

# **CPTED & LIVEABILITY: SYNERGY BETWEEN LIVEABILITY INDICES AND DIMENSIONS OF CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN**

**MOLOOD SEIFI<sup>1</sup>, SYARMILA HANI HARON<sup>2</sup>, ALDRIN ABDULLAH<sup>3</sup>, MINA SEIFI<sup>4</sup>**

<sup>1</sup> School of Built Environment, University College of Technology Sarawak

<sup>2,3,4</sup> School of Housing, Building and Planning, Universiti Sains Malaysia

## **ABSTRACT:**

Liveability concept is well known for improving the quality of life. Besides, crime prevention through environmental design (CPTED) has been proven as an effective strategy to reduce crime. Thus, there is a perception that CPTED is only employed to improve the safety feature of liveability, but in recent years, CPTED has developed beyond its basic concepts. Despite the broad spectrum of liveability indicators, it is argued that other than providing safety, CPTED dimensions might be able to fulfil some more features of liveability. However, the relationship between the individual dimensions of CPTED and concepts of liveability has rarely been explored. Hence, the present paper sought to investigate if CPTED can achieve liveability. Several kinds of literature on the subjects were reviewed to check the compatibility between various aspects of these two concepts. Also, a systematic comparison of the similar components was developed. The results of the study demonstrated that most of the measures of liveability related to peoples' demographics are directly linked with the territoriality concept of CPTED. Besides, all the dimensions of First-Generation CPTED could contribute to features of liveability. Likewise, the Second-Generation CPTED could assist the strategies of liveability through social cohesion, community culture and connectivity. The study concludes that nearly 50% of liveability features can be achieved through dimensions of CPTED. However, this is subject to change based on different scale and time of analysis. An exact empirical study measuring both liveability and CPTED simultaneously in a single context could further confirm the results of the present study.

**KEY WORDS:** Liveability, CPTED, Dimensions, Compatibility

## **I. INTRODUCTION**

According to the United Nations population division (2018), more than half of the world's population live in the cities and this is expected to escalate to 68% by 2050. While most of the cities are not well-planned to accommodate the additional 2.5 billion people. Besides, urban spaces are not effectively equipped to meet the needs of the residents in future. Henceforth, urbanization negatively impacts the ecosystem (Green & Baker, 2003), climate change (Grimmond, 2007), wealth (Mehta, 2000) and health of inhabitants (Moore, 2003; Turan & Besirli, 2008).

The uncontrolled urbanization has reduced the individual well-being in large metropolitans (Winters & Li, 2015). Socioeconomic disparities, poverty, unemployment, and climate change occurring because of urbanization have adversely affected the well-being of the people. Many researchers believe that urbanization is also one of the underlying causes of crime (Mishra, 2015). Hence, CPTED and liveability have been developed to battle the consequences of issues related to urbanization.

Liveability tool has been deployed to assess the quality of people's lives in a place by measuring the social and physical attributes of the environment which contribute to their well-being.

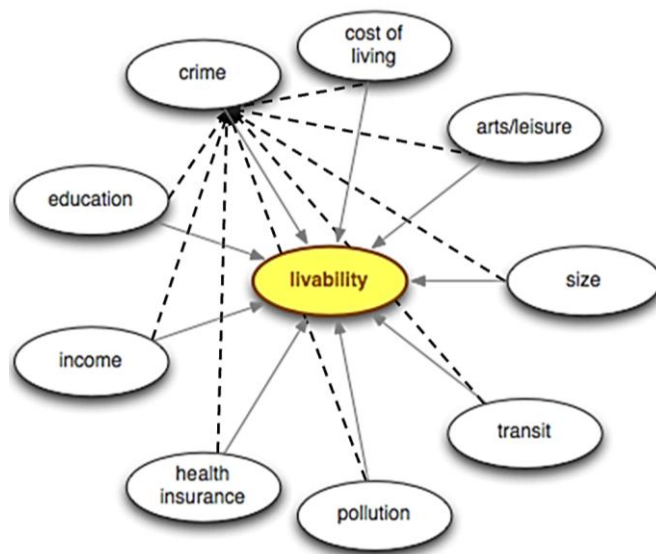
Namazi-Rad et al. (2012) recommended different factors of liveability in six categories with their individual features which consist of (1) home: size, affordability, quality and communication networks (2) neighbourhood: safety, attractiveness, cleanliness, friendliness, cultural diversity, (3), entertainment, (4) transport, (5) work and (6) services. Besides, concepts of CPTED namely natural surveillance, access management, territoriality, maintenance, image/management and activity support are known as effective strategies to reduce/prevent crime.

There is a perception among built environment professionals, planners, designers, and policymakers that CPTED is a tool to serve the safety feature of the liveability. Yet, many of the dimensions used for measuring the liveability seem to overlap with the measures of the CPTED concept. Therefore, this study sought to explore the likely connections that might exist between the different dimensions of CPTED and the features of liveability.

**Liveability Indicators and Crime**

Various researcher such as Douglass (2000) believes that the indicators of liveability are closely linked with safety and crime. According to him, one of the components to improve the quality of life is having a safe and clean environment which can make the city more liveable. A lack of community involvement, the traffic, ambient noise, and scarcity of facilities and services affect environmental quality and reduces the quality of life (Howley, et al., 2009). Moreover, investing in making the neighborhoods healthy, walkable and safe is one of the major domains of livability (Partnership for Sustainable Communities, 2011).

Figure 1 shows the basic model, which consists of several factors influencing liveability.



**Figure 1. Livability model with its basic variables; Adapted from Burrsettles (2014).**

The study by Burrsettles (2014) showed that crime had the highest negative magnitude of influence on liveability. Besides, the constructs of liveability also influence crime. The relationship between crime and CPTED has been proven in many studies. Hence, the liveability indicators which are in connection with a crime can influence CPTED. In next section, the link between individual dimensions of first and Second-Generation CPTED with liveability has been discussed.

**II. METHODOLOGY**

In this study, the literature has been reviewed based on the functioning of the dimensions of CPTED and indicators of liveability. Since liveability indices are very large in numbers (Perez, 2013) it was not possible to link all of them with CPTED dimensions. On the other hand, the majority of CPTED concepts are lesser in number. Hence, the compatibility of the concepts is checked from CPTED’s side. There could be many more features of liveability that could be achieved through CPTED, but that kind of investigation was not feasible to the present paper. Therefore, the characteristics of both concepts are short-listed.

The main dimensions of first-generation CPTED which are mentioned in the extensive bibliography by Cozen et al. (2005) are listed down for the comparison process. In addition, the dimensions of the second generation CPTED introduced in the CPTED book of Atlas (2008) are looked through. Subsequently, the individual dimensions of CPTED and liveability are compared based on their definitions in the available literature and their influence on the living environment. Moreover, a larger part of liveability characteristics was obtained from Namazi-Rad et al. (2012).

**First-Generation CPTED and Liveability**

First-generation CPTED includes design principles that alter the environment to deter criminality (Atlas, 2008). The dimensions of CPTED mentioned by Cozen, (2002) viz. surveillance, access management, territoriality, maintenance, image/management, activity Support have been compared with indicators of liveability.

The design of the physical elements provides opportunities for natural surveillance that enables residents to watch their immediate environment and become capable guardians of their living spaces (Painter and Tilley, 1999). This dimension of CPTED is a mean for neighbours to get to know each other as recognizing the residents and non-residence is an important part of this strategy. Territoriality is enhanced by the provision of natural surveillance hence; both the dimensions help in making human bonding and create the sense of care within people of neighbourhoods that increase liveability.

CPTED has guidelines on managing access to the neighborhoods, houses and streets. Similarly, research has shown that “Livable communities are healthy, safe and walkable” (Young & Hermanson, 2013). Increasing pedestrian movement and use of bicycles can promote health and safety in neighborhoods. According to research by Riggs and Gilderbloom (2015) conversion of a one-way street to two-directional traffic promotes safety, mobility and livability in cities. Walkability has a positive impact on neighbourhood crime. Good public transport can reduce the use of cars in residential places.

There is no doubt that neighbourhoods with better image management are more attractive. Image/ management dimension of the built environment has strong support in research for reducing crime (Eck, 1997; Spelman, 1993). Lastly, Joh et al. (2012) reported that more people’s activity in an area enhances the neighbourhood’s safety.

In addition to the list of liveability attributes mentioned in Table 1, Home size affects crime and fear of crime through resident’s level of territoriality and control over their living spaces and surrounding areas (Newman & Franck, 1982). Thus, providing a suitable home size which is one of the dimensions to measure territoriality of CPTED also contributes to the resident’s state of well-being which has been measured by Naramzi-Rad et al. (2012).

**Second-Generation CPTED and Liveability**

Second-Generation CPTED deals with people’s cultural, social and emotional needs for reducing crime by considering strategies such as connectivity, social cohesion, threshold capacity and community culture (Atlas, 2008). The set of activities introduced in Second-Generation CPTED to achieve safety is predicted to enhance the liveability of communities.

Neighbourhood friendliness feature of liveability can be fulfilled by applying the social cohesion dimension of CPTED. Friendliness evolves when positive esteem and social glue brings the people of the community together. In fact, the events of social cohesion organized amongst the members of the neighbourhood for taking responsibilities of their neighbourhood to deal with crime risks (Atlas, 2013), can promote liveability through the creation of friendliness in residents.

Neighbourhood Cultural Diversity and Community Culture: Festival, events, traditional and cultural activities (Atlas, 2008) and even simple cultural strategy like “Stories in a Park” (Sarkissian et al.,2003) makes people share a sense of place to have territorial control over their neighbourhood (Adams and Goldbard, 2001). This dimension of CPTED also promotes liveability through neighbourhood cultural diversity.

Furthermore, the entertainment measure of liveability could be fulfilled by providing access to various cultural, sport and social venues which is part of “community culture” activities. According to Falson (1995), the presence of handlers has an impact on making a potential offender an actual offender. Hence, engaging youths in art/leisure could fill up their free time wisely with healthy activities and avoid them to make friend with offenders or friends with a bad attitude who could influence them and encourage them to commit a crime.

Transport and Connectivity: Connectivity feature of Second-Generation CPTED focuses on the provision of adequate transport facilities for linking the neighborhood to outside areas. According to Barton and Silverman (1994), apart from internal cohesiveness, the neighborhood must not be isolated. This dimension of CPTED

includes some of the transport facilities of liveability concept such as access to public and private transport and its reliability, flexibility and cost (Namazi-Rad et al., 2012).

**III. DISCUSSION**

The six dimensions of the first generation CPTED; Surveillance, Access management, Territoriality, Maintenance, Image/management and Activity Support could be linked to the features of liveability. For instance, provision of surveillance in urban spaces such as residential neighborhoods or even apartments can generate friendliness which results both in safety and making the place more liveable. Moreover, the maintenance of the environment leads to the cleanness of neighborhood. Table 1 shows the compatibility between dimensions of First-Generation CPTED and the indicators of liveability.

**Table 1: Link between dimensions of First-Generation CPTED and Liveability.**

<b>Dimensions of First-Generation CPTED</b>	<b>Indicators of Liveability</b>
Surveillance	Friendliness
Access management	Transport, Transit, and Walkability
Territoriality	Home Size
Maintenance	Neighbourhood Cleanliness, and Pollution
Image management	Neighbourhood Attractiveness
Activity Support	Neighbourhood Safety

Similarly, the link between four Cs of Second-Generation CPTED and indicators of liveability are summarized. For instance, connectivity dimension of the Second- Generation of CPTED is tightly linked to the transport feature of liveability. Table 2 shows the compatibility between dimensions of Second-Generation CPTED and the indicators of liveability.

**Table 2: Link between dimensions of First-Generation CPTED and Liveability**

<b>Dimensions of Second-Generation CPTED</b>	<b>Indicators of Liveability</b>
Social Cohesion	Neighbourhood friendliness
Community Culture	Neighbourhood Cultural Diversity
Connectivity	Transport
Community Culture	Entertainment

**Scale of Analysis**

The scale of CPTED and liveability analysis is playing a significant role in understanding the synergy between physical and social elements. The measures which are suitable at the neighbourhood level may not be appropriate at the level of the individual dwelling. Hence, three scales were introduced by Minnery (2005) viz. “(i) the individual dwelling and its lot, (ii) the street immediately adjacent to the dwelling and lot, and (iii) the neighbourhood in which the dwelling is located”. The same scaling is implied to the assessment of liveability; for instance, in the study by Namazi-Rad et al. (2012) liveability indicators were measured at two separate groups; home level and neighbourhood level. Seifi et al. (2019) described the influence of community culture added to the design of residential places on the level of connectivity and social cohesion in the neighbourhood that enhances security and ultimately improves the liveability of the living spaces. They also delineated that what works at the house level might not have the same effect at the street and neighbourhood level. Similarly, the data might show a concentration of crime in certain areas, but it does not mean that all the neighbourhoods located within the hotspots are less liveable (Seifi, et al., 2020). Therefore, the scale of analysis plays a crucial role in understanding the synergy between the indices of liveability and CPTED.

#### **IV. CONCLUSION**

Cozens (2002) posited that sustainability has a conceptual overlap with CPTED. Moreover, there is substantial overlap between sustainability and livability (Young & Hermanson, 2013; Allen 2010; Sanford, 2011). Hence, the possibilities of CPTED to have common ground was highlighted in various studies. However, this study confirmed many of the components that result in liveability can be fulfilled by achieving the dimensions of CPTED. For instance, natural Surveillance can promote liveability by creating a sense of neighbourliness in a community. Access management overlaps with many of liveability strategies such as walkability and convenient transport.

However, liveability indices are large in consistency. Moreover, scale and time are two important factors while evaluating the liveability of a place (Perez, 2013). Hence, a balancing activity is important to control the congestion of places with adequate liveability features before they fall into an uncontrolled use. Threshold capacity dimension of Second-Generation CPTED balances the human-scale and density of use through tipping which supports the intended use of spaces (Saville, 1996) hence, it acts as an overall glue to keep different parts of activities together for appropriate operations towards security and liveability. While relating the dimensions of CPTED to the indices of liveability; scale and time are two chief factors. Sometimes, people find their neighbourhood extremely livable, but the city as a whole has not scored high in overall livability indices as compared to other cities; safety and perceptions of safety function in the same manner. Moreover, gathering demographics data is a crucial part of conducting a CPTED survey. Important information such as age, sex, job, income, education is necessary for evaluation of CPTED in a community (Crowe, 2000). Demographics is also essential for liveability planning. For instance, the school's location should be in the proximity of neighbourhoods with a higher number of children/teens or facilities for elderlies. Hence, all aspects of CPTED and liveability planning can vary according to the demographics of places. Besides, they affect nearly the entire functions involved, the dimensions and features of living space. Hence, they are beyond the scope of this paper and need a broad and complete study. Most of the transportation planning, some of the services, work and education-related components and policy and governmental decisions are out of the scope of CPTED. However, the synergy between the dimensions of CPTED and indices of liveability show that good CPTED planning can provide nearly 50% of liveability features including safety and security.

#### **V. ACKNOWLEDGEMENT**

The authors would like to extend their appreciations to the Ministry of Higher Education Malaysia for the Fundamental Research Grant Scheme (FRGS). Grant number: 203/PPBGN/6711406.

#### **REFERENCES**

1. Adams, D. and A. Goldbard (2001) *Creative Community: The Art of Cultural Development*. New York: Rockefeller Foundation.
2. Allen, T. F. (2010). Making livable sustainable systems unremarkable. *Systems Research and Behavioral Science*, 27(5), 469-479. <http://dx.doi.org/10.1002/sres.1059>
3. Barton, S. E. (1994). *Common interest communities: Private governments and the public interest*. Univ of California Inst of.
4. Burrsettles, (2014). Most Liveable Cities: A Meta-Analysis. *A Web Journal about Machine Learning*. Retrieved from <https://slackprop.wordpress.com/2014/09/21/most-livable-cities-a-meta-analysis/>
5. Cozens, P. M. (2002). Sustainable urban development and crime prevention through environmental design for the British city. Towards an effective urban environmentalism for the 21st century. *Cities*, 19(2), 129-137.
6. Cozens, P.M., G. Saville, and D. Hillier, Crime prevention through environmental design (CPTED): a review and modern bibliography. *Property management*, 2005. 23(5): p. 328-356.
7. Crowe, T. D. (2000). *Crime prevention through environmental design: Applications of architectural design and space management concepts*. Butterworth-Heinemann.
8. Douglass, M. (2000). Globalization and the Pacific Asia Crisis- Toward Economic Resilience through Livable Cities. *Asian Geographer*, 19(1-2), 119-137. <http://dx.doi.org/10.1080/10225706.2000.9684066>.
9. Eck, J. (1997), "Preventing crime at places: why places are important", in Sherman, L.W.
10. Felson, M. (1995). Those who discourage crime. *Crime and place*, 4, 53-66.

11. Gottfredson, D.C., Mackenzie, D.C., Eck, J., Reuter, P. and Bushway, S.D. (Eds), Preventing Crime: What Works, What Doesn't, What's Promising, National Institute of Justice Research in Brief, US Department of Justice, Washington, DC.
12. Gilderbloom, J. I., Riggs, W. W., & Meares, W. L. (2015). Does walkability matter? An examination of walkability's impact on housing values, foreclosures and crime. *Cities*, 42, 13-24.
13. Green, D. M., & Baker, M. G. (2003). Urbanization impacts on habitat and bird communities in a Sonoran desert ecosystem. *Landscape and urban planning*, 63(4), 225-239.
14. Grimmond, S. (2007). Urbanization and global environmental change: local effects of urban warming. *The Geographical Journal*, 173(1), 83-88.
15. Howley, P., Scott, M., & Redmond, D. (2009). Sustainability versus liveability: an investigation of neighbourhood satisfaction. *Journal of Environmental Planning and Management*, 52(6), 847-864. doi: 10.1080/09640560903083798
16. Mehta, D. (2000). Urbanization of poverty. *Habitat Debate*, 6(4), 1-4.
17. Mishra, A. (2015). Does Temperature Affect Homicide Rate. *J Climatol Weather Forecasting*, 3, 132.
18. Moore, M., Gould, P., & Keary, B. S. (2003). Global urbanization and impact on health. *International journal of hygiene and environmental health*, 206(4), 269-278.
19. Namazi-Rad, M., Perez, P., Berryman, M. & Lamy, F. (2012). An experimental determination of perceived liveability in Sydney. ACSPRI Conferences, RC33 Eighth International Conference on Social Science Methodology (pp. 1-13).
20. Newman, O., & Franck, K. A. (1982). The effects of building size on personal crime and fear of crime. *Population and Environment*, 5(4), 203-220.
21. Painter, K., & Tilley, N. (1999). *Surveillance of public space: CCTV, street lighting and crime prevention* (Vol. 10). Monsey: Criminal Justice Press.
22. Partnership for Sustainable Communities. (2011). *Livability initiative*. Retrieved October 1, 2015, from <http://www.fhwa.dot.gov/livability/partnership/partnerships1.cfm>
23. Perez, P. (2013). Modelling urban liveability. *TEDxUWollongong 2013*. Retrieved from <https://www.youtube.com/watch?v=qNF4SgHxKVQ>
24. Randall, L. A. (2008). 21st Century security and CPTED.
25. Riggs, W., & Gilderbloom, J. (2015). Two-Way Street Conversion Evidence of Increased Livability in Louisville. *Journal of Planning Education and Research*, 0739456X15593147.
26. Sarkissian, W. (2003) Stories in park. Stories in a park. Second-generation CPTED in practice: Reducing crime and stigma through community storytelling. *The CPTED Journal* 2(1), 34-45.
27. Saville, G. (1996) Searching for a neighborhood's crime threshold: Subject to Debate, 10(10): 1-6. Washington, Police Executive Research Forum publication.
28. Seifi, M., Abdullah, A., Haron, S., & Salman, A. (2019, October). Creating Secured Residential Places: Conflicting Design Elements of Natural Surveillance, Access Control and Territoriality. *In IOP Conference Series: Materials Science and Engineering* (Vol. 636, No. 1, p. 012017). IOP Publishing.
29. Seifi, M., Haron, S. H., Abdullah, A., Masron, T., Arshad, M. N., Seifi, M., & Salah, T. (2020). Applying Geographic Information System to Locate the Residential burglary Hotspots in Penang Island, Malaysia. *Test Engineering and Management*, 83, 13840-13846.
30. Turan, M. T., & Besirli, A. (2008). Impacts of urbanization process on mental health. *Anatolian Journal of Psychiatry*, 9, 238-243.
31. United Nations, Department of Economic and Social Affairs. United nations, world urbanization prospects: The 2011 revision. <http://www.un.org/en/development/desa/publications/world-urbanization-prospects-the-2011-revision.html>
32. United Nations, Department of Economic & Social Affairs, population Division. (2018). Retrieved from <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>
33. Winters, J. V., & Li, Y. (2015). *Urbanization, Natural Amenities, and Subjective Well-Being: Evidence from US Counties* (No. 8966). Institute for the Study of Labor (IZA).
34. Young, E., & Hermanson, V. (2013). Livability Literature Review: Synthesis of Current Practice. In *Transportation Research Board 92nd Annual Meeting* (No. 13-2940)..