

Research Article

Beyond Boundaries: Exploring Livability in Diverse CPTED-Enhanced Neighbourhoods of Bengaluru

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As cities rapidly urbanise, poorly built infrastructure and restricted public spaces provide an impression of obscurity and vulnerability in densely populated metropolitan settings, fueling criminal activity. In response to the growing desire for cities to be safer, more livable, and sustainable, Crime Prevention Through Environmental Design (CPTED) is a promising option. While the influence of CPTED on crime reduction has been widely documented, further research into its impact on broader dimensions of urban livability is required. This study aims to fill this research void by undertaking an extensive comparative analysis to uncover similar trends, variances, and best practices of livability in two CPTED-enhanced neighbourhoods in Bengaluru: Malleswaram and Jayanagar.

The study uses rigorous mixed-methods research to give a multidimensional understanding of the impacts of CPTED practices on urban living in the context of these two distinct neighbourhoods. The research design incorporates quantitative surveys, qualitative interviews, and comprehensive field observations to capture the varied viewpoints and nuances of individuals' lived experiences determined by common physical and social factors found to overlap between livability and CPTED such as Community Engagement, Land-use mix, Building visibility and Pedestrian infrastructure to name a few.

Finally, the results support the notion that CPTED is more than just a crime-reduction approach; it is a robust tool promoting sustainable and people-centred urban landscapes. By embracing the lessons acquired from Malleswaram and Jayanagar, it is possible to work collaboratively to create cities prioritising safety, community participation, social cohesion, and overall well-being for all people. As urban surroundings adapt, integrating CPTED principles should remain essential in creating thriving and inclusive communities for future generations.

1. Introduction

1.1. *Urbanization and its Challenges*

Exponential population growth leads to urbanisation, posing challenges to urban dwellers' well-being, safety, and sustainability (Savitch, 2005). The connection between physical infrastructure, public spaces, and urban life quality is critical as cities expand (Alexander, 1977). Inadequate infrastructure and limited public spaces in rapidly urbanising cities lead to substandard buildings, unreliable utilities, and insufficient transportation networks, impeding the quality of life and increasing vulnerability (Jacobs, 1961). Poorly designed public spaces exacerbate these problems, limiting opportunities for social interaction and community involvement, making them potential hotspots for criminal activities and compromising the overall quality of urban life (Crowe, 2000). The urgency to transform cities into safer, more livable, and sustainable environments has become a paramount concern for urban planners, architects, researchers, and policymakers alike.

The physical environment significantly impacts criminal behaviour, and inadequate design can facilitate criminal activities, making our cities uninhabitable and affecting the quality of life of its inhabitants (P. M. Cozens, 2007, 2008). Due to its complex nature, this relationship between the urban environment and crime has garnered the attention of researchers, policymakers, and urban designers. Hence, comprehensive strategies to reduce crime and improve livability in urban areas are being investigated, paving the way to the Crime Prevention Through Environmental Design (CPTED) concept.

1.2. *CPTED: A Promising Solution for Safer, Livable, and Sustainable Cities*

1.2.1. *Desire for Safer, Livable, and Sustainable Cities*

With urbanisation comes the demand for urban spaces that offer enhanced safety, well-being, and inclusivity has become a defining aspect of contemporary urban discourse (Nasar & Fisher, 2003). Residents and stakeholders in urban areas are progressively seeking environments that foster social cohesion, encourage community engagement, and provide opportunities for sustainable living (Jeffery, 1971). At the heart of this desire is the aspiration for cities to serve as platforms for positive human experiences where people can thrive, connect, and contribute to a vibrant urban fabric.

1.2.2. CPTED as an Approach to Address Urban Challenges

CPTED is a promising method for creating safe, livable, sustainable urban environments (Felson & Clarke, 1997). This approach has its roots in the visionary theories of Jane Jacobs, a seminal figure in urban studies who emphasised the vital interplay between urban design and social dynamics (Brantingham & Brantingham, 1993). One of Jacobs' crucial contributions was the "eyes on the street" concept, emphasising the significance of natural surveillance through public activity in deterring criminal behaviour (Loukaitou-Sideris, 2006). CPTED expands on this notion by fostering environments that promote community involvement, reinforce social interactions, and discourage potential offenders through increased visibility and connectivity (Saelens & Handy, 2008). Furthermore, architect Oscar Newman's "defensible space" concept has informed CPTED principles (Carr et al., 1992). This idea underscores the creation of well-defined, recognisable territories where residents feel a sense of ownership and responsibility, thereby deterring intruders.

By integrating Jacobs' social vitality theories and Newman's territoriality concepts, CPTED's holistic framework acknowledges that crime prevention is not solely the domain of law enforcement agencies but also an endeavour that involves urban planners, architects, designers, policy-makers, and local communities (P. M. Cozens, 2007). By leveraging the power of spatial design, land use, and social dynamics, CPTED aims to create urban environments that discourage criminal behaviour and illicit activities. Its principles include natural surveillance, access control, territorial reinforcement, and maintenance, all of which contribute to establishing a sense of ownership, security, and civic pride within urban neighbourhoods (Hedayati Marzbali et al., 2011).

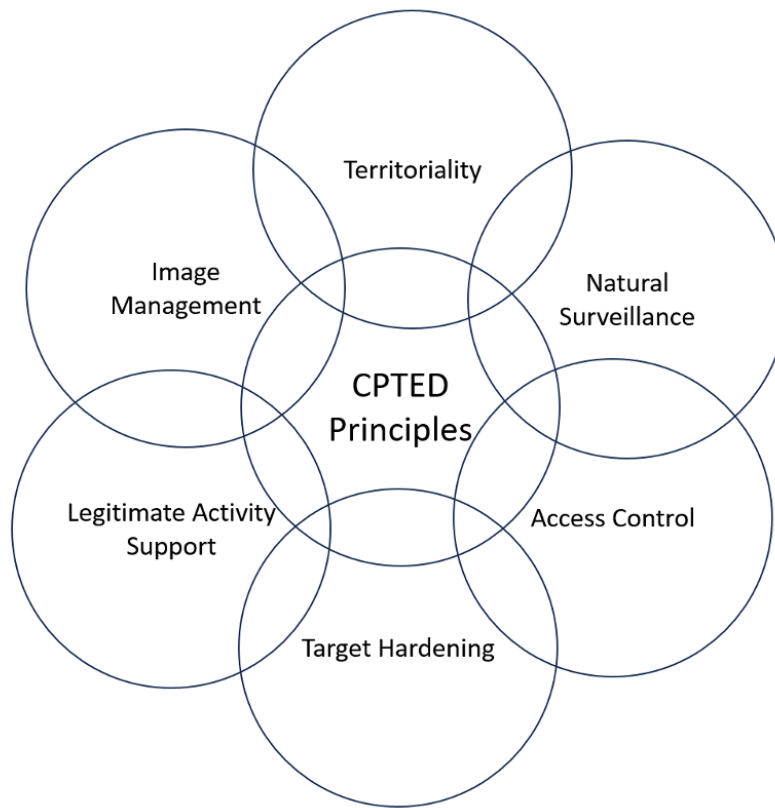


Figure 1. Principles of CPTED (P. Cozens, 2016)

1.3. Research Gap and Objectives

1.3.1. Existing knowledge about CPTED's crime reduction impact

As cities strive to create more livable and sustainable environments, integrating CPTED principles for crime prevention and safety enhancement has been the prime focus of many studies (Hedayati Marzbali et al., 2011). Through manipulating physical and environmental factors, CPTED seeks to create spaces that discourage criminal behaviour, enhance surveillance, and foster a sense of ownership among residents (Nasar & Fisher, 2003). Studies have demonstrated that well-implemented CPTED strategies can reduce specific criminal activities such as vandalism, theft, and burglary (S. et al. Mustafa). Moreover, the principle of natural surveillance, which encourages visibility and observation, has been shown to deter potential offenders and enhance the perception of safety (Nasar & Fisher, 2003).

S. Shamsuddin & Natasha Azim Hussin, 2013 emphasise the importance of effective CPTED implementation in reducing public expenditure while ensuring city safety. Cozens, 2007, 2008 stresses that crime and fear of crime can undermine the broader objectives of urban sustainability, advocating for CPTED as an invaluable tool in achieving sustainable urban development. Hedayati Marzbali et al., 2011 reinforce the positive impacts of crime prevention by design approaches, highlighting the role of such strategies in reducing crime and fear, ultimately contributing to more sustainable developments. Furthermore, empirical evidence suggests that CPTED is effective in crime reduction. Nasar & Fisher, 2003 reveal that elements such as increases in prospect and decreases in concealment and boundedness can enhance feelings of safety and decrease crime. Jeffery, 1971 advocates for a new and comprehensive approach to crime control, aligning with the interdisciplinary nature of CPTED that draws from fields such as criminology, psychology, and environmentalism. Additionally, S. R. M. Sakip & Anith Nabilah Mustafa, 2019 utilise GIS nautilus to identify street patterns vulnerable to criminal activities, suggesting that the effectiveness of CPTED lies in identifying and designing areas.

1.3.2. Need for further exploration of CPTED's influence on broader urban livability

Despite the plethora of literature demonstrating CPTED's effectiveness in reducing crime and improving safety, there is a significant gap in comprehending its impact on urban livability (Jeffery, 1971). Livability, a multifaceted concept encompassing quality of life, social interactions, and overall well-being, is pivotal in creating sustainable urban environments (Savitch, 2005). Most existing research primarily focuses on crime reduction and safety enhancement, neglecting the broader implications of CPTED on urban livability (P. M. Cozens, 2008).

Given the evolving nature of urban challenges and the growing emphasis on creating holistic and livable urban spaces, further exploration into the impact of CPTED on urban livability is crucial (Carr et al., 1992). This discrepancy emphasises the necessity for a cross-disciplinary study integrating insights from urban design, sociology, and psychology that not only evaluates the efficiency of CPTED in crime decrease but also investigates how these approaches affect inhabitants' understanding of their environment, social connections and complete enjoyment of their metropolitan settings (Francis et al., 2012). Through an examination of the synergies between CPTED and livability, informed decisions can be made by urban planners, designers, and policymakers to create urban environments that are more inclusive, safe, and vibrant.

1.3.3. Aim of the study: Comparative analysis of CPTED-enhanced neighbourhoods in Bengaluru

This research seeks to contribute to the burgeoning knowledge on creating vibrant and inclusive urban environments by undertaking a rigorous comparative analysis of CPTED-enhanced neighbourhoods in Bengaluru, explicitly focusing on the Malleswaram and Jayanagar areas.

The comparative analysis shed light on common trends, variations, and best practices in implementing CPTED principles within distinct urban contexts. Through this investigation, the study aims to provide insights into the nuanced relationships between CPTED and broader dimensions of urban living, elucidating how CPTED can contribute to creating safer, more socially cohesive, and sustainable neighbourhoods (Alexander, 1977). Ultimately, this research endeavours to enrich the discourse surrounding CPTED's potential as a tool for shaping urban environments that prioritise the well-being and experiences of their inhabitants (Jacobs, 1961).

2. Methodology

The influence of CPTED on urban livability was assessed using a combination of quantitative surveys, qualitative interviews, and field observations, employing a mixed-methods approach. The study examined Malleswaram and Jayanagar, gathering closed-ended and open-ended questions to comprehensively understand urban livability's complexity and intersection with CPTED strategies. The approach yielded valuable insights for academic discourse and practical urban planning. The study's findings enrich academic discussions and guide urban planning and design by capturing intangible aspects like community and social cohesion, which are challenging to quantify but essential for urban environments. The mixed-methods approach is valuable for complex research like urban livability, providing a holistic comprehension of the topic.

2.1. Study Area

The selection of study regions is a crucial decision in research. Malleswaram and Jayanagar in Bengaluru were chosen as case studies to examine the effects of CPTED on urban livability. These neighbourhoods have unique characteristics relevant to investigating the impact of CPTED principles on broader urban dynamics.

Malleswaram and Jayanagar are diverse and have distinct features corresponding to the study's objectives. Malleswaram represents the city's heritage, while Jayanagar exemplifies modern urban planning principles (Meera Iyer, 2019).

These neighbourhoods provide an ideal opportunity to explore how CPTED practices manifest within different urban contexts and contribute to enhancing livability elements unique to each neighbourhood. Additionally, these localities have experienced changes in social dynamics, land use patterns, community engagement, and transformations in their physical surroundings over time (*Quality of Life in Bangalore*).

By selecting Malleswaram and Jayanagar, this research aims to unravel the interplay between CPTED strategies and the intricate urban fabric while considering the nuanced cultural and demographic factors that shape urban life in these areas.

3. Dimensions of Analysis

3.1. Common Factors Between Livability and CPTED

To comprehensively examine the intricate relationship between CPTED principles and broader aspects of urban livability, the present study utilised a rigorous mixed-methods approach that involved both quantitative surveys and interviews. As part of the quantitative component, tangible aspects were studied with the help of a survey that was conducted with closed-ended questions, focusing on the common factors identified between livability and CPTED principles, namely Community Engagement, Land-use Mix, Building Visibility, and Pedestrian Infrastructure.

Community Engagement, as a CPTED principle, pertains to the involvement and participation of residents, local stakeholders, and community organisations in shaping the design and management of public spaces. It displays how people sense connectedness to their environment, cultivating a feeling of ownership, accountability, and collective identity. A strong sense of community engagement can lead to increased surveillance, informal social control, and the creation of safer, more vibrant neighbourhoods.

On the other hand, land-use mix refers to the variety and diversity of activities and functions within a specific area. It encompasses the coexistence of residential, commercial, recreational, and cultural land uses nearby. A well-balanced land-use mix fosters vitality and round-the-clock activity in

neighbourhoods, promoting natural surveillance and reducing the prevalence of deserted or isolated spaces that may facilitate criminal activities.

Building Visibility, as a CPTED principle, refers to the design and arrangement of structures to maximise natural surveillance and reduce potential hiding spots for criminal behaviour. Buildings with unobstructed sightlines and clear visibility from public areas can deter criminals by eliminating opportunities for anonymity and escape. Increased visibility also enhances residents' perception of safety and facilitates social interaction.

Pedestrian Infrastructure, as a CPTED principle, involves designing and providing safe and accessible pedestrian pathways within the urban fabric. Well-designed pedestrian infrastructure encourages walking, promotes social interaction, and ensures a lively streetscape. A well-connected network of pedestrian pathways contributes to increased foot traffic and enhances natural surveillance, discouraging criminal activities.

3.2. Multidimensional Understanding of Impacts

3.2.1. Quantitative data from surveys

A Likert scale approach was employed to evaluate the perceived effects of these factors on urban livability by CPTED principles. A total of 30 survey responses were gathered. Each respondent was instructed to rate the impact of each factor based on their sense of safety, well-being, and overall satisfaction using a scale ranging from 1 to 5, where 1 indicates 'Poor', and 5 indicates 'Great'. These bar charts provide a clear overview of how residents in each neighbourhood perceive the impact of the identified factors on their livability. By comparing the Likert scale ratings of the factors across the neighbourhoods, the study intends to unveil prospective variations and trends, illuminating the impact of CPTED-enhanced urban design on residents' experiences and perceptions of their living environments (Figures 1-4).

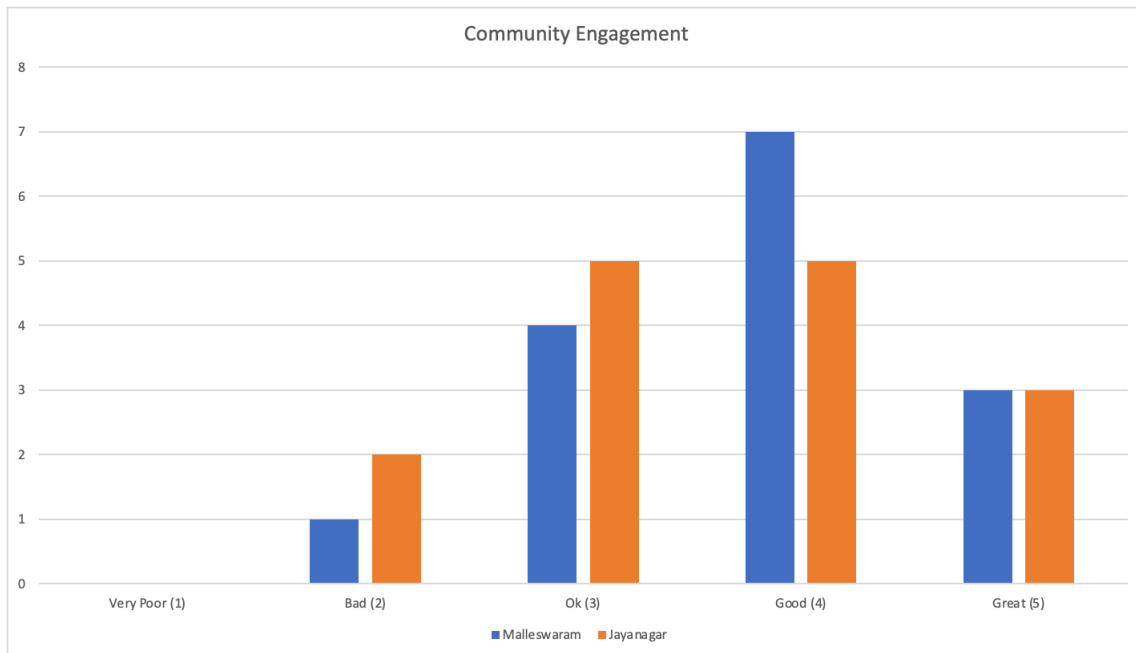


Figure 2. Comparative Analysis of Community Engagement in Malleswaram and Jayanagar

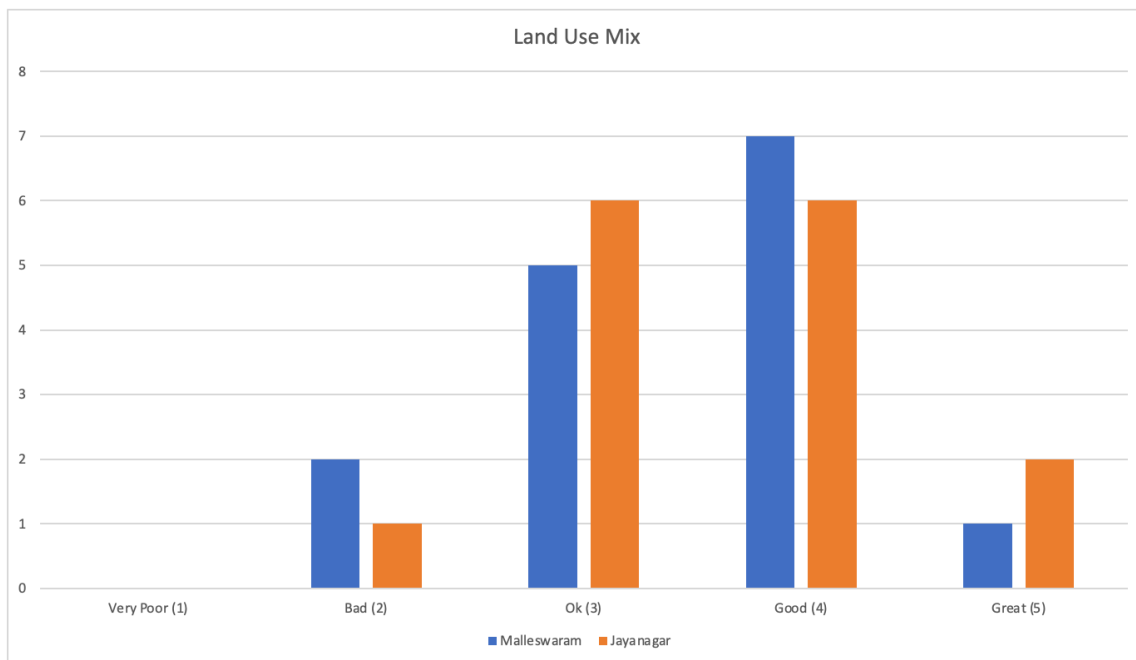


Figure 3. Comparative Analysis of Landuse Mix in Malleswaram and Jayanagar

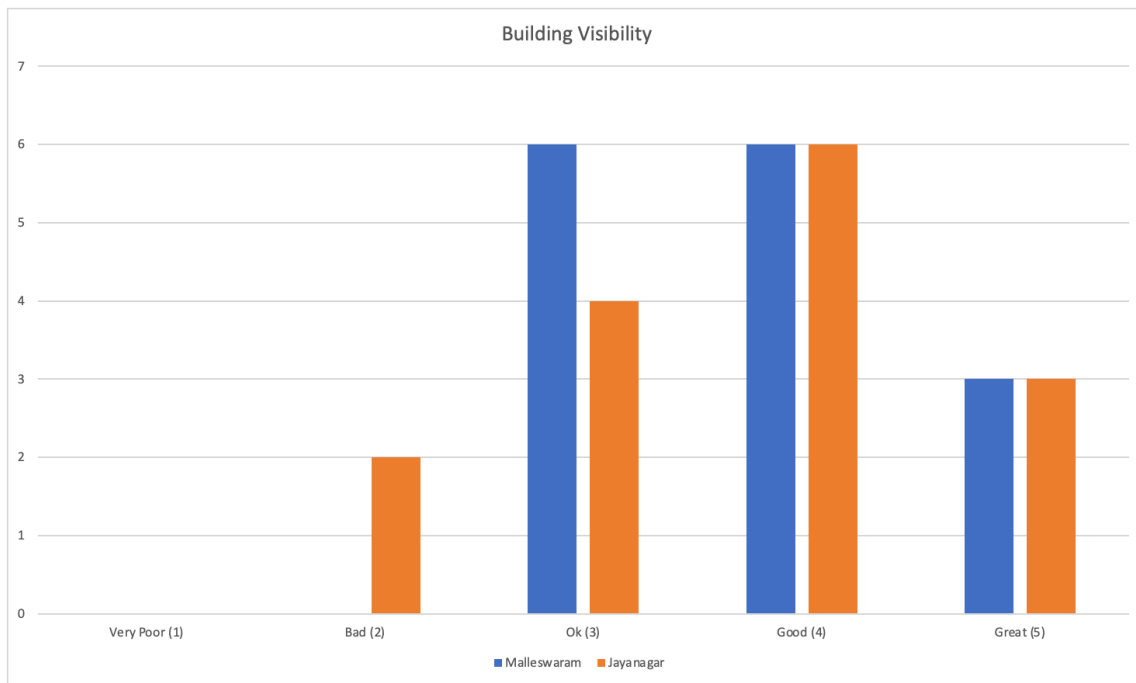


Figure 4. Comparative Analysis of Building Visibility in Malleswaram and Jayanagar

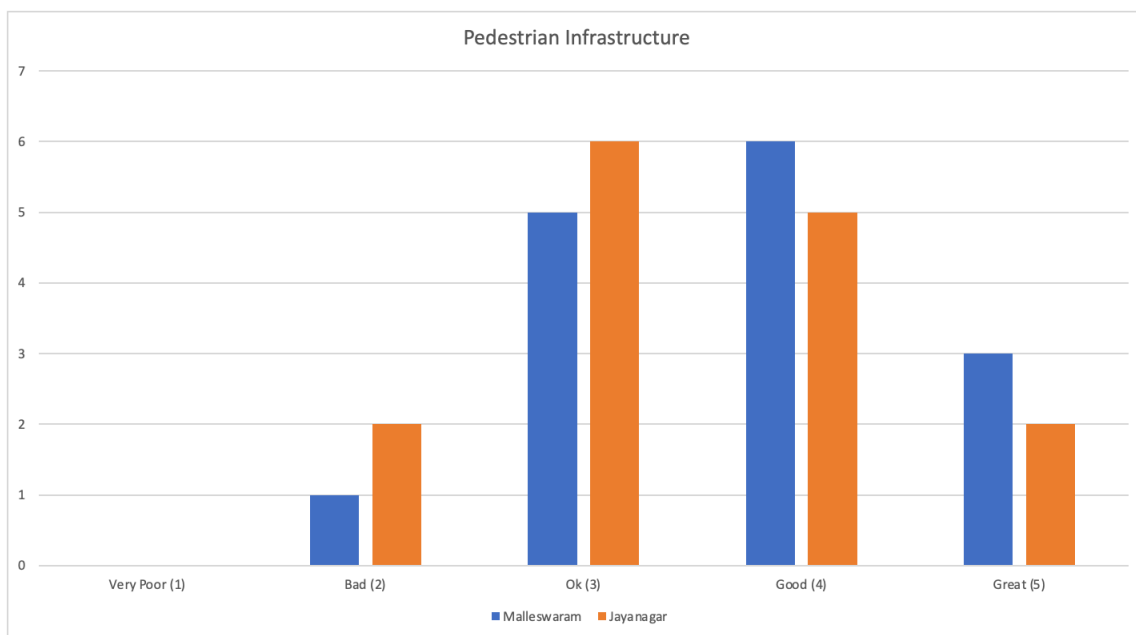


Figure 5. Comparative Analysis of Pedestrian Infrastructure in Malleswaram and Jayanagar

3.2.2. Qualitative insights from interviews and Nuances captured through field observations

3.2.2.1. Malleswaram Neighborhood

The interviews conducted in Malleswaram shed light on the community-driven transformation and active participation in shaping the neighbourhood's environment. The Malleswaram Social and Sensing Local have played a pivotal role in fostering a collaborative spirit within the community. Their efforts have transformed previously neglected conservancy lanes into vibrant communal spaces, reflecting an innovative and participatory approach to urban design. The cancellation of the Sankey Tank Road expansion, driven by the collective voice of the residents, exemplifies the neighbourhood's commitment to preserving its greenery and maintaining a harmonious relationship with nature. The qualitative insights provided by the interviewees highlight Malleswaram's strong sense of identity, community engagement, and environmental consciousness.

3.2.2.2. Jayanagar Neighborhood

Similarly, in Jayanagar, the interviews reveal a combination of government intervention and community initiatives that have positively impacted the neighbourhood's livability. Structured parks along the metro line indicate a strategic approach to optimising underutilised spaces for recreational purposes. This underscores a proactive stance toward improving public spaces and encouraging healthier lifestyles among residents. The neighbourhood's focus on improved lighting, visibility, mixed-use development, pedestrian infrastructure, and signage suggests a concerted effort to enhance safety, accessibility, and overall quality of life. The qualitative insights from the interviews portray Jayanagar as a neighbourhood that values thoughtful urban planning, collaborative endeavours, and the holistic well-being of its inhabitants.

In summary, both Malleswaram and Jayanagar exhibit distinct characteristics contributing to their livability and environmental design. Malleswaram is characterised by strong community engagement, co-creation, and a commitment to preserving greenery. On the other hand, Jayanagar stands out for its strategic urban interventions, well-planned public spaces, and emphasis on enhancing pedestrian experiences. These qualitative assessments offer a thorough comprehension of the dynamic nature of these areas in response to the necessities and ambitions of their inhabitants, exposing their distinct identities and approaches towards urban development.

4. Results and Findings

4.1. CPTED's Impact on Urban Livability

4.1.1. Positive correlation between CPTED practices and broader livability aspects

The study utilised a Likert scale approach to quantitatively evaluate the perceived impacts of CPTED principles on urban livability in Malleswaram and Jayanagar neighbourhoods. The residents were requested to rate the influence of building visibility, pedestrian infrastructure, land use mix, and community engagement on their sense of safety, well-being, and overall satisfaction. The data collected gave essential insights into residents' perceptions of how these factors contribute to their quality of life.

The data analysis revealed a consistent positive correlation between implementing CPTED practices and broader livability aspects. Both neighbourhoods demonstrated that improved building visibility, pedestrian infrastructure, well-balanced land use mix, and active community engagement positively contributed to residents' sense of safety, well-being, and satisfaction. The correlation between these environmental design measures and enhanced livability underscores the significance of a holistic approach to urban planning that prioritises security and quality of life.

4.1.2. Identification of trends and variances in the two neighbourhoods

The comparison of Likert scale ratings across Malleswaram and Jayanagar provided insights into trends and variances in residents' perceptions of CPTED-enhanced urban design. Building visibility, pedestrian infrastructure, land use mix, and community engagement were evaluated in both neighbourhoods. Notably, both neighbourhoods exhibited positive perceptions overall, but subtle differences emerged.

Both neighbourhoods, Malleswaram and Jayanagar, exemplify how CPTED principles can extend beyond crime reduction and contribute to broader aspects of urban livability. Implementing CPTED practices, such as improved building visibility, balanced land use mix, enhanced pedestrian infrastructure, and active community engagement, has led to positive outcomes regarding safety, well-being, and overall satisfaction. These findings emphasise that CPTED is not limited to security concerns alone but plays a pivotal role in creating vibrant and harmonious urban environments.

4.2. Lessons from Malleswaram and Jayanagar

4.2.1. Demonstrating the potential of CPTED beyond crime reduction

The case studies of Malleswaram and Jayanagar exemplify the potential of CPTED principles in contributing to broader aspects of urban livability beyond crime reduction. Implementing CPTED practices, such as improved building visibility, balanced land use mix, enhanced pedestrian infrastructure, and active community engagement, has resulted in positive outcomes regarding safety, well-being, and overall satisfaction. These findings demonstrate that CPTED plays a crucial role in creating vibrant and harmonious urban environments, and its application is not limited to security concerns alone.

4.2.2. Insights into creating sustainable and people-centred urban environments

The study yields valuable insights for urban planners, designers, and policymakers by examining qualitative data from interviews and observations in two neighbourhoods. Malleswaram's community-driven efforts demonstrate the significance of involving residents in creating living spaces, leading to a stronger sense of identity and ownership. Jayanagar's combination of government interventions and community initiatives reveals the potential of collaborative planning in transforming unused spaces into recreational areas, improving the overall quality of life. The findings highlight the importance of a people-centred approach to urban development, considering the built environment's functional and emotional aspects.

4.3. Implications and Future Directions

The study emphasises the importance of collaborative urban development for enhancing neighbourhood livability. CPTED practices promote safety, community participation, and social cohesion for broader livability. Safe environments encourage engagement and physical security. Inhabitants' participation fosters ownership, pride, and accountability. CPTED principles offer a framework for integrating safety measures. Resident involvement strengthens community bonds and cultivates collective identity. CPTED prioritises well-being by considering design solutions that align with contemporary urban design trends.

Integrating CPTED principles is crucial for urban planning as cities evolve. Adaptability is necessary for dynamic urban landscapes. Addressing new complexities in urban areas requires integrating

CPTED principles. This forward-looking approach upholds CPTED principles while responding to changing needs.

Implementing CPTED principles in urban design is crucial for inclusive and thriving neighbourhoods. Prioritising communities' safety, well-being, and engagement creates a foundation for sustainable development. Malleswaram and Jayanagar underscore the significance of physical design and the social fabric that binds communities together. Integrating CPTED principles can create resilient, adaptable, and equitable neighbourhoods. Urban planners and stakeholders pave the way for secure, functional, and livable cities that foster inclusivity, creativity, and well-being.

5. Conclusion

This study investigates the impact of Crime Prevention Through Environmental Design (CPTED) principles on urban livability, expanding its scope beyond crime reduction to include safety, well-being, and community engagement. The research contributes to a more holistic approach to urban planning, prioritising the well-being and experiences of residents. The comparative analysis of two neighbourhoods, Malleswaram and Jayanagar, yields insights into the application and impact of CPTED principles. The study emphasises the importance of tailoring design strategies to the specific context of each neighbourhood and highlights CPTED's role in shaping safer, livable, and sustainable cities. The research findings call for the continued integration of CPTED principles in urban planning practices to create inclusive, sustainable, and thriving communities for present and future generations.

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