TERRITORY OF RESEARCH ON SETTLEMENTS AND ENVIRONMENT
INTERNATIONAL JOURNAL OF URBAN PLANNING
34

Designing inclusive urban spaces 2

Federico II University Press
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
CENTRO INTERDIPARTIMENTALE L.U.P.T.
fedOA Press
Vol. 18 n. 1 (JUN. 2025)
e-ISSN 2281-4574

TERRITORIO DELLA RICERCA SU INSEDIAMENTI E AMBIENTE

TRIA
TERRITORY OF RESEARCH ON SETTLEMENTS AND ENVIRONMENT
INTERNATIONAL JOURNAL OF URBAN PLANNING

WoS (Web of Science) indexed journal
http://www.tria.unina.it

Responsible Editor in chief: Mario Coletta | electronic ISSN 2281-4574 | © 2008 | Registration: Cancelleria del Tribunale di Napoli, n° 46, 08/05/2008 | On line journal edited by Open Journal System and published by FedOA (Federico II Open Access) of the Federico II University of Naples

TRIA TERRITORIO DELLA RICERCA SU INSEDIAMENTI E AMBIENTE
INTERNATIONAL JOURNAL OF URBAN PLANNING

Federico II University Press
fedOA Press

TRIA 34 (1/2025) 107-124/ e-ISSN 2281-4574
DOI 10.6093/2281-4574/12559
www.tria.unina.it - Web of Science (WoS) indexed journal

abstract

Investigating Transformations Of Public Places In Planned Urban Developments: Inter-relationship between Related Parameters & Sub-Parameters

Ipsita Shee, Sanjib Nag, Soumen Mitra

Abstract

Transformations are critical indicators of developmental direction & growth pattern of an urban area. *Public Places (PP)* are democratic spaces, where the common citizen has free access. *Planned Urban Developments (PUD)* are designed & developed to help direct uncontrolled growth or over-densification of cities. *Transformations of PPs in PUDs* are a neglected area of scrutiny due various factors including lack of temporal data and assumptions that PUDs follow a pre-decided trajectory of development without any resistance to original master plans. As is evident from existing literature, *Transformations of PPs in PUDs* are an important area of study in the current scenario. Therefore, a research work has been initiated to understand such *Transformation*s and help direct them in desired directions. It is established that parametric studies are effective methods for analysing such *Transformations*. Following this, in this paper, an attempt is made to establish the inter-relationship between the identified Parameters & Sub-Parameters, through the process of Systematic Literature Review (SLR), and prioritization with Expert Opinion Survey (EOS). Parameters and Sub-Parameters is identified using SLR. Thereafter, an EOS was conducted to ratify & prioritize the Parameters and Sub-Parameters to arrive at a final set. The paper ultimately arrives at a set of three Parameters (Accessibility, Activity & Amenities) and six related Sub-Parameters which affect the *Transformations PPs in PUDs*. The final set of Parameters & Sub-Parameters can become a spring-board for future researchers aiming to study similar Transformations. Understanding these developmental directions, especially for PUDs can be critical to driving development along intended lines. The forthcoming part of the overall study will focus on testing the final set of Parameters and Sub-Parameters through selected case studies in the state of West Bengal, India, where at least five new PUDs have been developed by the State Government, which are in various stages of its developmental journey.

Keywords:

Transformations, Public Places (PP), Planned Urban Developments (PUD), Parameters, Sub-Parameters

Indagine sulle trasformazioni dei luoghi pubblici nei progetti di sviluppo urbano pianificato: interrelazione tra parametri e sottoparametri correlati

Abstract

Le trasformazioni sono indicatori fondamentali della direzione dello sviluppo e del modello di crescita di un'area urbana. I luoghi pubblici (PP) sono spazi democratici, liberamente accessibili ai cittadini comuni. Gli sviluppi urbani pianificati (PUD) sono progettati e sviluppati per aiutare a indirizzare la crescita incontrollata o l'eccessiva densificazione delle città. Le trasformazioni dei PP nei PUD sono un'armbito di studio spesso trascurato a causa di vari fattori, tra cui la mancanza di dati temporali e l'ipotesi che i PUD seguano un percorso di sviluppo prestabilito senza alcuna resistenza ai piani regolatori originali. Come emerge dalla letteratura esistente, le trasformazioni dei PP nei PUD è invece un tema importante nello scenario attuale. Pertanto, è stato avviato un lavoro di ricerca per comprendere tali trasformazioni e contribuire a indirizzarle nella direzione desiderata. È stato stabilito che gli studi parametrici sono metodi efficaci per analizzare tali trasformazioni. Di seguito, in questo documento, si cerca di stabilire l'interrelazione tra i parametri e i sottoparametri identificati, attraverso il processo di revisione sistematica della letteratura (SLR) e la definizione delle priorità con un sondaggio di opinione degli esperti (EOS). I parametri e i sottoparametri sono identificati utilizzando la SLR. Successivamente, è stato condotto un EOS per ratificare e dare priorità ai parametri e ai sottoparametri per arrivare a un insieme finale. Il documento arriva infine a un insieme di tre parametri (accessibilità, attività e servizi) e sei sottoparametri correlati che influenzano i PP di trasformazione nei PUD. L'insieme finale di parametri e sottoparametri può diventare un spunto per i futuri ricercatori che intendono studiare trasformazioni simili. Comprendere queste direzioni di sviluppo, in particolare per i PUD, può essere fondamentale per guidare lo sviluppo secondo le linee previste. La parte successiva dello studio complessivo si concentrerà sulla verifica dell'insieme finale di parametri e sottoparametri attraverso casi di studio selezionati nello stato del Bengala Occidentale, in India, dove il governo statale ha sviluppato almeno cinque nuovi PUD, che si trovano in varie fasi del loro percorso di sviluppo.

Parole Chiave:

Trasformazioni, Luoghi Pubblici (PP), Sviluppi Urbani Pianificati (PUD), Parametri, Sotto-Parametri

Fig. 1 - Urban Transformation at Biswa Bangla Gate Area at Newtown, Kolkata between 2011 & 2024. Source: Google Earth Historical Imagery, accessed on 21.10.2024

Investigating Transformations Of Public Places In Planned Urban Developments: Inter-relationship between Related Parameters & Sub-Parameters

Ipsita Shee, Sanjib Nag, Soumen Mitra

1. Introduction & Relevance

Transformations can be defined as fundamental change in inherent functioning of a system. In the urban context, they are critical indicators of the developmental direction & growth pattern of an urban area. Urban Transformations can take many forms: social, economic, physical, technological, political, institutional, and environmental (Maassen and Galvin 2019). In fact, urban history cannot be explained without reflecting on the inertia that exists in city transformations (Bosselmann 2008). Urban Transformation is an umbrella term for all spatial changes to an urban area, happening over time. Examining these Transformations of a place can provide vital insight into its developmental direction. However, due to the lack of sustained temporal documentation, transformational studies are challenging to undertake. For the current research work, 'Transformations' is defined as "Cumulative changes to a place over time." For the overall study, primarily spatial transformations will be in focus.

Public Places (PP) are democratic spaces in any urban setting, where the common citizen should ideally have free access. Although, there is no absolute consensus on the definition of 'Public Places (PP)' among experts, a set of commonalities run through them, namely: (a) Access – A public place has free access to all its citizens and users, without profit or discrimination; (b) Activities – A public place exhibits vibrancy through a multitude of different yet harmonious activities; (c) Ownership – A truly public place (in most cases) is owned by the government i.e.; they are public property; (d) Democracy – A public place encourages democratic use of spaces. The benefits of adequate and vibrant public places is well established through research and there is adequate literature on the same (Beck 2009) (Carmona, Magalhães and Hammond 2008) (Habitat 2015) (PPS 2016). Citizens can work, play, eat, relax, socialize, and shop in these shared spaces, thereby becoming an integral part of their lives. They are irremovably tagged to the Quality of Life of the citizens and instrumental to the overall success of cities themselves (Beck 2009). Vibrant PPs help build a sense of community, culture, and identity. Beyond the social and health benefits, these places are promising locations for economic activities, com-

Fig. 2 - Benefits of PPs | Source: Authors

munity congregation and tourism promotions. PPs are more prone to Transformations (often in the negative direction) as compared to privately-owned spaces (Nel and Landman 2021). Transformations of PPs depend not only on private landowners, but also public/ joint ownership, governance, and market forces. Multiple evidences of negative transformation like encroachment or over-commercialization of open public places have been documented in urban developments across the world. Although, PPs are a much-researched domain, their rapid degeneration and commercialization calls for more probe into their Transformations. For the current research work, 'Public Places are defined as "Areas in an urban settlement which is accessible to the general public, having a multitude of activities and owned by the Government, i.e., it is public property." The overall study will primarily focus on publicly owned open public places, accessible to the public.

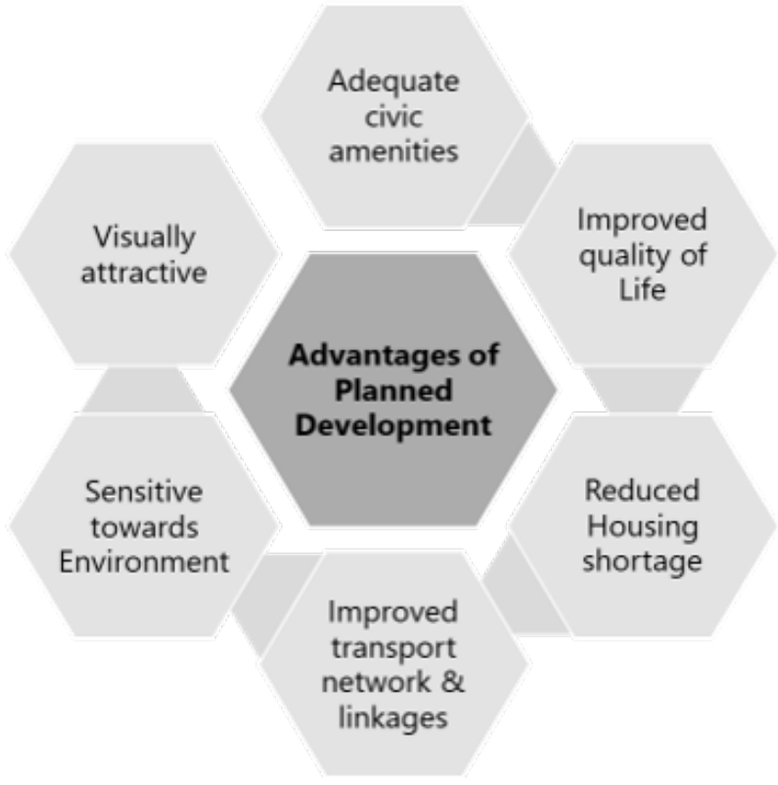


Fig. 3 - Advantages of PUDs | Source: Authors

Planned Urban Developments (PUDs) are habitations which are conceived, based on some specific requirements. They include road facilities, drainage, open space, mass management patterns, and so forth. From the ancient to the modern times, the history of planned cities is as old as the history of cities themselves. PUDs help direct uncontrolled growth, sprawl, or over-densification of cities. The inherent planning is expected to account for better civic amenities, controlled densities, reduced housing shortages, improved transport networks & visual attractiveness. However, as cities expand at break-neck speeds & urbanization spirals out of control, planning for cities has become indispensable. For example, in India, there are around 495 cities (population 1,00,000 or above) of which, not more than 75 are planned (Census of India 2011). PUDs are studied to a lesser extent than their organic counterparts, since they are considered to be "already planned" and expected to follow a pre-decided trajectory of development without any resistance to the original master plans. For the current research work, Planned Urban Developments will be defined as "Any development, in an urban area, which has been planned, partially or in its entirety, based on specific requirements."

Transformations of PPs in PUDs are an important area of study in the current scenario. Yet, they are scanty due to various reasons. Firstly, the lack of temporal documentation, makes these kinds of longitudinal research difficult. Secondly, PPs in PUDs are considered to be bound by robust Development Control Regulations (DCRs) and therefore not prone to much change. Thirdly the delineation of the extent of PPs, even in PUDs is challenging due to overlap of activities. Land-use based classifications and delineations do not work since PPs cut across many land uses including public, semi-public, institu-

tional, transportation, recreational, vacant land etc. Specifically, the transformational journey of PPs in PUDs have not been critically and adequately studied thus far. To amend this knowledge gap, a research has been initiated which will focus on investigating the Transformations that happen in PP of PUDs. It is established that parametric studies are effective methods for analysing such Transformations.

Following this, in this paper, an attempt has been made to establish the inter-relationship between the identified Parameters and Sub-Parameters, through the process of prioritization. First, Parameters & their related Sub-Parameters which affect the Transformations of PPs in PUDs were identified through Systematic Literature Review. Subsequently, to establish their inter-relationship, a process of prioritization was followed. For this, an Expert Opinion Survey (EOS) was designed through purposive sampling. This final set can then become a spring-board for all future researchers aiming to study the Transformative processes for any PP in a PUD through field studies. An increased understanding of the PPs in PUDs is the intended outcome of the overall research work, to help direct their Transformations in desired directions. The forthcoming part of the overall study will also focus on testing the final set of Parameters and Sub-Parameters through selected case studies in the state of West Bengal, India, which has at least 5 new PUDs, developed by the State Government, which are in various stages of their developmental journeys.

2. Methodology & Discussion

Transformations and similar processes, in the context of urban developments, happen due to changes in sets of Parameters. The Parameters may span across various dimensions from physical to environmental and from economic to cultural aspects (Hölscher and Frantzeskaki 2021). A 'Parameter' can be defined as "*Any of a set of physical properties whose values determine the characteristics or behaviour of something* (Merriam Webster Dictionary n.d.)." To establish an inter-relationship between the Parameters & Sub-Parameters, the following steps were followed:

1. *Identification of Related Parameters* –A set of five Parameters were identified from Systematic Literature Review for each of the terminologies (Transformations, PPs, PUDs). Some of the parameters were found to be recurrent in all the three terminologies. Next, Parameters were identified for the combined terminologies (Transformations of PPs, PPs in PUDs). Intersection of lists of above-mentioned parameters for the combined terminologies revealed the final set of possible parameters. Figure 5 (Parameter Identification from Literature Study) elaborates on the same.

2. *Identification of Related Sub-Parameters* - A set of six Sub-Parameters were identified for each of the five Parameters from relevant literature Section 2.2 and Table

2 (Identified Sub-Parameters from Literature Study) elaborates on the identified Sub-Parameters.

3. *Establishment of Inter-relationship of Identified Parameters & Sub-Parameters Through Prioritization* – An Expert Opinion Survey (EOS) was conducted to ratify & prioritize the Parameters and Sub-Parameters to arrive at a final set. Section 2.3 elaborates on the same.

The following illustration elaborates the steps discussed in graphical format.

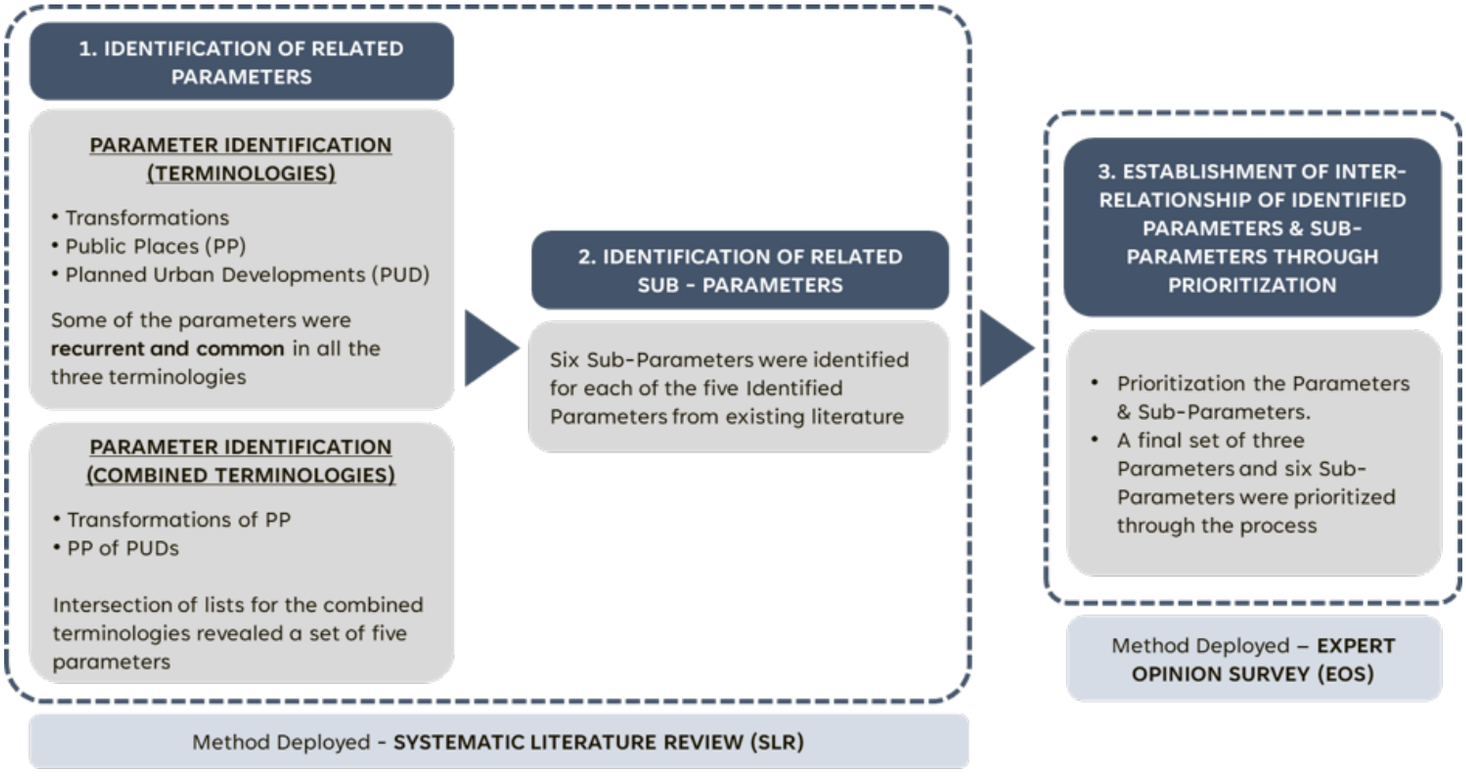


Fig. 4 - Methodology for Finalization of Parameters & Sub-Parameters | Source: Authors

The following sub-sections elaborate on the process conformed to and the outputs thereof.

2.1. Identification of Related Parameters

Systematic Literature Reviews (SLR) are an effective method of identifying related parameters for a particular area of scrutiny. For complex processes like Transformations, which are affected by a multitude of parameters, it is critical to do an SLR. Extensive literature study was conducted to identify the possible Parameters for each of the terminologies (Transformations, PPs and PUDs) (Shee, Nag and Mitra 2024). For each Parameters, a minimum of three authentications from relevant literature was sought. It was observed that some of the Parameters were

common and recurrent in all the three terminologies. Next, further literature study was conducted to identify possible Parameters for the combined terminologies (Transformations of PP and PP in PUDs). It was additionally observed that identified Parameters coincided with initial recurring and common parameters, thereby reinforcing their selection. The intersection of the lists of above-mentioned Parameters for the combined terminologies revealed the final set of possible Parameters. It was observed that the following five parameters lied at the intersection point, recurring in all the literature studied: *P1 – Accessibility; P2 – Activity; P3 – Amenities; P4 – Inclusiveness and; P5 – Imageability.*

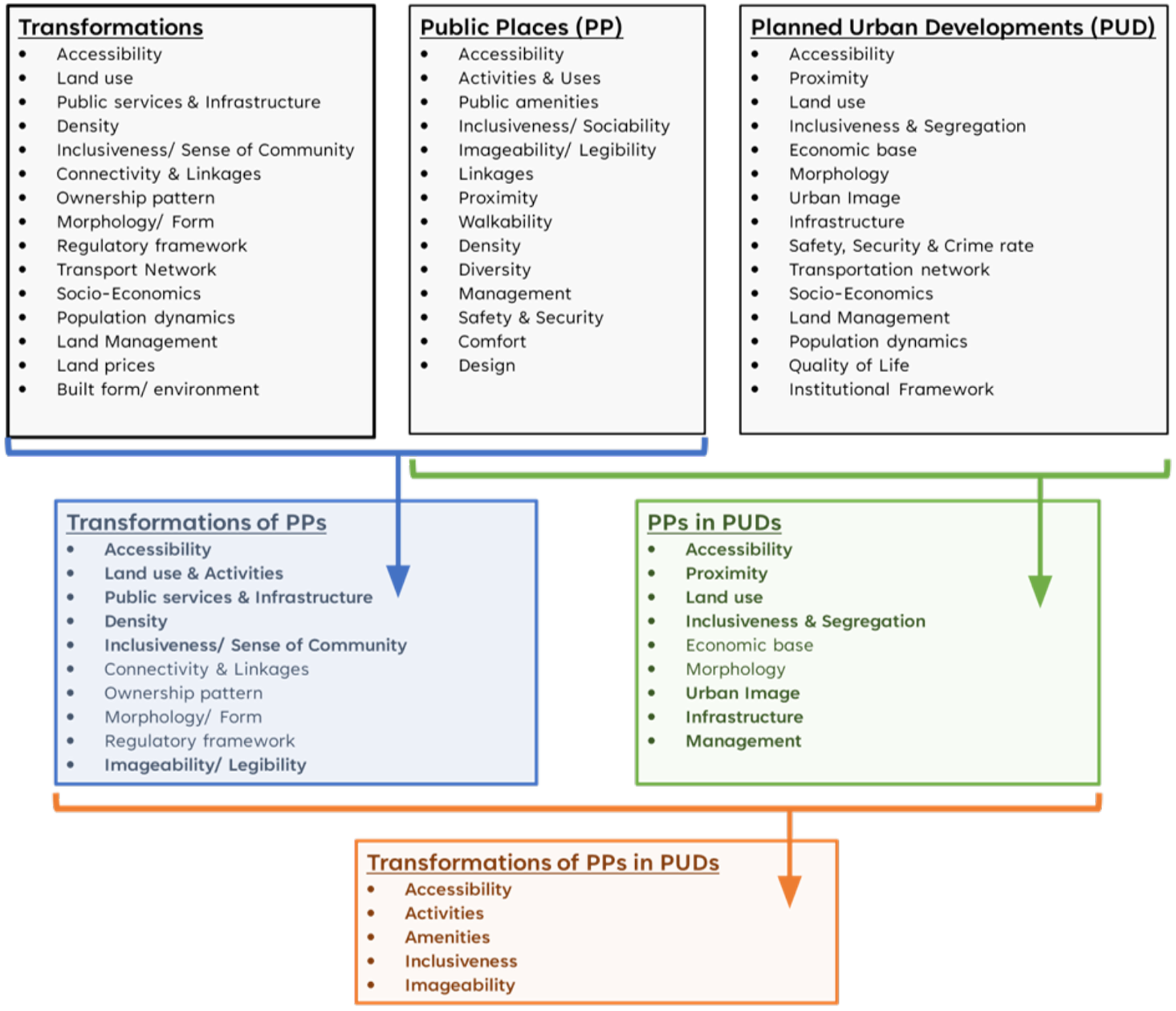


Fig. 5 - Parameter Identification from Literature Study | Source: Authors

Identified Parameters	Definition & Explanation	Referred Literature
P1 - Accessibility	*Accessibility refers to the ease with which a site may be reached, providing a measure that evaluates the relative opportunity for contact or use (Castree, Rogers and Kitchin 2013)*	*(Dinçer, Akyüz and Etike 2022) (Surya, et al. 2020) (Jigyasu 2014) (Gomes 2017) (Arslanli, Unlukara and Dokmeci 2011)*
P2 – Activity	Activities are the basic building blocks of a place, as having something to do gives people a reason to come to a place *(Pasaogullari and Doratli 2004)*. *Activities are important in the link between people and public space because they make it concrete. (Rajabi and Shrifian 2022)*	*(Mehta 2014) (Carr, Francis, et al., Needs in Public Space 2007) (Farhan, Abdelmonem and Nasar 2018) (Gehl 1998) (Turaga, et al. 2019) (Kongphunphin and Srivanit 2020)*
P3 – Amenities	*Amenity is defined as the 'contributions of the environment to the enjoyment of life (Corney, Ives and Bekessy 2015)*	*(Hölscher and Frantzeskaki 2021) (Köroğlu and Ercoşkun 2006) (Lopes, Cruz and Pinho 2019) (Baker, Guaralda and Chitrakar 2014) (Ramay, et al. 2009)*
P4 – Inclusiveness	*Inclusiveness is where the activities and discussions in its development and use processes are open to all (Akkar 2004).*	*(Mehta 2014) (Landman 2015) (Shukla and Chhabra 2022)*
P5 - Imageability	*Quality of a place that makes it recognizable, memorable, and distinct from other places, determining the character and identity of city space (Lynch 1960).*	*(Kim and Park 2016) (Moulay and Ujang 2016) (Jawaid, Pipralia and Kumar 2016)*

Tab. 1 - Authentication of Parameters for Transformations of PPs in PUDs | Source: Various Publications collated by Authors

2.2. Identification of Related Sub -Parameters

Based on the literature studied, a further set of Sub-Parameters for each of the identified Parameters were identified. The literature on the same is extensive and an elaborate list of thirty Sub-Parameters (six for each of the Parameters) were identified.

For *Accessibility*, walkability was one of the most important Sub-parameters, achievable by thoughtful design or redesign which is critical to creating vibrant public places with healthy social interactions (Giles-Corti, et al. 2005) (Khaleghimoghaddam 2023). Other important Sub-Parameters which were recurrent in existing literature included universal design elements, locational aspects, pedestrian & vehicular circulation and catchment area (Shukla and Chhabra 2022) (Zhang, Lu and Holt 2011) (Church and Marston 2003) (Pasaogullari and Doratli 2004). Availability of different modes of transport is also considered to be an important Sub-parameter driving overall accessibility to PPs. Accessibility is greatly influenced by the availability and connectivity to public transport (Terefe and Hou 2024). Similarly, car use facilities affect the accessibility of older adults to public places, particularly open parks, and playgrounds (Kou, et al. 2021).

For *Activity*, one of the most important Sub-Parameters which featured frequently in the existing literature was the multiplicity of uses & activities. This diversity of uses may be measurable by indicators like intensity of temporal use, spatial use, diversity of users etc (Spaces 2023). Other Sub-Parameters identified included volume of commercial activities, density, land use etc. Density, measurable by crowding, is often seen as a deterrent

in public places like busy streets yet they are crucial to encourage active participation (Wen, Kenworthy and Marinova 2020).

For *Amenities*, various Sub-Parameters were identified from literature including existing infrastructural levels, cleanliness & physical conditions, surveillance & visibility etc. Presence of physical infrastructure like seating and shades promote social interactions and social behaviour in various forms (Dudek 2019). Likewise, cleanliness, safety, surveillance indicate the overall upkeep of a public place and are considered imperative aspects. The presence of graffiti, surrounding built structures, signages etc. are all effective indicators for these Sub-Parameters (Shukla and Chhabra 2022).

For *Inclusiveness*, the level of interaction, the diversity of users and the footfall are important Sub-Parameters featuring in existing literature. Inclusiveness is also understood in some literature as being barrier-free in design (Siu, Wong and Xiao 2020). However, although this aspect is captured by the Sub-Parameter: 'Diversity of users,' in general, a more holistic approach to Inclusiveness is more desirable.

For *Imageability*, important Sub-Parameters included legibility, presence of landmarks, distinctiveness & sense of place. Existing literature proves that there is a very strong & positive co-relation between imageability and sense of place (McCunn and Gifford 2021) (Shamsuddin and Ujang 2008) Another important Sub-parameter was distinctiveness which was found to directly affect the imageability & likeability of a public place (Zamanifard, et al. 2018).

Identified Parameters	Identified Sub-Parameters
P1 – Accessibility	P1A - Walkability
	P1B - Universal Design Elements
	P1C - Modes of Transport
	P1D - Location
	P1E - Catchment Area
	P1F - Circulation
P2 - Activity	P2A - Multiplicity of activities
	P2B - Volume of commercial/ economic activities
	P2C - Density
	P2D - Land use
	P2E - Land value
	P2F - Utilization of Space throughout the day
P3 - Amenities	P3A - Cleanliness
	P3B - Surveillance
	P3C - Physical Infrastructure
	P3D - Street Furniture
	P3E - Visibility
	P3F – Physical Condition
P4 - Inclusiveness	P4A - Diversity of users
	P4B - Footfall
	P4C - Level of Interaction
	P4D - Comfort
	P4E - Safety
	P4F - Group Activity
P5 - Imageability	P5A - Legibility
	P5B - Presence of Landmarks
	P5C - Layout
	P5D - Height & Scale
	P5E - Distinctiveness
	P5F - Sense of Place

Tab. 2 - Identified Sub-Parameters from Literature Study | Source: Various Publications collated by Authors

2.3. Establishment of Inter-relationship between Identified Parameters & Sub-Parameters

Based on existing literature study, a set of five Parameters and thirty Sub-Parameters (six for each Parameter) were identified affecting the Transformations of PPs in PUDs. Such a large number of Parameters & Sub-Parameters will make it challenging to infer any purposeful deduction in any future study. Additionally, to establish any meaningful inter-relationship between the identified Parameters, they need to be prioritized (ranking in order of their relative importance or impact) first. For this study, since the decision-making is based on highly specific domain knowledge, an Expert Opinion Survey (EOS) was chosen as the preferred survey method. A total of 52 responses were received from Domain Experts from industry, research & academia, which is a reasonable sample size for EOS (Bruce, Langley and Tjale 2008). The Experts were chosen through a purposive, non-probability sampling technique. The chosen experts had extensive expertise of working in the Development and allied sectors. The Experts were contacted by the researcher and briefed about the research premise before the being requested to take the EOS. The survey contains a total of 11 questions which can primarily be broken down into 3 parts. As per convention, Part 1 focussed on profiling of the Expert Respondents.

• Part 1: Respondents' Profile - The first section deals with basic questions on the location, affiliation, and expertise of the respondents. A healthy mix of experts from industry (57%) & academia (43%) were observed. Almost half of the Respondents (47%) are practising Urban Planning & Management while 33% of the experts are practising Architecture. The remaining are from allied fields like Environment, Sustainability & Social Sciences within the larger realm of Development Management.

• Part 2: Prioritization of Parameters - The second section has one question, meant to prioritize the five important Parameters affecting the Transformations of PPs in PUDs. The question enquired the Expert's opinion on which out of the five identified Parameters play an important role in assessing the Transformations of PPs in PUDs. The question is designed in the form of a 5-point Likert's scale (with 5 being very important and 1 being not at all important), to quantify the relative importance of the identified Parameters and thereby prioritize them.

• Part 3: Prioritization of Sub-Parameters - The third section has 5 questions, pertaining to each of the identified Parameters. Each question lists a set of six identified Sub-Parameters and asks the Experts to suggest the most important ones, in the context of the current research work. The Experts were given the liberty to vote for more than one Sub-Parameter, based on their knowledge and expertise. The results of these questions suggest the most important Sub-Parameters for each of the identified Parameters.

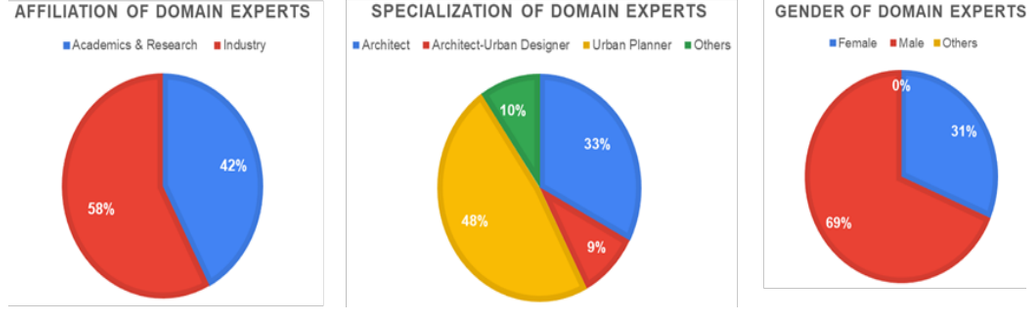


Fig. 6 - Respondents' Profiles in EOS | Source: Authors

The following sections elaborate on the results and inferences related to the prioritization of Parameters & Sub-Parameters.

2.3.1 Prioritization of Parameters

Based on existing literature study, a set of 5 Parameters were identified: *P1 – Accessibility; P2 – Activity; P3 – Amenities; P4 – Inclusiveness; P5 – Imageability*. These five Parameters were then prioritized based on the EO survey. The responses were collated & analysed through a Total Score (summation of the individual scores) & Mean Score (a measure of central tendency). Accessibility, Activities and Amenities emerged as the 3 most important Parameters. Additionally, for these three Parameters, more than 80% of the Respondents had voted them has either Very Important or Important, to double-check the prioritization.

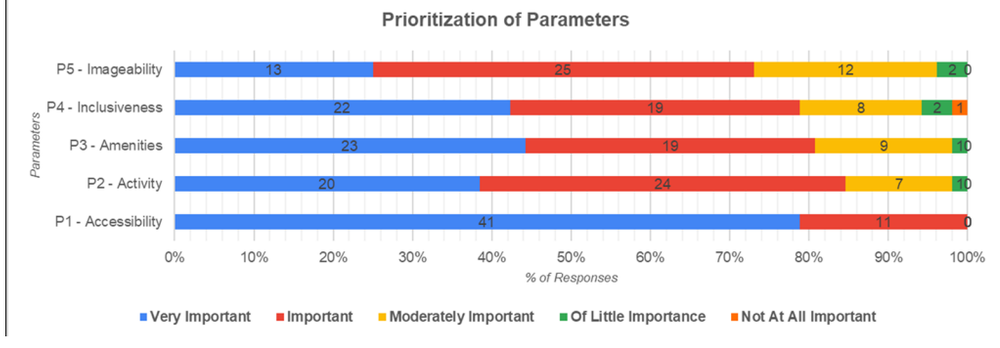
$$\textbf{Total Score (Px)} = 5*a + 4*b + 3*c + 2*d + 1*e$$

$$\textbf{Mean Score (Mx)} = P_x/n$$

where,
P_x = Total score,
M_x = Mean score
a = No. of Respondents according a score of 5 (Very Important) to the Parameter
b = No. of Respondents according a score of 4 (Important) to the Parameter
c = No. of Respondents according a score of 3 (Moderately Important) to the Parameter
d = No. of Respondents according a score of 2 (Of Little Importance) to the Parameter
e = No. of Respondents according a score of 1 (Not at All Important) to the Parameter
n = No. of Respondents (52 in this case)

Score allotted	5	4	3	2	1		
	Very Important	Important	Moderately Important	Of Little Importance	Not At All Important	Total score	Mean score
	(a)	(b)	(c)	(d)	(e)	P_x	M_x
P1 – Accessibility	41	11	0	0	0	**249**	4.79
P2 – Activity	20	24	7	1	0	**219**	4.21
P3 – Amenities	23	19	9	1	0	**220**	4.23
P4 – Inclusiveness	22	19	8	2	1	**215**	4.13
P5 – Imageability	13	25	12	2	0	**205**	3.94

**Numbers indicate the number of responses received.*



Tab. 3 - Total Score & Mean Score for Parameters | Source: EOS by Authors

Although the SLR identified Inclusiveness and Imageability as parameters, the EOS accorded more importance to Accessibility, Activity and Amenities, to assess the Transformations of PP in PUDs. Therefore, the following section focuses on the prioritization of Sub-Parameters for only these three Parameters.

2.3.2 Prioritization of Sub-Parameters

The Sub-Parameters which were identified from literature study were also prioritized through the EOS. For the process of prioritization, the percentages of votes were calculated and analyzed. Expert respondents could vote for a single or multiple Sub-Parameters, based on their understanding. Only those Sub-Parameters were chosen which received a total and clear majority of 2/3rd or 66.6% of the votes. A 2/3rd majority is generally considered to be a clear majority because of its high threshold requirement for consensus as compared to simple measurement (which is 50%+1). A simple majority also does not account for the margin of error (Strass 2018). The following Table presents collated data.

Sub-Parameters Prioritization for "Accessibility (P1)"			
#	**Sub-Parameter**	**Number of Votes**	**% of Votes**
1	Walkability	44	84.6
2	Universal Design Elements	18	34.6
3	Modes of Transport	41	78.8
4	Location	33	63.5
5	Catchment Area	22	42.3
6	Circulation	22	42.3
Sub-Parameters Prioritization for "Activity (P2)"			
#	**Sub-Parameter**	**Number of Votes**	**% of Votes**
1	Multiplicity of activities	37	71.2
2	Volume of commercial/economic activities	33	63.5
3	Density	14	26.9
4	Land use	26	50.0
5	Land value	14	26.9
6	Utilization of Space throughout the day	41	78.8
Sub-Parameters Prioritization for "Amenities (P3)"			
#	**Sub-Parameter**	**Number of Votes**	**% of Votes**
1	Cleanliness	35	67.4
2	Surveillance	28	53.8
3	Physical Infrastructure	44	84.6
4	Street Furniture	32	61.5
5	Visibility	33	63.5
6	Physical Condition	29	55.8

Tab. 4 - Sub-Parameter Prioritization through EOS | Source: EOS by Authors

The bar charts below explain the results in a graphical format. For Accessibility (P1), the prioritized Sub-Parameters were Walkability and Modes and Transport. For Activity (P2), the prioritized Sub-Parameters were Multiplicity of activities and Utilization of space throughout the day. For Amenities (P3), the prioritized Sub-Parameters were Cleanliness and Physical Infrastructure.

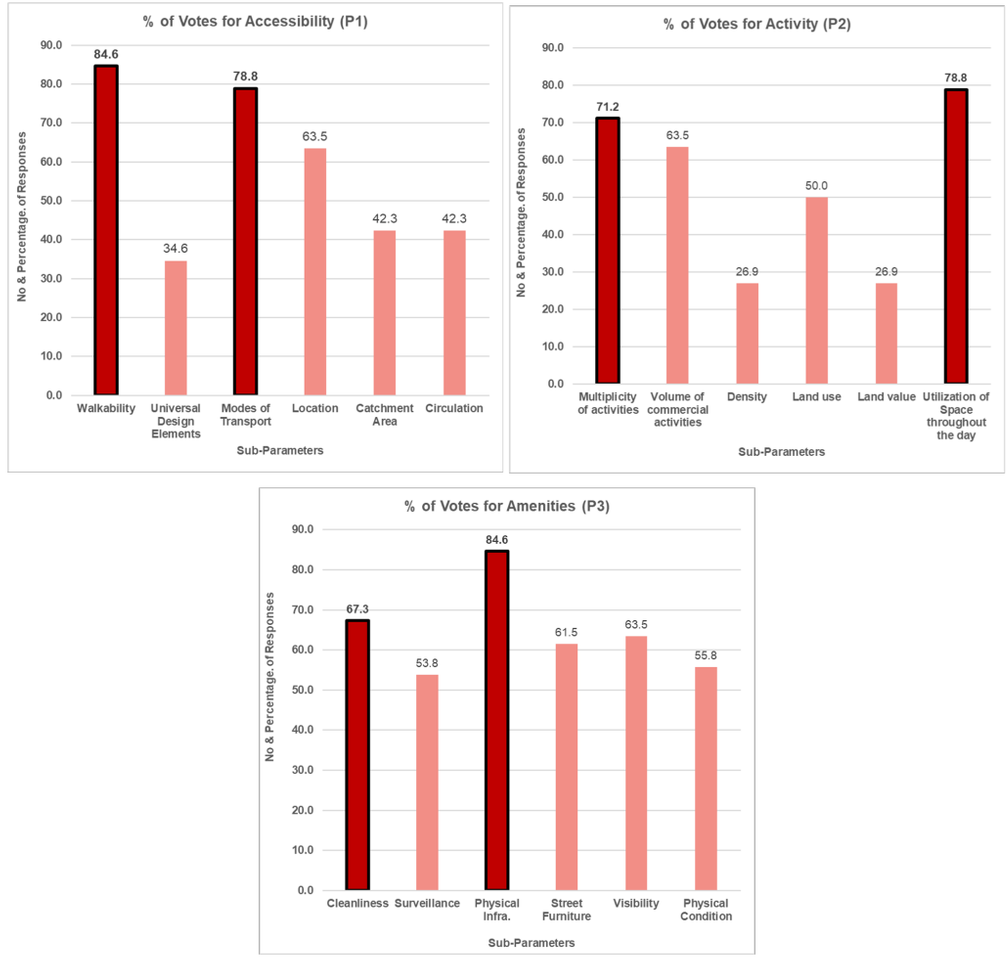


Fig. 7 - Sub-Parameter Prioritization through EOS | Source: Authors

2.3.3 Establishment of Inter-relationship

Based on the above study, a total of three Parameters and six Sub-Parameters were identified and ratified with respect to Transformations of PPs in PUDs. The following chart lists the Final list of prioritized Parameters and Sub-Parameters affecting the Transformations PPs in PUDs.

Walkability is a measure of pedestrian environment measurable through a host of metrices ranging from ease of use to visual interest (Lo 2009). It has been established to be an important Sub-Parameter to assess the Accessibility. Walkability can be measured by the presence of pedestrian infrastructure as well as the Pedestrian count. Modes of Transport and their integration has also been established as an important Sub-Parame-

Final Parameters	Final Sub-Parameters
P1 - Accessibility	P1A - Walkability
	P1C - Modes of Transport
P2 - Activity	P2A - Multiplicity of activities
	P2F - Utilization of Space throughout the day
P3 - Amenities	P3A - Cleanliness
	P3C - Physical Infrastructure

Tab. 5 - Final List of Related Parameters & Sub-Parameters | Source: Authors

ter where their multiplicity plays an important role (Jefferson 1996). The modal split and their relative volumes can prove to be important indicators to measure the overall accessibility. Similarly, for the Parameter, Activity, Multiplicity of activities, which is an indicator of the diversity of uses and functions of a PP, has been established as an important Sub-Parameter (Tamašauskaitė 2020). The Utilization of a PP throughout the day rather than only for a specific time has also been established as a significant Sub-Parameter. This multiplicity of activities along with their spatial arrangement and diurnal utilization are important to effectively measure the usage of PP in a PUD. For the Parameter Amenities, Cleanliness is an important Sub-Parameter since it provides a pleasing and inviting environment which is crucial for a vibrant PP (Mehta 2014) (Pasaogullari and Doratli 2004). The presence of proper and adequate Physical Infrastructure, measurable by the presence of proper lighting, street furniture, public restrooms etc. has been established as an important Sub-Parameter. Beyond analysing the actual presence of infrastructure and undertaking a condition survey, the perceived cleanliness and usability of the amenities is also important. In conclusion, these Parameters and Sub-Parameters have been identified to be recurrent in existing literature as well as ratified and prioritized through EOS and are therefore established as related Parameters and Sub-Parameters in the Transformations of PPs in PUDs.

3. Conclusion & Way Forward

The analysis of the Transformations of PPs is tied up with the analysis of its wider setting: the city (TUNÇ, 2003). Understanding these developmental directions, especially for PUDs can be critical to driving development along intended lines. Transformational studies of PPs in PUDs are scanty due to a multitude of reasons, some of which were stated earlier. In the history of the existence of an urban area, it is likely to have gone through various spells of densification, sprawl, specific interventions, growth and decline to contribute to its overall Transformation. It is extremely challenging to capture these changes holistically. One possible remedy, specifically, in the case of PPs in PUDs can be to first compare the current scenario with the original master plan and look for changes/deviations. For such studies, these Parameters and Sub-Parameters can be critical to field test and study the on-ground Transformations of PPs & PUDs.

The final set of prioritized Parameters and Sub-Parameters can then also become a spring-board for all future researchers aiming to study the Transformative processes for any PP in a PUD. In the context of post-independent, (1947 onwards) urban India, all major metropolises have developed new PUDs in its fringes to tackle the problem of burgeoning population and growth: New Delhi (Gurgaon, Noida), Mumbai (Navi Mumbai), Kolkata (Bidhannagar, Newtown), Bhubaneswar, Ahmedabad (Gandhinagar) and many others. 50 years hence, these PUDs and specially their PPs have experienced significant Transformations, often deviating from their

original master plans. The study can become a good starting point to investigate the genericness or the specificity of these Transformations.

The forthcoming part of the overall study will also focus on testing the final set of Parameters and Sub-Parameters through selected case studies in the state of West Bengal, India. Post independence, at least 5 new PUDs have been developed by the State Government, which are in various stages of their developmental journeys. This makes West Bengal apt for a holistic study. A set of four PPs in Saltlake (Bidhannagar) and Newtown are being finalized for the field studies.

Further avenues of research can also include probing the causes of such Transformations as well as understanding the fundamental differences in nature of Transformations of PPs in PUDs in comparison to unplanned urban developments. The study can also extrapolated to other geographies as well as other historical, cultural, and socio-economic contexts.

Finally, after understanding the nature of these transformative processes, recommendations and strategies can be formulated to guide such Transformations in desired directions.

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