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Beyond policy domains: Reframing age-friendly urban villages as aspirational–relational configurations of ageing-in-place

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ABSTRACT

This study aims to identify priorities for strengthening elderly-friendly villages within the framework of Integrated Elderly Services (LLT) through cross-domain synthesis and evidence-based prototype outputs. A design-based case study was conducted in the Purbayan cluster, Yogyakarta City, involving 40 participants from several villages. Data were collected through structured narrative responses on elderly activities, challenges, and priority improvement ideas, and analyzed using thematic coding and theme coverage calculations as indicators of signal strength. The findings show that existing programs, such as senior citizen schools, integrated health service posts, and social-religious activities, do not automatically ensure stable participation due to three cross-domain barriers: (1) accessibility and mobility safety, including route connectivity, lighting, rest areas, and surface safety; (2) readability of information and structured communication, including public schedules, reminder systems, and elderly-friendly materials; and (3) resource resilience and governance, including minimum funding, cadre development, and updated target databases. Based on these findings, the study developed a place-based intervention prototype by optimizing Bumen Park RTHP as an elderly center and community activity hub using a flexible local "celebration tent" concept. The study contributes a practical framework for elderly-friendly villages and offers a replicable model to strengthen LLT implementation across subdistricts.

1. Introduction

Demographic changes, with an increasingly aging population, coupled with intensified urbanization, place new demands on cities and urban villages: not just to "provide services," but to ensure that older adults can age in place safely, meaningfully, and independently through an environment that supports social participation, access to services, and daily mobility. The WHO's Age-Friendly Cities framework emphasizes that age-friendliness is cross-domain (outdoor spaces–buildings, transportation, housing, social participation, communication–information, community support – health services, civic participation–employment, and respect–social inclusion), so that the aging agenda cannot be reduced to a stand-alone sectoral program (WHO, 2007). At the global policy level, the WHO also emphasizes healthy aging as the result of the interaction between intrinsic capacity and environmental context (WHO, 2015), while international reports show that population aging is occurring rapidly and requires planned adjustments to the social-spatial system (WHO, 2020).

However, in practice, many age-friendly initiatives stop at "domain checklists" and reporting achievements, while the mechanisms that enable older adults to actually attend, understand information, and receive ongoing support remain weak, especially at the village/sub-district level, which is their daily living space. The literature emphasizes that age-friendliness needs to be understood as a relational configuration between people, space, and institutions, not merely a physical attribute; in other words, an "age-friendly environment" must be able to reduce social exclusion and expand opportunities for older adult involvement (Chung et al., 2021; van Hoof and Marston, 2021). The ecological perspective on aging also emphasizes that the quality of outcomes (health,

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independence, participation) is determined by person–environment fit: minor misalignments in access, spatial orientation, or social support can trigger withdrawal and reduce participation (Lawton and Nahemow, 1973).

Based on this gap, this article positions villages/subdistricts not as "program locations," but as relational systems where aging-in-place is negotiated daily through networks of activities, public spaces, information flows, and service support. By combining a cross-domain reading of aging activities, recurring enablers/barriers, and a cross-location synthesis, this study not only explains "what is happening" but also prioritizes implementable interventions—including evidence-based prototype outputs to tie programs, information, and service support into a single, easily recognizable and accessible node. This orientation is in line with the Decade of Healthy Aging agenda, which emphasizes systemic change at the community level (WHO, 2020) and design principles that place inclusion as the standard (Steinfeld and Maisel, 2012), while also affirming that the quality of public space (Gehl, 2010), social infrastructure (Klinenberg, 2018), and city legibility (Lynch, 1960) are part of the main mechanisms that determine the success of age-friendliness at the village level.

In this article, the term "aspirational-relational configuration" is used to explain that the elderly-friendly village agenda is not only based on "program aspirations" (aspirational)—for example, targets for increasing participation and service accessibility—but also on the operational relationship between programs, space, information, and governance that makes these aspirations achievable in daily practice. Operationally, this configuration is mapped to three implementation mechanisms that can be traced from the data: (i) participation becomes possible when the prerequisites of accessibility and mobility safety are met; (ii) reachable when activity information is readable, consistent, and disseminated through structured communication mechanisms; and (iii) sustainable when resource support and governance stabilize program implementation beyond dependence on specific individuals. These three mechanisms form a synthesis framework for reading the patterns of enablers/barriers, and at the same time serve as the basis for translating the findings into the output of a place-based intervention prototype.

2. Methods

2.1. Research design

This study adopts a design-based case study approach. The case study method is used to examine how elderly service activities operate in real community settings. At the same time, principles of design-based research are applied to develop a practical intervention prototype that can inform similar village-level initiatives. This approach allows the study to move beyond description and focus on identifying concrete needs, barriers to implementation, and possible design solutions grounded in empirical evidence.

Prototype development follows the Design Thinking framework, which helps connect user needs with practical service implementation. The process consists of five stages—empathize, define, ideate, prototype, and test (Brown, 2008; 2009). In this study, these stages were translated into four practical steps: mapping existing activities and needs, identifying cross-domain barriers and enabling factors, synthesizing priority interventions, and developing a design prototype as the main research output.

Because the prototype represents a place-based intervention, the design is embedded in the specific spatial setting, actor network, and service flow of the study location rather than presented as a generic program model (McGowan et al., 2021). The prototype is therefore designed as a flexible intervention that can be adapted to different village contexts. In line with design-based research practice, it is intended to be tested and improved through future implementation cycles (Hoadley and Campos, 2022). It should be emphasized that the present article focuses on the design phase of the research. The objective is to translate empirical findings into a feasible intervention prototype grounded in community needs and spatial context. The implementation and testing of the prototype are planned as the next stage of the research, which will examine its effectiveness in supporting elderly participation, information access, and service coordination.

2.2. Research location and context

The research was conducted within the framework of the Integrated Elderly Services Program (LLT) in the city of Yogyakarta, as a cross-sectoral commitment to improve the quality of life of the elderly while supporting the vision of an Age-Friendly City 2030. Conceptually, the LLT framework is in line with the WHO agenda on age-friendly cities, which emphasizes the optimization of health, participation, and safety through eight environmental domains (WHO, 2007), as well as the Healthy Aging/Decade of Healthy Aging agenda, which encourages community-based systemic change (WHO, 2015; 2020). In terms of services, the health-social integration orientation refers to the ICOPE approach, which emphasizes person-centered assessment and service pathways in primary/community services (WHO, 2019).

In its implementation, LLT was launched in 2022 through a phased pilot scheme: Wirogunan Village as the first pilot, then expanded to Purbayan, Baciro, and Gedongkiwo Villages as the second pilot, and subsequently added Semaki and Kotabaru Villages. The LLT program aims to help older adults access cross-sectoral services (health, social, education/training, communication-information,

social participation, housing, and social protection), which in practice are greatly influenced by local governance capacity and information access design (Torku et al., 2021; Xiang et al., 2021). In terms of regional policy, the implementation of elderly welfare is regulated through city government regulations, which serve as the operational reference for program implementation, and the strengthening of cross-stakeholder collaboration is also reflected in planning and coordination documentation at the city/kelurahan level.

The main unit of analysis in this study is the Purbayan cluster, which includes Basen, Purbayan, Alun-Alun, and Gedongan villages. The primary empirical analysis presented in the Results section is based on narrative responses from participants in this cluster (N = 40). To increase the transferability of the findings, additional observations were collected from two other locations: Baciro (n = 15) and Gedongkiwo (n = 8). These additional data were used to identify recurring themes across locations and to distinguish between common patterns and location-specific issues. Therefore, the cross-location comparison is interpreted as analytic generalization based on pattern consistency, rather than as a statistical comparison between samples (Yin, 2018).

2.3. Participants/informants

Participants were recruited using purposive sampling to capture the perspectives of various actors involved in or affected by activities for the elderly at the village/sub-district level. The inclusion criteria were: (1) elderly residents and/or family caregivers, (2) cadres/volunteers (e.g., posyandu), and (3) community/sub-district actors who play a role in organizing activities. The total number of participants in the Purbayan cluster was N = 40. Participant characteristics (gender, age, education, occupation, income, and location distribution) are presented in Table 1.

2.4. Data sources and instruments

The data sources consist of participants' narrative responses related to: (a) ongoing activities, (b) obstacles encountered, and (c) priority ideas for improvement. The data collection instrument was designed in the form of structured questions that guided participants to describe conditions, challenges, and suggestions for improvement (*condition–challenge–priority*). In addition, supporting documents (if available) were used to understand the context of the program and service infrastructure.

2.5. Data collection procedures

Data collection was conducted between March and August 2025, with field facilitators assisting participants in filling out narrative responses and clarifying answers when necessary. All responses were then compiled into an integrated database for thematic analysis and design synthesis.

2.6. Data analysis procedures

Data were analyzed using thematic analysis followed by design synthesis. First, all narrative responses were cleaned and standardized to ensure consistent terminology. Second, open coding was conducted to identify key issues, needs, and opportunities for improvement. These codes were then grouped into broader cross-domain themes following the thematic analysis approach (Braun and Clarke, 2006). Third, the themes were compared across participant groups—older adults, caregivers, and community actors—to identify differences in perspectives and service bottlenecks. Fourth, cross-location triangulation was conducted by comparing patterns from the main dataset (Purbayan) with supporting observations from Baciro and Gedongkiwo. Finally, the themes were translated into practical design requirements and priority interventions, which informed the development of the prototype.

To maintain the credibility and traceability of the results, the study emphasizes audit trails (analytical decision trails), cross-actor theme consistency checks, and the use of cross-location triangulation as a strategy to strengthen findings, in line with the principle of trustworthiness in qualitative research (Lincoln and Guba, 1985). This approach also ensures that the design prototype output is supported by user needs and explicit implementation rationales, rather than merely researcher preferences (Hoadley and Campos, 2022).

2.7. Trustworthiness

The validity of findings is maintained through several strategies: (1) compiling a standardized codebook, (2) checking coding consistency through discussions among researchers on ambiguous themes, (3) the use of representative quotes for each main theme in the results, and (4) the tracing of deviant cases to avoid overgeneralization. This process ensures that the synthesis of themes and intervention priorities is truly derived from the data.

2.8. Research ethics and participant consent

This research was conducted in accordance with the principles of social research ethics, including voluntary participation, respect for participant autonomy, and protection of data confidentiality. Prior to data collection, each participant received an explanation of the research objectives, the type of information collected, and the use of data for scientific purposes and service improvement. Participant consent was obtained verbally/in writing according to the field context. Participant identities were anonymized throughout the analysis and

reporting process; each quote was coded (e.g., R01, R02) to prevent the identification of specific individuals or micro-locations. Data were stored with access restricted to the research team and used only for purposes consistent with participant consent. Data in the form of participants' narrative responses contain sensitive information and micro-community context, so they cannot be shared openly. Anonymized data (codes, themes, and *coverage* summaries) can be provided by the corresponding author upon reasonable request for academic purposes, taking into account ethical approval and protection of participant confidentiality.

Table 1: Participant characteristics (Purbayan urban-village cluster; N = 40)

Characteristic	Category	Value
Study sites	Urban villages	Basen (n = 11), Purbayan (n = 11), Alun-Alun (n = 9), Gedongan (n = 9)
Gender	Female	25 (62.5%)
	Male	15 (37.5%)
Age (years)	Median [IQR]; min–max	63.5 [59.5–67.2]; 20–76
Education	≤ SMP	12 (30.0%)
	SMA/SMK	13 (32.5%)
	Diploma/S1	11 (27.5%)
	≥ S2	2 (5.0%)
Occupation	Not working/housewife/retired	20 (50.0%)
	Self-employed/informal business	10 (25.0%)
	Employee/worker	3 (7.5%)
	Community/organization role	3 (7.5%)
Monthly income	< Rp1.000.000	6 (15.0%)
	Rp1.000.000–Rp1.500.000	5 (12.5%)
	> Rp1.500.000	17 (42.5%)

3. Results

3.1. Respondent profiles and their implications for interpreting findings

This study involved 40 participants from four urban villages in the Purbayan cluster (Basen, Purbayan, Alun-Alun, and Gedongan). Female participants constituted the majority of respondents (62.5%). These demographic characteristics provide an important context for interpreting the findings. Participation in elderly programs is closely related to demographic structure, socioeconomic conditions, and local environmental contexts that influence accessibility, social interaction, and service access. Therefore, the patterns of needs and barriers discussed in the subsequent sections should be understood in relation to the participant profile and location distribution presented in Table 1.

3.2. Ongoing activities, obstacles, and areas for improvement

Informants' narrative responses indicate that the portfolio of elderly activities in the Purbayan cluster mainly focuses on (i) educational activities (elderly schools) and (ii) community health services (elderly health posts), which are then reinforced by religious/community-based activities and cultural activities (in a small number of responses). Explicitly, senior citizen schools and senior citizen health posts were each mentioned by 7 of the 40 informants and appeared in all 4 villages, while religious/cultural activities appeared in 3 of the 4 villages. A summary of the evidence on "activities–constraints–priorities for improvement" is presented in Table 2.

School for the elderly: In responses mentioning senior citizen schools, the most prominent obstacles were irregular participation (schedule conflicts and forgetting to attend) and issues of material accessibility (pace of delivery and readability). In addition, some responses indicate a gap in program availability at the village level (e.g., statements such as "there are no schools for the elderly"), which implies a need for program distribution across locations.

Senior citizen health monitoring program: The elderly health posts are reportedly running, but several informants emphasized that the funding burden—particularly for PMT—still relies on community/cadre contributions, and elderly participation is not yet optimal (there is a discrepancy between the number of registered elderly and those who attend). Proposed improvements tend to be specific and operational: standardization of PMT (nutritionist/catering menu), financial support, addition of simple infrastructure, and expansion of the types and frequency of examinations.

Religion/arts: Religion-based activities emerged as ongoing social practices, but some responses highlighted issues of stability in implementation (relocation), limitations in technology/communication, and the need to strengthen management (cadre development). In the cultural sphere, one response pointed to the vacuum left by ketoprak after the pandemic and the weakness of digital communication as obstacles to sustainability.

3.3. Enablers/barriers to aging activities

Building on the findings reported above, the analysis synthesized the identified obstacles into cross-domain clusters of enablers and barriers. This synthesis positions barriers not as single issues, but as a series of prerequisites that determine whether

older adults can be present (accessibility), can understand/remember (information-communication), and can continue to be served (governance and resources). Table 3 summarizes the themes, representative quotes across villages, and coverage (based on explicit mention by informants) to show the weight and distribution of barriers/enablers.

Table 2: Elderly activities, constraints, priorities for improvement, and evidence (Purbayan cluster; N=40)

Activity domain	Ongoing activities	Reported key constraints	Improvement needs	Evidence weight	Representative quotes
Elderly school (Sekolah lansia)	Educational sessions/classes for older adults implemented in several neighborhoods.	Schedule clashes, forgetfulness, low readability of materials, and sustainability concerns linked to community dues-based funding.	Strengthen reminder systems, improve readability using larger fonts and slower delivery pace, and expand program coverage.	7/40 informants; 4/4 neighborhoods	"Sometimes the elderly school schedule clashes with personal commitments."
Older adults' community health post (Posyandu lansia)	Community-based health services, supplementary food provision, and routine health check-ups.	PMT funding depends heavily on community contributions; participation gaps remain; additional facilities and broader examinations are needed.	Standardize PMT, strengthen financial support, improve outreach participation, and add simple facilities and more frequent examinations.	7/40 informants; 4/4 neighborhoods	"There are 50 older adults in total, but only about 35–40 usually come."
Religious and cultural arts activities	Religious study circles and cultural arts activities such as ketoprak.	Weak digital communication, unstable venues, declining participation, and post-pandemic inactivity.	Strengthen communication channels, regenerate cadres, improve venue organization, and support recovery programs.	4/40 informants; 3/4 neighborhoods	"There is no digital communication such as WhatsApp."

Table 3: Enablers and barriers shaping older-adult participation: Cross-domain synthesis and priority responses (N=40)

Cluster	Barrier/enabler to report	Data evidence	Coverage	Priority response
Infrastructure and accessibility	Insufficient facilities and comfort, including health equipment, chairs, projectors, and storage.	Respondents requested projectors, blood pressure monitors, scales, seating, and storage cabinets.	~12/40 responses (30.0%); 4/4 neighborhoods	Provide a minimum facility package supported by inventory and maintenance procedures.
Infrastructure and accessibility	Safety and comfort risks in the physical setting.	Respondents mentioned slippery surfaces and the need for handrails in public facilities.	~2/40 responses (5.0%); 2/4 neighborhoods	Introduce anti-slip surfaces, levelling improvements, handrails, and safer toilet access.
Information and communication	Reminder systems and schedule certainty are not yet stable.	Attendance is affected by forgotten schedules and schedule clashes.	~2/40 responses (5.0%); 1/4 neighborhoods	Implement fixed calendars, visual schedules, and structured reminder systems.
Information and communication	Low readability and appropriateness of learning materials.	Participants reported small text, fast delivery pace, and language limitations.	~4/40 responses (10.0%); 3/4 neighborhoods	Use age-friendly materials with larger fonts, visual aids, and simplified language.
Resource and governance	Fragile operational funding and dependency on contributions.	PMT and activity operations rely heavily on community and cadre contributions.	~9/40 responses (22.5%); 4/4 neighborhoods	Develop a minimum annual operational financing scheme supported by village allocation.
Resource and governance	Limited cadre regeneration and mobilizing actors.	Dependence on a small number of active individuals weakens program sustainability.	~9/40 responses (22.5%); 4/4 neighborhoods	Formalize youth involvement and provide role-based training and clearer task allocation.

Coverage indicates the number of respondents who explicitly mentioned the issue in the survey (challenges/priority ideas). The figures are used to indicate the strength of the theme signal, not a population estimate

In the infrastructure-accessibility cluster, the strongest signal is not simply a "lack of space," but rather the need for a minimum package of infrastructure that is repeated across villages—for example, health measurement tools, chairs/visual aids, and storage facilities—which appeared in around 12/40 responses (30.0%) and occurred in 4/4 villages. This finding is important because it shows that the functionality of activities (health posts/senior citizen schools) depends on very basic operational prerequisites, so that the most efficient intervention is not to add new programs, but to close the "infrastructure gap" so that existing programs can run consistently. Meanwhile, safety issues (slippery surfaces, need for handrails/safe toilets) had a smaller coverage (±2/40; 5.0%), but were high-risk in nature and therefore warranted positioning as *high–impact, low–cost interventions* (e.g., anti-slip, leveling, handrails) that reinforce a sense of safety for attendance.

In the information-communication cluster, findings indicate that the main problem is not simply

the absence of channels, but rather the weakness of stable and easily readable information mechanisms. Patterns of "missed attendance" due to conflicting schedules/forgetting to attend (±2/40; 5.0%) and issues with the readability of materials (fast tempo, small print, language barriers; ±4/40; 10.0%) show that effective communication needs to be designed as a layered system: a fixed activity calendar, structured reminders, and facilitation materials that are truly senior-friendly. Even when digital channels were low (±1–2/40), the implications remained strategic because institutionalized channels made information dependent on personal relationships, making it difficult to expand the recruitment of new participants and increase service coverage.

In the resource-management cluster, the two most prominent systemic signals are fragile operational funding (±9/40; 22.5%) and weak regeneration/dependence on individuals (±9/40; 22.5%), both of which appear in 4/4 villages. This indicates that the sustainability of core programs (posyandu, elderly schools) is at risk of declining when community contributions weaken or administrators change. Therefore, the most "targeted" improvement priorities are formalizing role sharing, minimum financing schemes, and strengthening the capacity of cross-generational actors. On the other hand, the issue of database accuracy only appeared in ±1/40 (2.5%), but it has a structural impact because it determines the accuracy of the target and the effectiveness of service coverage. In summary, Table 3 confirms three locking mechanisms: accessibility determines the ability to attend, information determines awareness and recall, and governance determines sustainability, which form the direct basis for the output logic of the place-based prototype in Results 3.4. For example, a small annual operational allocation at the village level (e.g., Rp10–15 million per year) could help stabilize basic activities such as PMT provision, simple equipment maintenance, and the printing of information materials. Such modest funding can significantly reduce dependence on informal community contributions.

3.4. Preliminary observations from additional locations and prototype implications

This section presents preliminary observations from two additional locations (Baciro and Gedongkiwo) that were reviewed after the main analysis of the Purbayan cluster. These observations are not intended as a full cross-village comparison, because the number of participants in the additional sites is limited. Instead, they serve as contextual checks to see whether several issues identified in the main dataset also appear in other locations. Overall, the observations suggest that several concerns reported in the Purbayan cluster—particularly those related to accessibility, information communication, and operational resources—also appear in these additional locations. However, because the data from Baciro and Gedongkiwo are limited, these findings should be interpreted as indicative patterns rather than confirmed cross-location trends.

In the accessibility cluster, the synthesis results show that elderly participation is greatly influenced by the quality of the physical environment: the connectivity of pedestrian paths, rest areas, lighting, and spatial orientation. In the information/communication cluster, the recurring obstacle is not the absence of channels, but the lack of easily accessible visual information and structured information dissemination mechanisms, which results in information delays, missed appointments, and difficulties in recruiting new participants. In the resources/governance cluster, the findings show the dependence of activities on certain actors and the need to strengthen financing schemes and role sharing, so that activities such as posyandu and senior citizen schools are not vulnerable to changes in management or funding constraints.

Based on this cross-domain synthesis, this study formulated a prototype for a place-based intervention in the form of optimizing the Bumen Park green space as an elderly center and community activity hub. This prototype positions the park as "social infrastructure" that integrates activity needs (education, health services, and social activities) with the prerequisites of accessibility, spatial legibility, and flexibility of use, so that it can accommodate the varying needs of users across different ages and levels of physical ability.

As a design output, the prototype adopts the local concept of a "celebration tent" to emphasize the flexible, inclusive, and adaptable nature of the space for different activities, while reducing operational costs through a configuration that can be opened and closed as needed. Thus, the prototype is not positioned as a "new building" per se, but as an integration mechanism that links activities of daily living, information dissemination, and service support in a single, easily recognizable and accessible space. The prototype visualization and key design elements are presented in Fig. 1.

Its key attributes—flexibility, ease of installation and dismantling, and the ability to adapt to varying conditions—constitute the core design principles translated into this architectural proposal. The prototype presented here represents a design proposal derived from empirical findings rather than a fully implemented intervention. Its purpose is to demonstrate how the identified barriers—accessibility, information communication, and governance resources—can be translated into a spatial and organizational design solution. Future research will focus on pilot implementation and evaluation of this prototype to assess its practical effectiveness in real community settings.

Overall, this cross-location synthesis resulted in three action priorities that can be implemented in parallel to maximize impact. First, improving mobility and safety (connecting pedestrian paths, rest areas, lighting, and clear orientation markers) should be treated as a prerequisite for program participation, not merely as a complement to

environmental facilities. Second, structured information and communication (easily visible public information points, simple schedule markers, and consistent information dissemination routines) are important to reduce absenteeism and expand the involvement of older adults beyond those who are already active participants. Third, the stabilization of governance and resources—including clarity in the division of roles among community actors, support for basic operational funding, and connectivity with service support—needs to be formalized so that core activities such as health posts and elderly schools do not depend on specific individuals and remain sustainable. These three priorities form an integrative pathway from needs identification to intervention readiness, while positioning the *elderly center* prototype as a practical focal point for coordinating programs, information, and service support across the Purbayan cluster. These additional observations should therefore be interpreted with caution. They are presented only to provide contextual insight and to indicate possible directions for broader comparative research. Future studies with larger samples across multiple villages will be necessary to examine whether these patterns consistently appear across different urban contexts.

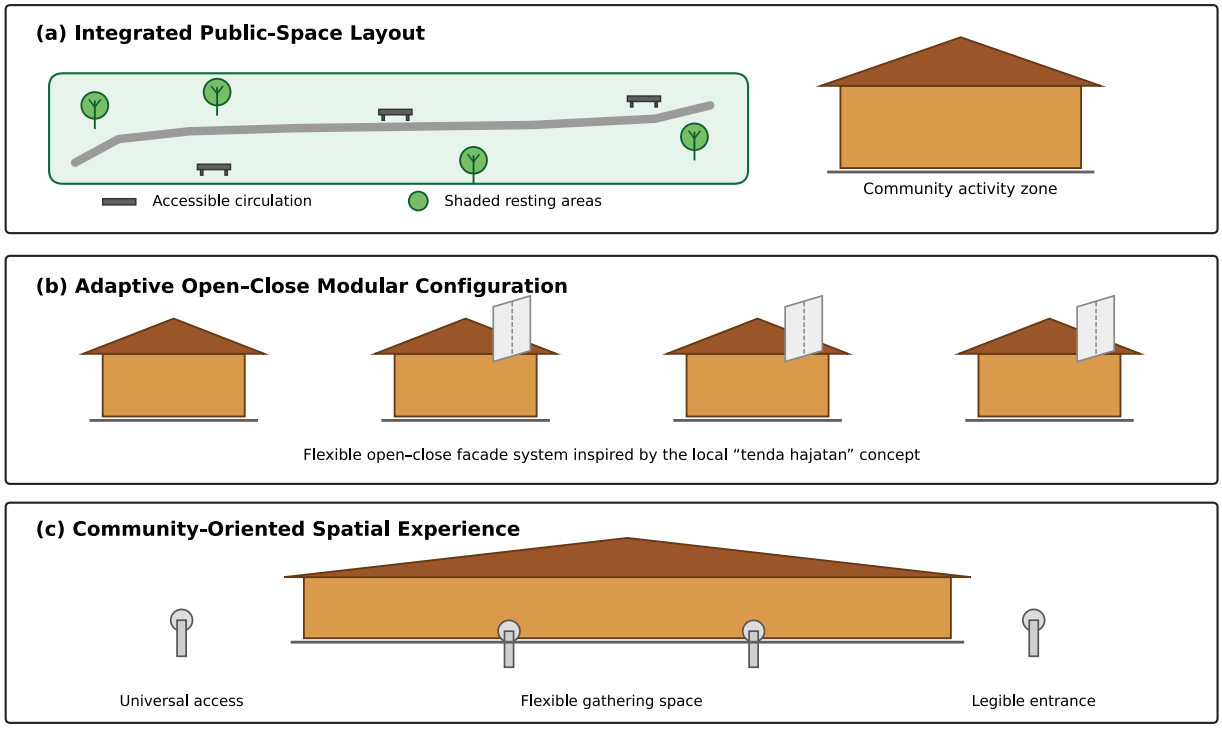

Fig. 1: Proposed elderly-center prototype for Bumen Park showing (a) site integration, (b) adaptive open–close facade system, and (c) community-oriented spatial use

4. Discussion

The findings of this study provide a design-oriented interpretation of how elderly-friendly village initiatives can be strengthened in the Purbayan cluster. Rather than evaluating an implemented intervention, this research focuses on identifying cross-domain barriers and translating these findings into a prototype design that can guide future implementation. The emerging pattern is consistent with the framework of age-friendly cities/communities: social participation is only stable when the domains of "space-buildings," "transport/mobility," "communication-information," and "service support" function as a single system (WHO, 2007; van Hoof and Marston, 2021). In other words, activities such as posyandu and senior schools function as "program engines," but their performance is determined by often invisible prerequisites: accessibility, information readability, and governance resilience. This systemic reading is also in line with conceptual reviews that emphasize that AFCC (age-friendly cities and communities) need to be understood as an ecology of practices—not a list of stand-alone interventions (Torku et al., 2021; Hong et al., 2023). These findings become even more significant because they move beyond merely identifying implementation barriers and instead provide evidence-based prototype outputs as tangible design responses linked to the proposed elderly-center framework. The relationship between the identified implementation barriers and the proposed prototype design is summarized in Table 4, which illustrates how empirical findings were translated into concrete spatial and organizational design features.

Mechanistically, the clarity of the relationship between barriers and elderly participation can be explained through the logic of *person–environment fit*: when environmental demands exceed functional capacity (mobility, sensory, stamina, orientation), participation will decline even if programs are available (Lawton and Nahemow, 1973). In the domain of accessibility, recent evidence shows that

the quality of the micro-environment (walkways, connectivity, rest points, safety, and comfort) is associated with walking intensity and exposure to outdoor spaces among older adults, which in turn influences their opportunities to participate in community activities. In the information domain, recurring barriers in the field are typically not the "absence of channels," but rather the low readability and consistency of dissemination, which intersects with issues of health literacy and digital literacy among older adults (Grover et al., 2023; Kyaw et al., 2024). Meanwhile, in the governance domain, dependence on certain actors and fragile financing are classic mechanisms that make community programs vulnerable to changes in management and priorities, so that system strengthening needs to be placed on *organizational routines* and service support networks (WHO, 2015; 2019). Therefore, your findings "make sense" not only descriptively, but because they can be explained as a series of mutually reinforcing mechanisms.

Table 4: Relationship between the three implementation "locks" identified in the empirical analysis and the corresponding design features of the proposed elderly center prototype

Implementation lock	Prototype design features	Key empirical findings	Expected functional outcome
Accessibility and mobility safety	Accessible public space, improved pedestrian connectivity, shaded resting points, and safe surfaces.	Older adults face barriers related to physical access, limited activity space, slippery surfaces, and lack of supportive infrastructure.	Improved physical access and increased participation in community programs.
Information readability and communication	Public information points, visible schedule boards, age-friendly learning materials, and reminder systems.	Attendance problems occur because of schedule conflicts, forgotten activities, and weak communication channels.	Reduced missed attendance and more consistent participation.
Resource resilience and governance	Flexible multi-use activity space and support for village-level operational funding and role allocation.	Activities depend heavily on informal contributions and a small number of active cadres.	Greater program sustainability and reduced dependence on individual volunteers.

It is important to note that the cross-location observations in this study are exploratory. The primary dataset comes from the Purbayan cluster, while the additional observations from Baciro and Gedongkiwo are limited in size. Therefore, the patterns discussed here should be interpreted as preliminary indications rather than definitive cross-location comparisons. Compared to the literature, the three priority clusters (accessibility–information–governance) are consistent with the argument that age-friendly agendas are most effective when they combine changes to the physical environment, social capacity, and service support as a single package of policies and practices (WHO, 2007; van Hoof and Marston, 2021). A number of reviews also confirm that successful AFCC interventions tend to link social activities with "enablers" that make access possible: wayfinding, a sense of security, thermal comfort, and forms of communication that suit the needs of older adults (Hong et al., 2023; Chung et al., 2021). Even in community-referral-based service models such as social prescribing, the quality of implementation and success in "binding" older adults to community assets depends on the availability of resources, accessibility, and consistent mentoring support—not on the program alone (Percival et al., 2022). Thus, your findings do not deviate from the literature, but rather clarify the "breaking point" of implementation at the village level: the program is running, but the support system is not yet sufficiently consolidated, so the benefits are uneven and fragile.

The novel contribution in the context of LLT/EFD lies in how this research converts empirical findings into place-based and testable *policy-design responses*. The prototype for optimizing the Bumen Park RTHP is positioned not as a "new building," but as *social infrastructure*—a hub that integrates activities, information, and service support in a single, easily recognizable and accessible space (Klinenberg, 2018). What makes it academically relevant is the design rationale that is not merely aesthetic, but stems from the logic of adaptability and inclusivity, in line with the principles of universal design (Steinfeld and Maisel, 2012) and design practices that emphasize user feedback-based iteration (Brown, 2009). Linking the inspiration of the "celebration tent" as a local social typology also provides epistemic added value: it elevates everyday cultural forms as design tools for producing flexible, open, and communal spaces, which, in many studies of age-friendly cities, are a prerequisite for lasting social participation (Gehl, 2010). In this way, your article does not stop at "diagnosing needs," but offers a transferable *integration model* that can be adapted to other contexts.

The most operational policy implication is the need to strengthen governance mechanisms that support these activities. In practice, this may include the establishment of a minimum operational funding scheme at the village level, for example, a small annual allocation (approximately Rp10–15 million per village) drawn from the village budget or local social programs. Such funding can cover essential operational needs such as supplementary food provision (PMT), printing of learning materials, minor equipment maintenance, and communication costs for community cadres. In addition to financial support, clearer role distribution among actors—such as cadres, neighborhood leaders (RT/RW), and youth organizations—can help stabilize program implementation. By formalizing these

responsibilities and providing simple role-based training, elderly programs such as posyandu and elderly schools can operate more consistently and reduce dependency on individual volunteers.

5. Conclusion

This study concludes that strengthening elderly-friendly villages within the framework of Integrated Elderly Services (LLT) should not rely solely on adding activities, but rather requires the establishment of cross-domain prerequisites that determine whether the elderly are able to attend, know, and remember, and remain connected to services. The synthesis of findings reveals three consistent "locks": (i) accessibility and safety of mobility, (ii) readability of information and communication of activities, and (iii) resource resilience and governance (minimum funding, division of roles, and accuracy of the target database). These three enablers explain the variation in program participation and sustainability between villages/subdistricts, while also providing a framework for interpreting residents' needs as systemic issues rather than a list of separate complaints. With this framework, this article does not stop at program description but offers an implementation logic that can be traced back to the data and used for intervention planning.

As its main outcome, this research formulates a place-based intervention prototype in the form of optimizing the Bumen Park RTHP as an *elderly center* and community activity hub that functions as social infrastructure to integrate activities, public information, and service support. The prototype is designed with the local rationale of a "celebration tent" to ensure flexibility, inclusivity, and adaptability of the space to program variations, while reducing operational costs through a space configuration that can be opened or closed as needed. In practical terms, the findings point to a parallel *blueprint* of priorities: improving access to and safety of public spaces, establishing a stable and legible communication-information system, and formalizing minimum governance and funding so that the program is not vulnerable to management changes. Going forward, further research needs to test prototypes through limited implementation (*pilot*) and evaluation based on LLT indicators (participation, information accessibility, user satisfaction, and governance sustainability), so that the integration of elderly services can move from planning to measurable impact. This study represents the design stage of a broader research agenda on strengthening elderly-friendly villages. The prototype proposed in this article should therefore be understood as a conceptual and spatial intervention model derived from empirical findings. Future research will focus on pilot implementation and systematic evaluation of the prototype, including its impact on elderly participation, accessibility of information, and sustainability of community-based services.

List of abbreviations

AFCC	Age-friendly cities and communities
EFD	Elderly-friendly villages
ICOPE	Integrated Care for Older People
IQR	Interquartile range
LLT	Integrated Elderly Services
N	Number of participants (sample size)
n	Number of participants in a subgroup
PMT	Supplementary food provision (Pemberian Makanan Tambahan)
RT/RW	Neighborhood administrative units (Rukun Tetangga/Rukun Warga)
RTHP	Green open public space (Ruang Terbuka Hijau Publik)
S1	Bachelor's degree
S2	Master's degree
SMA/SMK	Senior high school/vocational high school (Sekolah Menengah Atas / Sekolah Menengah Kejuruan)
SMP	Junior high school (Sekolah Menengah Pertama)
WHO	World Health Organization

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Compliance with ethical standards

Ethical considerations

All participants were informed about the objectives of the study prior to data collection. Participation was voluntary, and informed consent was obtained from all respondents involved in interviews and questionnaire-based data collection. The identities and responses of participants were treated confidentially and used exclusively for academic research purposes.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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