decision to publish the results. The research was conducted independently, and the findings reflect the collective perspectives of workshop participants rather than the positions of any single organisation.

## Abbreviations

The following abbreviations are used in this manuscript:

| | |
|---|---|
| ASM | Action Scales Model |
| CFP | Casey Futures Partnership |
| CLD | Causal Loop Diagram |
| CSO | Community Service Organisation |
| LGA | Local Government Area |

## Appendix A

Table A1 contains the full list of factors identified through the study, along with a description, their type, alignment to the ASM, degree centrality, and betweenness centrality scores.

**Table A1.** Systems map factors, type, Action Scales Model categorisation, description, degree (total, in- and out-), and betweenness centrality scores. Table is organised by influential ASM category (beliefs, goals, structures, events) and then factor label.

| Label | Type | ASM Category | Description | Degree | Indegree | Outdegree | Betweenness |
|---|---|---|---|---|---|---|---|
| Awareness of community needs and priorities | Community profile | Beliefs | The extent to which communities, organisations, and funders recognise and understand local needs and priorities. | 11 | 3 | 8 | 0.2131 |
| Resource and collaboration mindset | Organisational culture, governance and values | Beliefs | The orientation of organisations toward sharing resources and working collectively. | 10 | 7 | 3 | 0.0926 |
| Territorial behaviour | Organisational culture, governance and values | Beliefs | When organisations act competitively to protect their own resources or influence. | 10 | 7 | 3 | 0.0850 |
| Trust and willingness to collaborate from funders | Organisational culture, governance and values | Beliefs | The degree to which funders trust organisations to achieve outcomes, and support collaborations. | 5 | 1 | 4 | 0.0126 |
| Commitment to cultural responsiveness | Community profile | Beliefs | The extent to which service providers are committed to recognising and responding to the cultural and linguistic diversity of the community they serve. | 5 | 1 | 4 | 0.0026 |
| Intra-organisational goals, culture and authorising environment | Relationships | Goals | The internal priorities, culture, and governance that shape how organisations operate and collaborate. | 10 | 6 | 4 | 0.1586 |
| Outcomes-focused approach | Organisational culture, governance and values | Goals | An emphasis on achieving and demonstrating meaningful results for communities. | 9 | 5 | 4 | 0.1372 |

**Table A1.** *Cont.*

| Label | Type | ASM Category | Description | Degree | Indegree | Outdegree | Betweenness |
|---|---|---|---|---|---|---|---|
| Outputs driven reporting | Organisational culture, governance and values | Goals | A prioritised focus on meeting activity targets and reporting requirements. | 5 | 3 | 2 | 0.0215 |
| Advocacy effectiveness | Policy environment and system setting | Structures | The extent to which advocacy efforts influence government and funding body decisions. | 7 | 1 | 6 | 0.0700 |
| Diversity of service provision | Service delivery and infrastructure | Structures | The variety of organisations, models, and approaches delivering services in the community. | 3 | 1 | 2 | 0.0056 |
| Effective IT systems and data | Service delivery and infrastructure | Structures | The quality and reliability of IT systems and data management that support service delivery. This includes ability | 4 | 1 | 3 | 0.0057 |
| Funding availability and criteria | Human and financial resources | Structures | The amount, availability, criteria, and stability of funding accessible to organisations for service delivery. | 18 | 10 | 8 | 0.2489 |
| Government system reliability | Policy environment and system setting | Structures | The consistency and dependability of government processes and systems. | 4 | 1 | 3 | 0.0082 |
| High quality referral pathways | Service delivery and infrastructure | Structures | The clarity and reliability of processes for referring clients between services. | 6 | 3 | 3 | 0.0289 |
| Information sharing, privacy, and client trust | Relationships | Structures | The systems and practices that balance safe information sharing with privacy and trust. | 3 | 2 | 1 | 0.0070 |
| Inter-organisational communication | Relationships | Structures | The quality and frequency of communication between organisations. | 7 | 2 | 5 | 0.1705 |
| Organisational recruitment and retention capability | Organisational culture, governance and values | Structures | The ability of organisations to attract, recruit, and retain skilled staff and volunteers. | 4 | 2 | 2 | 0.0216 |
| Organisations' physical infrastructure and assets | Service delivery and infrastructure | Structures | The facilities, equipment, and resources that support service delivery. | 4 | 2 | 2 | 0.0051 |
| Paid and volunteer workforce size | Human and financial resources | Structures | The number of paid staff and volunteers available to deliver services. | 11 | 9 | 2 | 0.0304 |
| Partnership quality | Relationships | Structures | The strength and effectiveness of collaborative relationships between organisations. | 6 | 4 | 2 | 0.0402 |
| Sharing of assets or resources | Organisational culture, governance and values | Structures | The practice of organisations making their resources available for others to use. | 5 | 4 | 1 | 0.0082 |
| Supportive policy environment | Policy environment and system setting | Structures | The degree to which policy settings enable service integration and collaboration. | 5 | 2 | 3 | 0.0110 |
| Uncoordinated service duplication | Service delivery and infrastructure | Structures | The extent to which similar services are provided by multiple organisations. | 5 | 3 | 2 | 0.0143 |
| Understanding of available services | Community profile | Structures | The level of awareness among the community about what services exist and how to access them. | 5 | 2 | 3 | 0.0618 |
| Workforce development | Human and financial resources | Structures | The availability of training and professional development for staff and volunteers. | 4 | 1 | 3 | 0.0776 |
| Workforce resilience | Human and financial resources | Structures | The capacity of the workforce to adapt, remain healthy, and sustain services under pressure. | 3 | 1 | 2 | 0.0024 |
| Changes in available services | Community profile | Events | Adjustments in the type, scope, or availability of services offered to the community. | 10 | 4 | 6 | 0.1663 |
| Client eligibility for services | Community profile | Events | The rules and criteria that determine who can access particular services. | 2 | 2 | 0 | 0.0000 |
| Digital access and inclusion | Service delivery and infrastructure | Events | The ability of communities to access and use digital services. | 2 | 1 | 1 | 0.0000 |
| Election policy shifts | Policy environment and system setting | Events | The impact of election cycles and political changes on service priorities and funding. | 2 | 1 | 1 | 0.0000 |

**Table A1.** *Cont.*

| Label | Type | ASM Category | Description | Degree | Indegree | Outdegree | Betweenness |
|---|---|---|---|---|---|---|---|
| Physical accessibility of services | Service delivery and infrastructure | Events | The ease with which people can physically reach and use services (e.g., location, transport). | 9 | 8 | 1 | 0.0000 |
| Socio-economic conditions of place | Community profile | Events | The conditions of the community, including housing, income, and employment. | 9 | 1 | 8 | 0.0000 |
| Time pressure | Human and financial resources | Events | The extent to which limited time and competing demands constrain organisations and staff. | 5 | 3 | 2 | 0.0776 |

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