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INVESTIGATING COMMUNITY-BASED PARTICIPATORY DESIGN APPROACHES IN PLANNING AND CONSTRUCTING PUBLIC COMMUNITY FACILITIES: A SCOPING REVIEW

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ABSTRACT

The construction industry is witnessing a paradigm shift towards Community-Based Participatory Design (CBPD) approaches, deviating from traditional top-down methodologies. CBPD prioritises local knowledge and perspectives, encouraging inclusive collaboration among stakeholders. With the aim of investigating different CBPD approaches in planning and constructing public community facilities, focusing on their applicability, benefits, and limitations, this study employed a Scoping Review Methodology. Scopus and Web of Science databases were used to identify the papers with the use of predefined keywords. Following the screening process, 30 relevant research studies were analysed. Findings revealed that CBPD approaches offer several benefits, including promoting democratic decision-making, sustainable development, and community empowerment, ultimately enhancing the inclusivity and effectiveness of infrastructure projects. Simultaneously, limitations were identified, including navigating power dynamics, reconciling stakeholder interests, addressing scalability concerns, and overcoming resource constraints. Real-life examples and case studies were thoroughly analysed to identify the applicability of CBPD approaches and the importance of implementing such approaches in public community facilities. Based on the findings as well as the identification of gaps, future research areas were proposed.

Keywords: *CBPD Approaches; Community-based Participatory Design Approaches; Construction; Public Places; Sustainability.*

1. INTRODUCTION

In recent years, the approaches to planning and constructing public community facilities have evolved significantly, with an emphasis on community-based participatory design (CBPD) approaches (Valladares, 2017). In traditional practice, construction planners, engineers, and architects held significant authority in shaping the vision of the project and its outcomes, often based on technical expertise and organisational hierarchies

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(McAnany, 2012). This top-down approach has been efficient in some respects including providing clear direction from leadership, enabling streamlined decision-making, and ensuring efficient implementation of strategies aligned with organisational goals (Semeraro et al., 2020). However, when it comes to the construction of public community facilities, this traditional approach often overlooks the specific requirements and desires of the communities that these projects were intended to benefit, which are frequently ignored or not fully considered (Schutte, 2016). CBPD challenges this approach by recognising the local expertise and perspectives that community members bring to the process (Galamba & Nielsen, 2016).

Participatory development strategies aimed at enhancing the effectiveness and sustainability of development projects, in the context of promoting inclusive growth. In general, the project outcomes developed adopting the participatory development and construction strategies have been termed "democratic innovations" (Björgvinsson et al., 2010). Further, CBPD is not just a design methodology; it represents a paradigm shift in the way projects are conceptualised and executed. It is argued that the involvement of all stakeholders and planners in the construction process would be the most suitable strategy for sustainable development (Mueller et al., 2018).

On the other hand, the traditional top-down development model has faced criticisms for its limited effectiveness in meeting the diverse needs of communities, not being sustainable and neglecting the perspectives and aspirations of local stakeholders (Dias et al., 2014). A construction project to address a certain problem may succeed in one community, and it may encounter obstacles and fail to meet expectations in another community for the same problem. This highlights the importance of adopting context-specific and participatory approaches that address community-specific needs and priorities (Schutte, 2016).

Major public community development projects around the world include various infrastructure such as roads, railways, waterways, and pipelines, alongside community-centric establishments such as community centres, recreational spaces, and health facilities, and their success is assessed by how the community members in the society benefited from the project (Baporikar, 2016). Community-based development has been identified as a missing component in most community infrastructure projects, leading to the failure of the majority of them (Hussein & Kisimbii, 2019; Baporikar, 2016). Recognising these limitations, practitioners have increasingly adopted CBPD approaches to promote a sense of ownership, and sustainability in infrastructure projects (Meetiyagoda et al., 2024).

This review paper aims to investigate the applicability, benefits, and limitations of CBPD approaches in the planning and construction of public community facilities. By analysing diverse case studies and existing literature, the research seeks to identify how CBPD can facilitate inclusive and sustainable development, promote community empowerment, and enhance cultural preservation.

This paper comprises sections discussing the employed scoping review methodology, followed by the presentation of analysis and findings. It concludes by discussing the results and their future implications.

2. METHODOLOGY

This study adopts a Scoping Review Methodology, to comprehensively examine CBPD approaches in planning and constructing public community facilities. This research approach was chosen due to its suitability for exploring emerging evidence and providing insights as the research area requires clarification and refinement (Arksey & O'Malley, 2005). Unlike systematic reviews, which focus on specific research questions, scoping reviews are instrumental in mapping the breadth and depth of existing literature, making them ideal for synthesising diverse perspectives and methodologies related to CBPD in community facility development (Schultz et al., 2017). Extensive research has been conducted on participatory post-disaster construction, with significant community participation (Harahap, 2020; Hosseini & Izadkhah, 2020). Thus, a scoping review was identified as the most suitable research approach to investigate the study under consideration. The process followed for the scoping study is given in Figure 1.

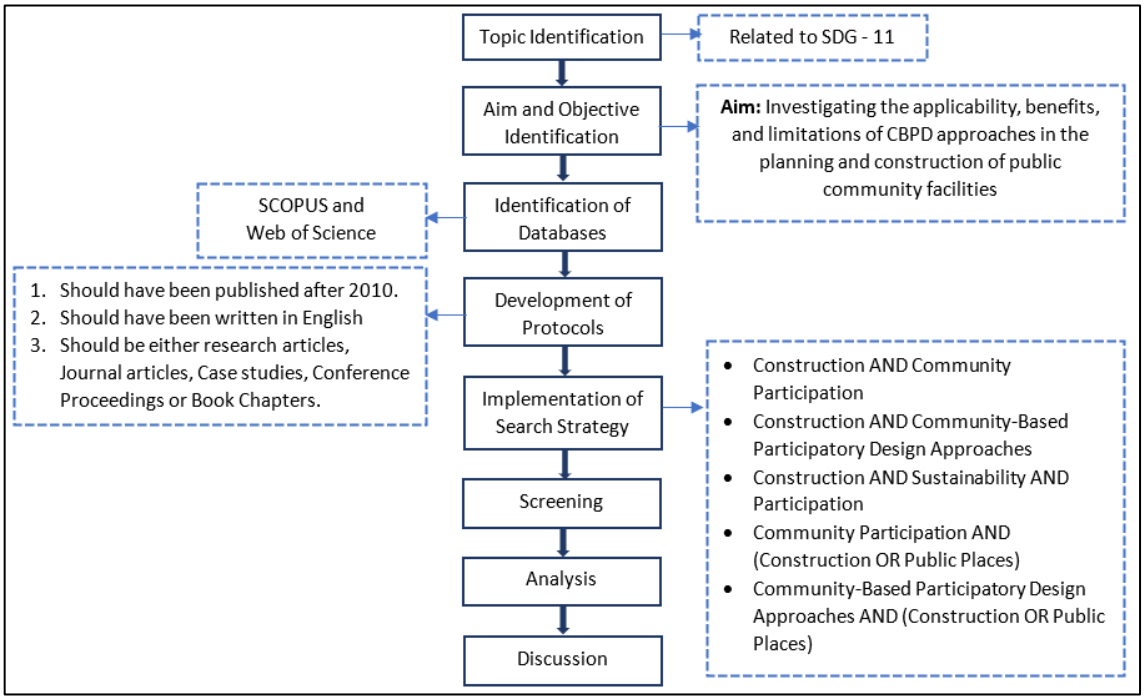

Figure 1: Methodology flowchart

The process of reviewing the papers involved a multi-stage process in alignment with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, yet customised., as outlined in Figure 2.

Figure 2: Multi-stage paper reviewing process

First, a protocol is developed to outline eligibility criteria, search strategies, and data extraction methods. This protocol serves as a guiding tool, allowing flexibility to adapt to the evolving needs of the study while maintaining consistency and transparency. The following are the main criteria for the selection of papers.

1. Should have been published after 2010. This ensures maximum validity and currency.
2. Should have been written in English.
3. Should be either research articles, journal articles, case studies, conference proceedings or book chapters.

A comprehensive search strategy is implemented, utilising predefined keywords and search strings to identify relevant literature from diverse sources such as academic databases, industry reports, and relevant journals (Refer to Figure 1). The search is focused on recent publications to ensure the inclusion of up-to-date evidence. Screening procedures are rigorously applied to select publications based on predefined eligibility criteria, ensuring the inclusion of high-quality sources relevant to CBPD in community facility development. Scopus and Web of Science databases will be implemented.

Then, data extraction is conducted systematically, capturing key information related to CBPD approaches, methodologies, outcomes, and implications for practice and policy. Data charting tools are utilised to organise and analyse the extracted data, facilitating a structured approach to synthesis and interpretation.

Finally, the analysis of findings employs a descriptive and standardised classification approach, allowing for the identification of patterns, trends, and key insights across the literature. This synthesis aims to contribute to a comprehensive understanding of CBPD approaches in planning and constructing public community facilities, identifying gaps in knowledge, and informing future research and practice in community development.

3. FINDINGS AND DISCUSSION

3.1 SELECTION OF THE SOURCES

Only papers published after 2010 were chosen for the scoping review to ensure maximum validity and timeliness. The majority of the papers are from 2017 and 2018, each constituting 16.67%. Initially, a criterion was established that the selected papers should fall under specific categories such as research articles, journal articles, case studies, conference proceedings, or book chapters (refer to Figure 1). However, after the screening process, only journal articles and conference proceedings remained within the scope, as other types of papers did not meet the predefined criteria (refer to Figure 4). Among these, the majority of the selected papers were journal articles. The demographic data regarding publication type and publication year are outlined in Figure 3.

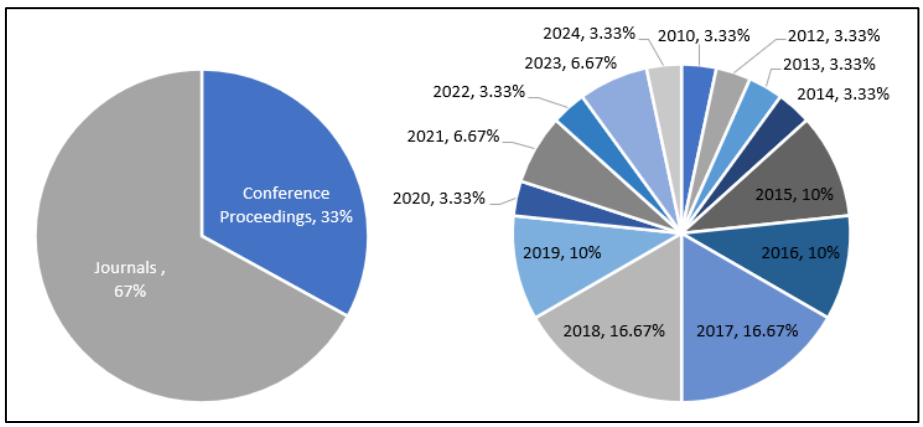

Figure 3: Demographic data: publication type and publication year, respectively

Throughout the selection process, a methodical filtration process was executed, considering predefined criteria as stated above. Initially, 116 papers were identified based on the specified keywords. Afterwards, filtration was applied, resulting in the selection of 30 papers for inclusion in the scoping review. The papers were filtered to ensure that the outcomes of the scoping review were of good standard. A significant number of papers, totalling 86, were excluded during the process due to reasons, including language issues, lack of relevance to the construction topic, discrepancies in abstracts, published years, and duplication of published data. These exclusions are shown in Figure 4.

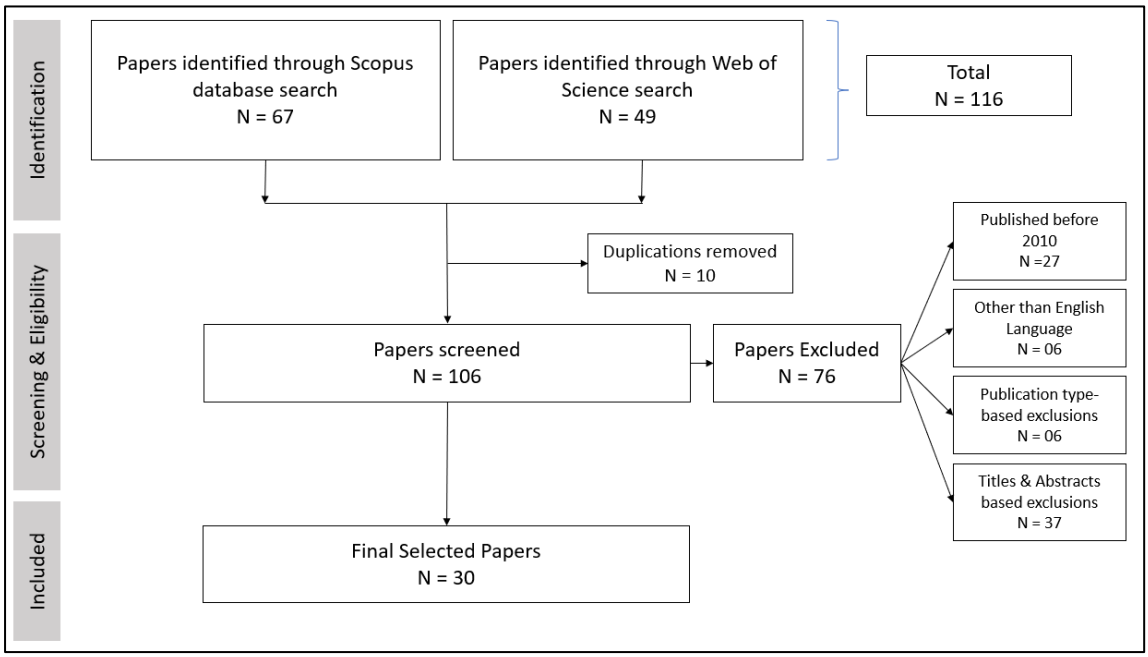

Figure 4: Screening process

3.2 CBPD Approaches in Planning and Constructing Public Community Facilities

CBPD approaches have gained significant popularity in recent years for planning and constructing public community facilities. This section examines various case studies and research articles that explore the benefits, applicability, and limitations of CBPD approaches in this context.

3.2.1 Applicability of CBPD Approaches in Planning and Constructing Public Community Facilities

CBPD approaches have been used in post-disaster housing projects as illustrated by Hussain (2017) and Shafique & Warren (2015). These approaches are also commonly used in road infrastructure projects in several countries including Indian and Kenya (Ahuja & Priyadarshini, 2017; Hussein & Kisimbii, 2019). For infrastructure projects CBPD have been effective bringing forth optimistic outcomes (Baumann et al., 2017; Ahuja & Priyadarshini, 2017; Meetiyagoda et al., 2024). They help communities define preferable futures, preserve cultural norms, facilitate meaningful encounters, and bridge gaps between groups. The Sankofa City and Leimert Phone Company projects involved African American communities in defining their future, and community-led reconstruction initiatives in Kathmandu, Nepal, emphasised traditional heritage conservation (Baumann et al., 2017; Joshi et al., 2021). CBPD also aids in inclusive

decision-making, as seen in the Bengaluru Transportation Projects Impacted Communities Network in India, the Construction Logistics Stakeholder Framework in Brussels, and post-disaster reconstruction in Pakistan (Ahuja & Priyadarshini, 2017; Brusselaers et al., 2021; Hussain, 2017). Furthermore, CBPD approaches adapt design processes to participants' specific needs, as demonstrated in the case study of Care+ building for Older Adults in Oslo, Norway (Joshi & Bratteteig, 2016; Bratteteig & Wagner, 2016). Furthermore, several studies emphasise the importance of CBPD in encouraging effective communication, empowering communities and building their capacity to participate effectively (Marín & Roelofs, 2018; Shafique & Warren, 2015; Hussain, 2017). In line with these cases studies, development of tools like Qua-kit aimed to bridge the gap between expert designers and local knowledge through crowd-creative participation in urban design (Mueller et al., 2018).

Table 1 summarises the case studies focusing on the applicability, benefits and limitations.

Table 1: Summary of the case studies

#	Case Study	Type of Applicability	CBPD Approaches Used	Outcomes	Citations
1	Sankofa City Project - USA (Los Angeles)	City Infrastructure Project	Collaborative workshops, prototyping, design fictions	Preserved cultural norms; beneficial urban infrastructure	(Baumann et al., 2017)
2	Cultural heritage reconstruction - Traditional public rest house, Kasthamandap, Nepal	Heritage Site Reconstruction	Community involvement, local labour and materials, community committees	Heritage preservation, resilient infrastructure, increased community ownership	(Joshi et al., 2021)
3	Bengaluru road widening and other urban transport projects, India	Road Infrastructure Project	Formation of Bengaluru Transportation Projects Impacted Communities (BATPIC) network	Advocacy for community rights, minimal displacement, promotion of sustainable transportation	(Ahuja & Priyadarshini, 2017)
4	Sardar Patel Ring Road project in Ahmedabad, India	Road Infrastructure Project	Public consultations by Urban Development Authority, Consultation meetings	Faster land acquisition, voluntary land handover, greater local support	(Ahuja & Priyadarshini, 2017)
5	Pakistan's Housing Reconstruction Programme in Azad Jammu & Kashmir	Post-Disaster Housing Project	Owner-driven reconstruction	Seismic-resistant construction, cultural acceptance	(Hussain, 2017; Shafique & Warren, 2015)
6	Road construction projects in Garissa County, Kenya	Road Infrastructure Project	Decision-making forums (barazas)	Improved implementation efficiency, effective projects for	(Hussein & Kisimbii, 2019)

#	Case Study	Type of Applicability	CBPD Approaches Used	Outcomes	Citations
				arid/semi-arid regions	
7	Care+ building for Older Adults in Oslo, Norway	Infrastructure for Elderly	Project SmartWalker - Interviews, home visits, workshops, usability testing	Alternative indoor navigation systems using Bluetooth and sensors	(Joshi & Bratteteig, 2016)
8	Crow Island Beach Park, Sri Lanka	Public Infrastructure Project	Community initiated the idea, actively involved throughout the entire process from the start.	Sense of Place among the community, Sustainable maintenance	(Meetiyagoda et al., 2024)
9	Kandalama Resort, Sri Lanka	Commercial Infrastructure Project	Making the community partners of the project, transparency and accountability	Acceptance from the Community	(Gayanika, 2017)

3.2.2 Benefits of CBPD Approaches in Planning and Constructing Public Community Facilities

CBPD approaches offer numerous benefits and are applicable in various contexts. They incorporate local knowledge, cultural practices, and social beliefs into the design process, ensuring that the resulting facilities are relevant and meaningful to the community (Baumann et al., 2017). These approaches foster democratic decision-making processes and promote the empowerment of marginalised or underrepresented groups (Baumann et al., 2017; Björgvinsson et al., 2010; Racadio et al., 2014; Ahuja & Priyadarshini, 2017). Furthermore, they facilitate capacity building and the transfer of ownership to the community, contributing to sustainable and long-term solutions (Racadio et al., 2014).

CBPD approaches promote mutual learning and knowledge exchange between designers, researchers, and community members (Baumann et al., 2017; Bødker et al., 2022). They increase the appropriateness, effectiveness, and adoption of interventions or solutions by deeply understanding the users' experiences and contexts (Chen et al., 2019). Additionally, these approaches facilitate the identification and resolution of potential conflicts or controversies early in the process, contributing to more sustainable and inclusive urban planning and infrastructure development (Ahuja & Priyadarshini, 2017; Baumann et al., 2017; Brusselaers et al., 2021).

Hussein and Kisimbii (2019) investigated the role of community participation in the implementation of county road development projects in Kenya. The study highlighted the vital contributions of community members in decision-making processes, human resource mobilisation, conflict resolution, and providing capital resources such as land and raw materials. The researchers recommend involving local communities at all levels of project implementation to prevent conflicts, ensure effective utilisation of resources, and foster a sense of ownership among community members.

Corbett and Le Dantec (2018) stated that municipal agencies often employ practices such as raising awareness, building relationships, setting the table, and finding opportunities to involve community members in city-scale projects. These practices not only foster a sense of ownership and belonging but also ensure that the community's needs and preferences are accurately reflected in the outcome. Furthermore, by giving communities a voice and enabling them to shape their built environment, CBPD approaches can promote inclusivity and address the spatial manifestations of social inequalities (Corbett & Loukissas, 2019).

Furthermore, Forst et al. (2013) demonstrate the effectiveness of a participatory health and safety program for Hispanic immigrant construction workers in the US, showing that engaging workers in program design improves safety knowledge and empowers them to advocate for safer conditions. Gayanika (2017) highlights the significance of assessing residents' empowerment perceptions, indicating that understanding psychological, social, and political empowerment influences community support for sustainable initiatives, aiding in fostering well-being and sustainable development over time. Summary of benefits and limitations of CBPD approaches are shown in Figure 5.

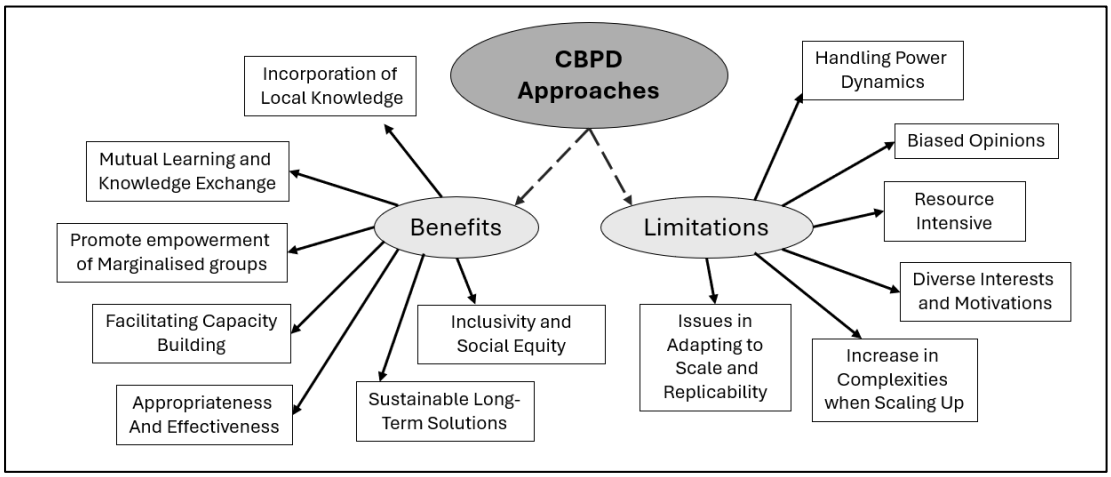

Figure 5: Summary of benefits and limitations of CBPD approaches

3.2.3 Limitations and Challenges of CBPD Approaches in Planning and Constructing Public Community Facilities

While CBPD approaches offer significant advantages, they also present several limitations and challenges. Ensuring genuine participation and addressing power imbalances between researchers/designers and community members can be challenging (Baumann et al., 2017; Joshi & Bratteteig, 2016; Peralta & Murphy, 2016). The inherent complexity and ambiguity of the sense of place concept, as well as the diverse interests and motivations of stakeholders, can complicate the design process and decision-making (Meetiyagoda et al., 2024; Brusselaers et al., 2021).

Facilitating meaningful community engagement and participatory processes can be resource-intensive and time-consuming (Joshi & Bratteteig, 2016; Brusselaers et al., 2021). Reconciling conflicting views, interests, and priorities among stakeholders may require extensive negotiation (Baumann et al., 2017; Joshi & Bratteteig, 2016; Peralta & Murphy, 2016; Brusselaers et al., 2021). Addressing the complexities and uncertainties of real-life contexts and ensuring that the designed solutions are feasible and sustainable can be challenging (Baumann et al., 2017; Brusselaers et al., 2021).

Furthermore, while some case studies demonstrate the applicability of CBPD approaches in specific contexts, scaling up or replicating these approaches across different settings may require further adaptation and validation (Brusselaers et al., 2021). Additionally, the limited capacity and resources of community members, such as low knowledge, poverty, and lack of education, can hinder their effective participation in the design and construction processes, necessitating capacity-building initiatives and sensitisation programs (Wedam et al., 2015; Stewart et al., 2023; Shafique and Warren, 2015; Roosli et al., 2018).

Another challenge lies in the complex power dynamics and potential conflicts that may arise when involving diverse stakeholders with varying interests and agendas. Effective conflict resolution mechanisms and equitable power-sharing arrangements are crucial for ensuring inclusive and productive collaboration (Tremblay et al., 2017; Hussein and Kisimbii, 2019). Furthermore, the scalability and replicability of CBPD approaches may be constrained by context-specific factors, such as the availability of supportive legal frameworks, access to financing, and the willingness of public institutions and private sector entities to embrace alternative housing models and community-driven initiatives (Cabré and Andrés, 2017; Kazemidemneh and Lashgari, 2023; Wedam et al., 2015).

3.3 WAY FORWARD

Based on these findings, several future implications can be proposed. By embracing these approaches and addressing the identified limitations through further research, capacity building, and the development of inclusive and adaptive frameworks, the construction industry can play a pivotal role in creating sustainable, resilient, and community-driven public facilities and infrastructure, aligning with the goals of Sustainable Development Goal 11 (SDG 11). Furthermore, future research should aim to establish robust conflict resolution mechanisms to foster inclusive collaboration among diverse stakeholders. Also, it is recommended to conduct research to develop and evaluate practical strategies for addressing specific challenges, such as power imbalances, reconciling conflicting interests, and managing the complexities and uncertainties of real-life contexts. Such endeavours are essential for promoting sustainable development and equitable outcomes in community-driven initiatives.

4. CONCLUSIONS

The findings of this scoping review emphasise the growing significance and potential of community-based participatory design approaches in the planning and construction of public community facilities. By actively engaging community members and incorporating their local knowledge, cultural practices, and social beliefs, these approaches promote inclusive and sustainable solutions.

The scoping review highlights the diverse applications of CBPD across various contexts such as urban planning, infrastructure development, post-disaster reconstruction, affordable housing initiatives, and heritage preservation. Key findings demonstrate that CBPD is instrumental in defining futures tied to local cultural norms, facilitating meaningful encounters, promoting inclusive decision-making, addressing immediate community needs, and fostering community ownership and empowerment. Despite its numerous benefits, CBPD faces challenges like ensuring genuine participation, reconciling conflicting stakeholder interests, and addressing real-life complexities, which are resource-intensive and time-consuming. Additionally, limited community capacity

and resources necessitate capacity-building initiatives. Nevertheless, the review underscores CBPD's potential in creating sustainable, inclusive, and community-driven public facilities and infrastructure, emphasising the need for further research, capacity building, and the development of inclusive frameworks to overcome its limitations.

Furthermore, the case studies illustrate the importance of adapting CBPD processes to the specific needs and abilities of participants, bridging the gap between expert designers and local knowledge, and fostering effective communication and community ownership throughout project lifecycles. While some case studies demonstrate the applicability of CBPD approaches in specific contexts, scaling up or replicating these approaches across different settings may require further adaptation and validation. Addressing power imbalances between designers/researchers and community members, reconciling conflicting views and priorities among stakeholders, and navigating the complexities and uncertainties of real-life contexts remain ongoing challenges.

This review contributes to the ongoing discussions on public participatory development strategies in the construction industry, providing a theoretical background for practitioners, researchers, and community stakeholders. It advocates for inclusive and sustainable infrastructure development that incorporates local knowledge, preserves cultural values, and promotes community empowerment. By fostering collaborative and participatory approaches, the construction industry can play a crucial role in creating resilient, equitable, and community-driven public facilities and infrastructure that meet the diverse needs and aspirations of local communities.

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