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DEFINING SLUMS USING MULTIDIMENSIONAL AND RELATIONAL PROPERTIES: A DYNAMIC FRAMEWORK FOR INTERVENTION

Aisha Abubakar*, Ombretta Romice , Ashraf M. Salama

Keywords

slums;
definition;
ontology;
framework;
intervention;
prosperity

Abstract

Phenomenon as old as cities themselves, slums - in their many permutations - have been part of city management for a long time. Descriptions and definitions have gone through trends and so have the strategies to address their conditions and relationship to cities. Summarising various trends, definitions and approaches to solutions of slums, this paper critically analyses more recent and structured approaches that attempt to grasp the complexity of all realities constituting the slum as a key to their management. Then, from a detailed review of properties of slums from literature, it proposes a rational framework – the Slum Property Map – that organises such properties (cultural, social, economic, environmental) into a relationship map where reciprocal links between properties are highlighted and used both to develop narratives of the slum – how it originates, develops and functions for its inhabitants, and in relation to the city- and thus eventually to guide intervention through investment in and management of local assets. The paper presents the Slum Property Map as a comprehensive and dynamic way to understand slums as holding potential for their immediate and future prosperity.

A. Abubakar, O. Romice , A. M. Salama*

A. Abubakar, Urban Design Studies Unit (UDSU), Department of Architecture, University of Strathclyde. 75 Montrose Street, Glasgow G1 1XJ – United Kingdom*
O. Romice. Urban Design Studies Unit (UDSU), Department of Architecture, University of Strathclyde, 75 Montrose Street, Glasgow G1 1XJ – United Kingdom
A. M. Salama, Cluster for Research in Architecture and Urbanism in the Global South, Department of Architecture, University of Strathclyde. 75 Montrose Street, Glasgow G1 1XJ – United Kingdom

*Corresponding Author's email address: aisha.abubakar@strath.ac.uk

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Aisha Abubakar*, Ombretta Romice , Ashraf M. Salama

INTRODUCTION – OVERVIEW OF SLUMS TODAY

In 2003, the United Nations Habitat (UN-Habitat) highlighted how continued slum growth in Developing Regions posed a challenge to global urban sustainability; accordingly, Millennium Development Goals were defined 'to significantly improve the lives of at least 100 million slum dwellers by the year 2020' (UN-Habitat, 2003, p. 8); these are now superseded by the Sustainable Development Goals (SDG) and new targets for total eradication of slums by 2030 (United Nations, 2014).

In a rapidly urbanising world, where 90% of an overall population presently growing at 0.9% annually is occurring in Developing Regions, slum urbanism is a dominant part of cities since early records in 1969 officially commenced (UN-Habitat, 2013a, 2016; United Nations Population Division, 1969). Of all continents, Sub-Saharan Africa is the most vulnerable to this phenomenon with 55% of the overall slum population, followed by Southern Asia, South-Eastern Asia, and Eastern Asia at 31%, 28% and 26% respectively (UN-Habitat, 2016). Because this trend is set to continue, the challenge for Developing Regions lies in the appropriate management of slum urbanism (Tannerfelt & Ljung, 2006).

Developing Regions are at a difficult juncture in the general challenge of meeting global urban standards, and slums are in general not regarded as mainstream parts of development nor an advantage to city profile (Alagbe, 2006; Marx, Stoker, & Suri, 2013; Satterthwaite, 2016). This perception has in the past steered most approaches to the management of slums towards their elimination or containment (Hamdi, 2010). Prevailing attitudes since the 1950s, and still common today, include policies of benign neglect by government bodies, who believed slums would disappear with steady economic growth (Arimah, 2010; Njoh, 2003); of forced evictions and demolitions of entire settlements during the 1970s and 1980s which destroyed communities in multiple ways (UN-Habitat, 2003; Arimah, 2010); and the re-settling or re-housing of entire slum populations into standardised, planned and over dense inner city estates, or structures outside the city (Abubakar, 2013; Davis, 2006). These have often been shown to rapidly degenerate into slums or to become gentrified, with the consequent expulsion of the population they were created for (see Hamdi, 2010; Cronin, 2013).

In the past three decades, there has been some progress in dealing with slum in a more positive way, involving on-site strategies to improve overall living conditions with the acknowledgement that destroying slums without resolving issues at their roots only fuels the growth of more slums. Some of these strategies include initiatives on tenure, poverty alleviation, sanitation and education (Arimah, 2010; Jaitman & Brakarz, 2013). However, a target 9% drop in the proportion of slum to urban populations between 2000 to 2014, favoured by slum upgrades and the Participatory Slum Upgrading Program of the UN-Habitat, remains dwarfed by the continued rise in absolute slum populations (UN-Habitat, 2011a, 2011b, 2013a, 2013b). The many layers of social related, economic, and environmental complexities intertwined in them makes appropriately implementing any interventions a challenge (Jaitman and Brakarz, 2013). As such, according to the UN-habitat, efforts are still unsatisfactory to the present challenge of slums, which remain a critical point of concern in the fight to improve overall wellbeing of cities (UN-Habitat, 2011b, 2013a, 2016).

SLUMS IN HISTORY

"All cities start in mud." Robert Neuwirth, 2005

Slums are an old phenomenon, linked to the city's development as a form of specialisation and advancement (Glaeser, 2013), which makes it a place to foster, change and pursue ambitions, even if just by proximity to other people (UN-Habitat, 2013a; Geoffrey Payne,

2008). Slum development has been a consistent part of the urbanised Developed Worlds, Europe and America in particular, long before it became a phenomenon predominantly associated to the Developing World. In 800 BC, people were squatting in the temples and vacant or derelict lands of Greece (Finley, 1985 in Neuwirth, 2005). In Rome, seven centuries later, the migrating population that could not afford private housing or had anywhere to stay, built freestanding colonies wherever possible (Neuwirth, 2005); whilst France experienced squatter colonies and declining households as early as the 13th century, and by the 18th century their population amounted to 20% of the total. England also had its own fair share of squatters before the Industrial Revolution, as records show people settling in the royal forest, the commons and even about the Tower of London already in the 1500s, conditions that heightened after the great fire of 1666 and the 17th century plague (Neuwirth, 2005). Squatting also formed a substantial part of American urban expansion before the War of Independence and thereafter. The 18th and 19th century industrialisation in Europe and America exacerbated squatting and land speculation as city populations grew (Birch, 2014; Neuwirth, 2005; UN-Habitat, 2003). New forms of slums emerged – densely built, overcrowded makeshift, subserviced tenements, which drew exploitation and marginal activities to new limits.

For the new Developing Worlds of Asia, Latin America and Africa, however, it was the heterogeneous effects of the forces of colonisation, and related industrialisation of the late 19th and early 20th century that gave rise to the appearance of the first slums – Dharavi in India, favelas in Brazil, Kibera in Nairobi, and sections of Lagos island (Bigon, 2008; Neuwirth, 2005; UN-Habitat, 2003). Colonialists separated and confined indigenous populations, land and property holders to peripheral lands, and did not invest in native resources, thus creating settlements spatially segregated and marked by social differences (Bigon, 2008; Ekdale, 2011; Jefwa, 2015; Magalhães & Nacif Xavier, 2003). When migration into cities increased, due to scarcity of work in the hinterlands and countryside, segregation became even more acute, and slum settlements expanded. The mid-1900 wave of globalisation caused further migration amidst quests for employment, environmental and climatic challenges, and civil unrests. This extreme urbanisation happened without the necessary economic and structural growth and support (Fox, 2013; Hutchinson, 2010; UN-Habitat, 2003), widening extensive poverty and slum population to almost 1Billion, a figure set to double by 2050 (Florida, 2014; UN-Habitat, 2016).

OVERVIEW OF DEFINITIONS OF SLUMS SINCE EARLY 1800

Since their inception, defining and understanding the meanings of slums has been an ensuing challenge, not in standardising the noun 'slum' per se, with all its variations and connotations, but in describing the many complex contexts, conditions and causes that characterise it.

Some of the oldest references (Rome, Paris and London) are to shanty towns and squatters, characterised by squalid accommodation (evil smelling, squalid, filthy) and destitute inhabitants (beggar families, miscreants) (Whittaker, 1993; Geremek, 1987; Stow, 1842 in Neuwirth, 2005). The 19th century brought a wave of audits and campaigns for urban reform of the challenged parts of society and the term 'slum' – 'to sink in a muddy swampy place' (Bigon, 2008), 'a form of depredation practiced by thieves, or house stripped of its linens or valuables' (Prunty, 1998 in Gilbert, 2007), or 'a racket or criminal trade' (Davis, 2006, p. 21) – was coined in reference to a configuration of people and the physical places they inhabit (Davis, 2006).

The general discourse in the mid-19th to early 20th century focused on what was perceived as the main factors that distinguished slums from the rest of the city – poverty (especially), criminality, infectious diseases and resourceful, if desperate, behaviour (Davis, 2006; Gilbert, 2007), often leading to quite categorical conclusions. Hollingshead for example, writing in 1861 of Bayswater and Notting Hill suggested that if people were attached to a place of such un-wholesome sanitary conditions, then they were beyond help (Hollingshead, 1861 in Neuwirth, 2005). Cardinal Wiseman's documentation of the slums of Westminster (Ward, 1897), and Charles Booths' categorisation of London working class from upper-class wealthy, to lowest-class, 'vicious, criminal' (British Library, 2017), were more rigorous, attempting to profile both the slum as a place and their population. Others, like journalist H.C Bunner, saw industriousness and 'comic potential' in slums, rather than pestilence only (Neuwirth, 2005, p. 222). Nonetheless, squatter evictions, demolitions, re-settlement, sometimes supported by privatisation and legal rulings were the prevalent actions throughout the early centuries and into the 20th century in Europe and America, all geared to the eradication of the slum as a reality. Subsequently, however, slums in these regions were steadily managed owing to increasing affluence, and both physical and soft reforms (further driven by slum community organisations and social grassroots movements).

Dealing with slums in the new Developing Worlds during the first half of the 20th century was at least as much a challenge as it was for the Developed Worlds. Similarly, pejorative perceptions and disregard for them unveiled a very simplistic understanding of a very complex phenomenon (UN-Habitat, 2003). The ignorance of the realities and the needs of the poor, and slum clearance prevailed (Davis, 2006; UN-Habitat, 2003; see also Bigon, 2008; Ekdale, 2011; Jefwa, 2015; Magalhães and Nacif Xavier, 2003), causing further slum expansion and breakdown of social and civil relations between their people and the administrations.

ARTICULATING THE PROBLEM: LACK OF ACCEPTED AND ADOPTED DEFINITIONS OF SLUMS

"Whenever action is required, it is necessary to identify the target population. So, what is a slum?" (Alan Gilbert, 2007: 699).

Cuthbert (2011) highlights that scholars have been tracking the problem of defining slums for decades without actually coming to a precise definition. Nevertheless, the clock is ticking; evident and projected peaks in urbanisation and their impacts on Developing Regions post 1950's heightened calls for effective urban management policies and action, thus making a proper, as well as operational, slum definition even more essential. Stokes (1962, p. 188) explained the lack of systematic understanding of slums very simply: they are 'the home of the poor and the stranger [....] classes not (as yet) integrated into the life of the city' and therefore difficult to document. This, according to Gilbert (2007) made the slum an even more amorphous term. Many arguments against the use of the term 'slum', the superficial perception of slums along with the lack of consideration for the human and social capital, housing solutions, and interactive and dynamic nature of slums followed – Turner (1976, 1978, 1969) and Marris (1979) can be cited as examples.

Following the adoption of the United Nation's millennium declaration in 2000, the organisation sought to breach the slum definitional gap with an operational definition in the 'Challenge of Slums' (UN-Habitat, 2003) – returning the use of the 'slum' to popular urban discourse (Gilbert, 2007). This definition of slum referred to an area with a combination of the following characteristics:

- Inadequate access to safe drinking water;
- Inadequate access to sanitation and other basic infrastructure and services;
- Poor structural and inadequate quality of buildings;
- Overcrowding and insecure tenure.

This definition is still restrictive (Davis, 2006; Gilbert, 2007), as it disregards the more social and complex aspects of slums and their communities. The Cities Alliance's slum definition is also limiting, as it only uses tenure and sanitation as indicators (see Cities Alliance, 2016); its slum upgrading strategy is, however, more socially oriented. The UN-Habitat, however, recognising the limitations of its operational slum definition, has called for a more organic and socially inclusive slum definition.

In response, scholars have proposed comprehensive frameworks to define slums: Gulyani and Bassett (2010) propose the 'living conditions diamond' as an overview of slums that distinguishes four interactive dimensions, with their relevant indicators: (1) tenure, (2) infrastructure, (3) housing unit, (4) neighbourhood and location. This framework does not consider other (causal) variables that lie outside the purview of the slum (Gulyani and Bassett, 2010); or, again, their associated complex social contexts. Kohli et al. (2012) propose the Generic Slum Ontology (GSO), a framework for conceptualising slums (based on image analysis and classification) and for the extraction of information across non-physical contexts. The GSO describes slums on three levels of image analysis: (1) building and access network at the object level; (2) settlement shape and density at the settlement level, and (3) location and neighbourhood at environmental level. Considerations for other salient social contexts, interrelations between the distinctive characteristics of slums, and local knowledge from slum community is however, still limited.

Indeed, there are many complex contexts – social, physical, economic and political – that play a part in the conditions (and causes) of slums, some of which are positive capital, rather than negative challenges. For Pretz, Naples and Sternberg (2003), the first stage to manage a complex problem is a precise *cognitive* identification and understanding of it; the second is a definition that enables it to be conceived relative to *why it is needed*, allowing a more positive approach to be found. For slums then, we need to capture the cognitive complexities associated with them to guide proactive and effective intervention.

The dimensions that make slums complex and hard to define are:

Differences in perceptions

- Standards and baseline measures for urban planning and housing vary between regions and are influenced by ideals, cultures, professional affiliations and society, making objective targets all the harder to establish. Slum are more of a political than scientific issue (Yelling, 1986 in Gilbert, 2007).

Locational, social and spatial dynamics

- Geographical locations create great variety in slum profiles and forms. In addition to this are people's relative social, subjective, and spatial interactions and associations that are further complicated by culture, ethics, and socio-economic profiles, and which generate great variations in the dynamic of life in slums, and are difficult to represent.

Transformations with time

- There are three contexts to transformations that occur in, or affect slums over time: 1) changes in social-spatial interactions between people in the slum; 2) Social, economic, and structural changes of cities' spatial structure; 3) The continuous review and evolution

of urban and development standards of the infrastructure that make up the slum in the city – standardisation of land, use, functions, and materials. What might have been condoned at one time might not be so at another time. For Gilbert (2007) the only temporal consistency of the slum concept is the general perception that they are undesirable places to live.

In light of the preceding dimensions, the paper proposes a comprehensive framework to define slums and guide intervention within them in a context specific manner: a definition that is both comprehensive, as a platform of analysis, and relative to unique slum contexts.

AN APPROACH TOWARDS A SOLUTION: BUILDING A FRAMEWORK FOR A DYNAMIC SLUM PROPERTY MAP (SPM)

To answer the age-old question of what a slum is, and for effective intervention, its story needs to be told: a story that gives a narrative to the multidimensional contexts – of people and their place, and the wider city – of slum development. To guide this narrative, we propose the Slum Property Map (SPM); it will need to take into account the many dimensions that give complexity to slums, thus fulfilling these requirements:

- To allow any slum to be profiled irrespective of variations in standard, form or location dynamics. A standard way of perceiving and telling the story of the slum, yet allowing context specific profiles to be formed;
- To consider the complete image of slums, the complex and interactive social (and even subjective) and spatial, and physical dynamics that are characteristic of all city systems (see Jacobs, 1961). These dynamics, one must remember, are not necessarily all negative challenges;
- To be a dynamic framework that can be used to describe the slum when changes to general conditions occur;
- To profile the slum in a manner that is **heuristic**, where the effects of actions and outcomes can be considered relative to the unique slum profile.

To fulfil the first three requirements, we follow an integrated ontological as well as cognitive approach, identifying all those properties needed to develop a comprehensive overview of slums and organising them into *Types* (of perceptual properties) and *Categories* (of cognitive properties).

This first step of the research involved a qualitative content analysis. Over 98 publications were considered and reviewed. The literature survey was done using global search in Google Scholar, Scopus, and Suprimo (library contents); publications including published journals, books, theses, reports, working papers, media, and websites were all considered. The literature survey was also done without restriction to location, from a publication date of 1969 (emergence of publications on urban concerns), with specific focus on literature on types of slums presented by (UN-Habitat, 2003), and to include literature that discuss slums in general (e.g. (Davis, 2006)) and those that discuss specific slum areas (e.g. (Cronin, 2013)).

The *Types* (of perceptual properties) and *Categories* (of cognitive properties) describe the social, cultural, economic and environmental characters of the slum, but taken alone do not offer a comprehensive overview of such a complex phenomenon. Two further steps that we propose in the SPM are required. The first consists in making explicit the connections that such properties have amongst themselves, to highlight relationships, effects, influences that

they might have on each other. The second consists of building narratives that connect all properties into complex and context specific overviews on how the slum originates, develops and functions for its inhabitants, and in relation to the city. This step fulfils the fourth requirement and makes the comprehensive overview of the slum operative.

TELLING THE STORY OF THE SLUM:
BUILDING A COMPREHENSIVE IMAGE OF SLUMS

In philosophy, *ontology* is a systematic account of the existence of something, a characterisation of its nature or reality (Agrawal, 2005 in Kohli et al., 2012); a conceptualisation of it that clarifies or simplifies it (Gruber, 1993). To know the true nature of anything or 'object' being contemplated (Kluge, 2000) – in our case (any) slum – we need to know: (1) What composes it; (2) what form it takes; (3) what causes it and/or produces the change towards its form; and (4) its purpose. These are its material, formal, efficient and end causes (Aristotle in Falcon, 2015; Kemerling, 2011; Koslicki, 2008).

Some of this information is acquired through simple observation and perception of phenomenal, and the noumenal realms (Haybron, 2011; Koslicki, 2008; McLoud, 2011); and then through our cognitive processing of such information (O'Brien, n.d.). We therefore aim to describe the ontology of slum through two sets of properties, those which we observe and perceive, and those we construct through cognition and elaboration of information (figure 1).

The SPM, therefore is structured in: (1) an experiential set of *slum (object) property* **Types**, and (2) a cognitive set of *slum (object) property* **Categories.**
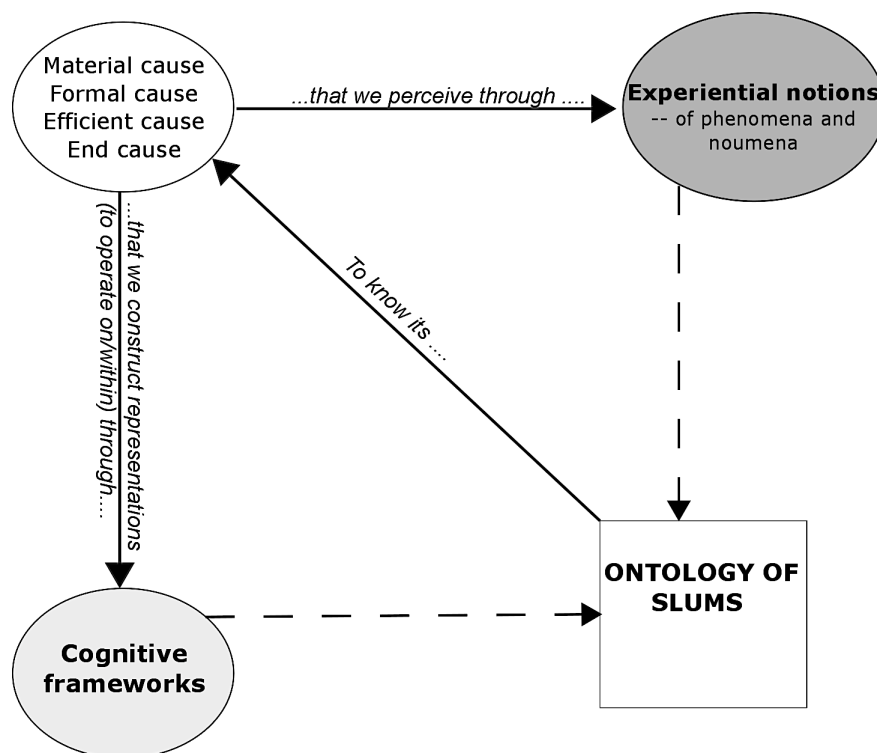

Figure 1. The slum ontology – we experience through perception and operate through cognition (Source: Authors).

Experiential Slum (object) Property Types

The experiential set of *property types* are necessary to experience and observe the slum as it manifests itself, its describable and measurable traits that we perceive, and they include *objective* and *inferred properties*. Objective properties are aspects of the phenomenal realm of slums; that is, descriptions of it that are grounding appearances in real space-time, or can be experienced and measured through sensorial intuition (or pure reasoning – seen, heard, touched etc.). Properties that we perceive in this way have objective existence, measures can be both qualitative and quantitative (Cordier & Tijus, 2001; McLoud, 2011). Inferred properties, however, are aspects of the noumenal realm of slums that are hidden and/or not observable by grounding appearances in real space-time; hence, we cannot experience them in a sensorial way but rather through intellectual intuition (or practical reasoning) (Cordier & Tijus, 2001; McLoud, 2011) (figure 2).

For a comprehensive understanding of slums therefore, its property profiles will include those that are observable – physical, environmental – and those that are not but formed from acquired knowledge of things and of people's experiences – social and subjective, cultural, economic and environmental contexts. The cognitive set of *property categories* provides a conceptual coherence (within which we can operate) to exploring and representing slum property *types* that we can objectively comprehend and those we infer. Both are important to define the slum as a complex system.
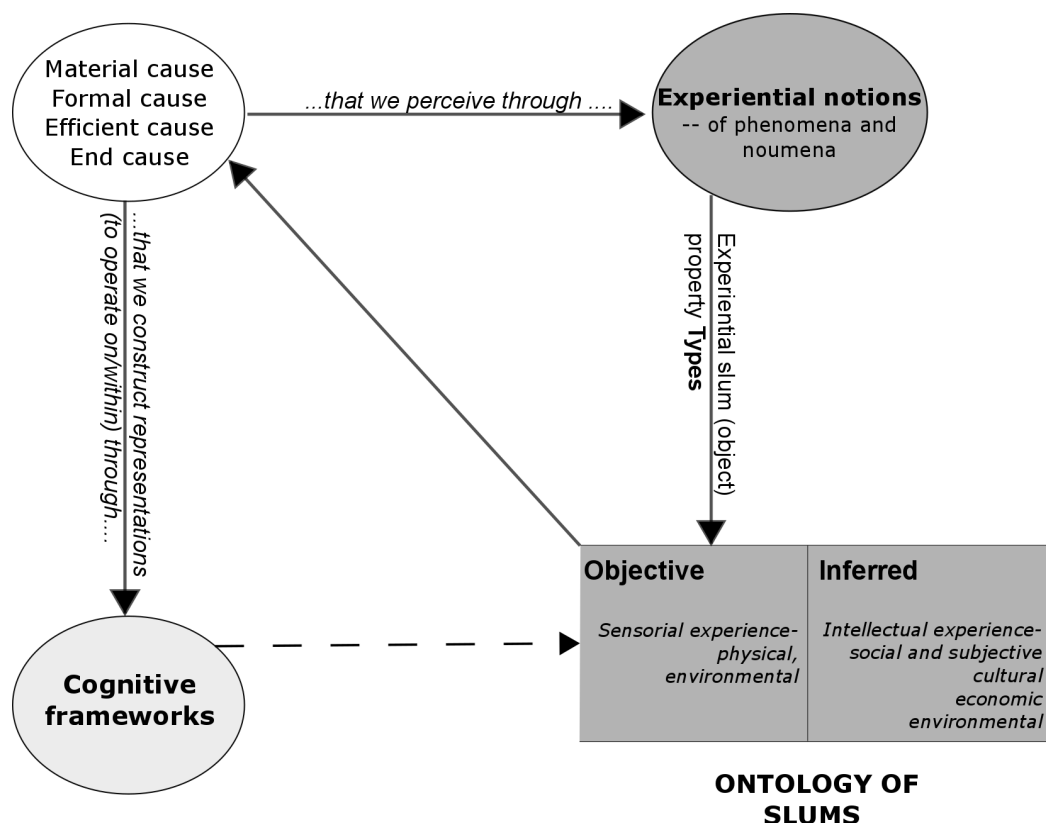

Figure 2. Experiential slums properties – descriptions of slums include those that are objective and those that are inferred (Source: Authors).

A Cognitive Slum (object) Property Categories

The cognitive set of *property categories* represents our cognitive frameworks of slum properties, and they expand upon the typology of object properties by Cordier and Tijus (2001). Exploring and properly representing the complex *causal nature* of objects (their ontology) – in our case the slum – so we can operate on or within it, implies dealing with property concepts that can be grouped into three: (1) structural properties that describe its structure; properties linked to action relative to it that include (2) *functions, (3) procedures and agency, (4) processes, (5) personality traits, and (6) behaviours*; and properties that can add to meaning and context of it, which include (7) *place* and (8) *name*.

We then combine the slum property types within their complex narratives. In their conceptual set up, structural properties are objective profiles of the slum: functions, procedures, processes, personality traits are inferred and observed from knowledge and/or people's experiences, whilst behaviour properties can be both objective and inferred. Place properties can be both objective and inferred, whilst the name property is inferred (figure 3). Combined, cognitive property categories with experiential property types generate a framework of the eight property categories (named above) with relevant clusters of slum properties that they capture (which similarly combine property types into their narrative) (figure 4).
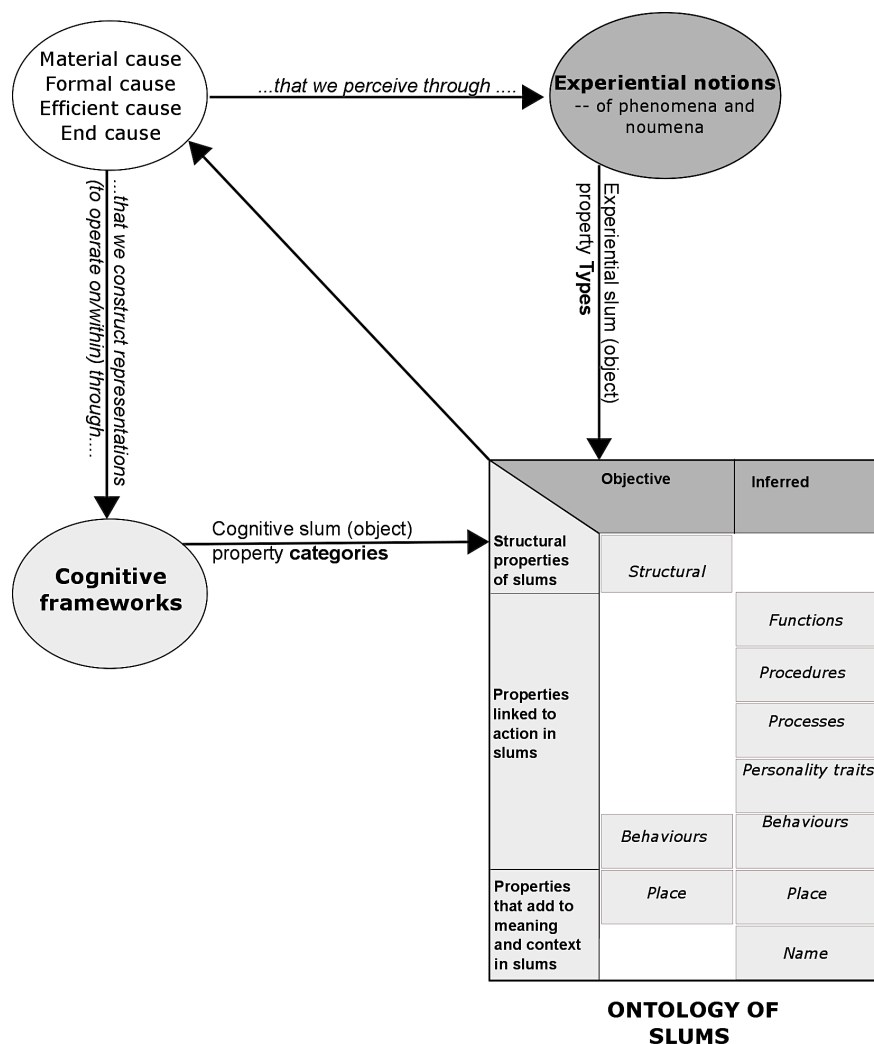

Figure 3. the experiential and cognitive framework of properties of the slum property map. (Source: Authors).

Structural properties:

- Slums' structural properties refer to all composition of parts that make up the slum (as an object (Cordier & Tijus, 2001; Koslicki, 2008)) and their attributes – arrangement, and quantity, quality, materials and relations that capture the physical image of slums. Slum properties that are structural include: (1) *the form of the slum – infrastructure, safe water, sanitary conditions, density, spatial patterns, building forms and durability, and building construction*. These properties of slums describe the nature of the physical spaces, forms, and services that should fundamentally support people's living and livelihood activities in slums (Arputham, 2016; Gulyani & Bassett, 2010), and are therefore important to understand.

- Experiential property types: these properties for describing the (1) the form of the slum are objective.

Properties linked to action in slums:

- The function of the slum (as an object (Cordier & Tijus, 2001; Kemerling, 2011) captures its purpose and usefulness to its inhabitants or those who choose to settle there. In defining slums, we consider the function of the slum to be primarily: (1) *provision of relatively available and accessible domicile* – attributed to an inability to afford and/or access standard city domiciles – and thereby providing access to livelihood opportunities (Agyeman & Warner, 2002; Geoffrey Payne, 2008; E. Glaeser, 2011).

  Experiential property types: inferred, from knowledge and people's experiences.
- Procedures & agency capture how slums are developed, transformed, and used by inhabitants to become what they are and fulfil their purpose, and agencies or forces that are responsible or influential it (as object of contemplation (Cordier & Tijus, 2001; Kemerling, 2011; Marmodoro, 2014)). These properties therefore capture how slums originate and include: (1) *the origin of slums – by activities of land occupation, by type of built form, and type of land possession*, which are decisive to slums development and portrays what they are (Fernandez, 2011; Parham, 2012; UN-Habitat, 2003); and (2) *forces and drivers of slum – migration, poverty, appropriateness and adaptive nature of homes, structural policies and institutional functions, land use and zoning patterns, social and cultural pathology, and gentrification* – need to be understood in principle as they highlight links to other relevant characters of the slum, or between slum and city that need to be looked at more precisely (Berner & Phillips, 2005; Gulyani & Bassett, 2010).

  Experiential property types: (origin of slums, and forces and drivers of slums) inferred, from knowledge and people's experiences.
- Processes capture the evolution of the slum and the story of different states it has been, relevant events, and even conditions, etc. that define it (as an object (Cordier & Tijus, 2001)). Process properties are therefore a documentation of slums' existence and will include: (1) *the age of settlement and social evolution – history and defining events, social consolidation and established social structures,* and *spatial consolidation of place* – are vital information on how it reached the stage it is and social and spatial dynamics at play (Hamdi, 2004, 2010; Maturana, 2014; UN-Habitat, 2003).

  Experiential property types: these properties of slum are inferred from knowledge and people's experiences.

- Personality traits are the multi-dimensional sets of an individual's intellectual, mental, emotional characteristics, and (in their semantics) individual's manner of behaving, which can be influenced by needs, culture, place settings ongoing-events etc. (McLeod, 2014; Sincero, 2012; Veld, 1999 and Wojsiszke & Pienkowski, 1991 in Cordier & Tijus, 2001). Personality traits are inherent to people and include: the (1) *place map: perceptions of the slum by its community – meanings and experiences attached to it, and feelings evoked by these experiences* – that are an important in understanding the quality of life of people (Hamdi, 2010).

  Experiential property types: inferred, from knowledge and people's experiences.

- Behaviours describe people's manners of acting or expressive responses, and conditions of being or physiological responses within, and due to, their environments, which are responsible for carrying out changes within them (Cordier & Tijus, 2001; Hockenbury & Hockenbury, 2007; Kemerling, 2011; Malle, 2011). Behaviours are generally responsive to mental activity (of personality traits); and in combination, therefore, are intermediaries between profiles of the slums existence. People's behaviours are also characteristically of intelligent agency relative to slum descriptions and include: (1) *health conditions*, which are vital information on challenges and vulnerabilities to people's quality of life (Satterthwaite, Mitlin, & Bartlett, 2015; UN-Habitat, 2003), and (2) *activities of people* – that capture changes to slum profiles, livelihood and need endeavours, as well as social vices etc.

  Experiential property types: health conditions of people: inferred, from knowledge and peoples experience; activities of people: objective, but can, however, be inferred after the act.

Properties that add to meaning:

- Place properties capture the many layers of interrelated locational, physical, social (people), and spatial contexts of the slum (as an object (Cordier & Tijus, 2001; Noberg-Schulz, 1993; Bourdieu, 1986 in Rose, 2009)), which cannot experience change without other profiles of the slum changing. These properties are an identity of slums as well as context for all else that capture it, and include: the slum (1) *geography – absolute space and location, relative landscape and site conditions, relative position in the city, and slum presentation* (visible or hidden) – that influences settlement and livelihood choice and patterns (Davis, 2006; Gulyani & Bassett, 2010), (2) *demography – population profile (count, family structures, culture, education, work, political engagement), and socio-economic enterprise* – that frame vital information on the people and their livelihood endeavours (Hamdi, 2010; Kyobutungi et al., 2008; UN-Habitat, 2003), (3) *tenure conditions – tenure security, tenancy and ownership, and tenure mix* – that are symbolic to dwelling and habitation patterns (Gulyani & Bassett, 2010; Patel, 2011), and (4) *poverty conditions – income poverty, non-income poverty, and social exclusion* – which are a reality in slums that need to be clearly understood to encourage human development (Broch-Due, 1995; UN-Habitat, 2003).

  Experiential property types: slum geography, demography – population count, and family structure, and socio-economic enterprise: objective; demography – culture, education, work, political engagement, and specifically social enterprise, and tenure and poverty conditions: inferred, form knowledge and people's experiences.

- The name property of slums (as objects) can be described as a holonym that by reference, sets all information about them in our semantic memory, and this will include any meanings of the name (Cordier & Tijus, 2001; Cummings, 2016; Ketchian, 2006;

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Speaks, 2014). The meanings of slum name (either slum or any relative term used as a form of address) can have causal-historical references (to people, environment etc.) attributed to profiles of its other properties. Name property is therefore an identity of slum and includes: (1) *slum name and its significance* – a unique characteristic of a slum that knowing its origin and meaning can contribute to a better understanding of the physical and social profiles it is attributed to (Suditu & Vâlceanu, 2013; UN-Habitat, 2003, 2013a; Wood, 2007), as well as its effects on the quality of lie of people.

Experiential property types: inferred, from knowledge and people's experiences.
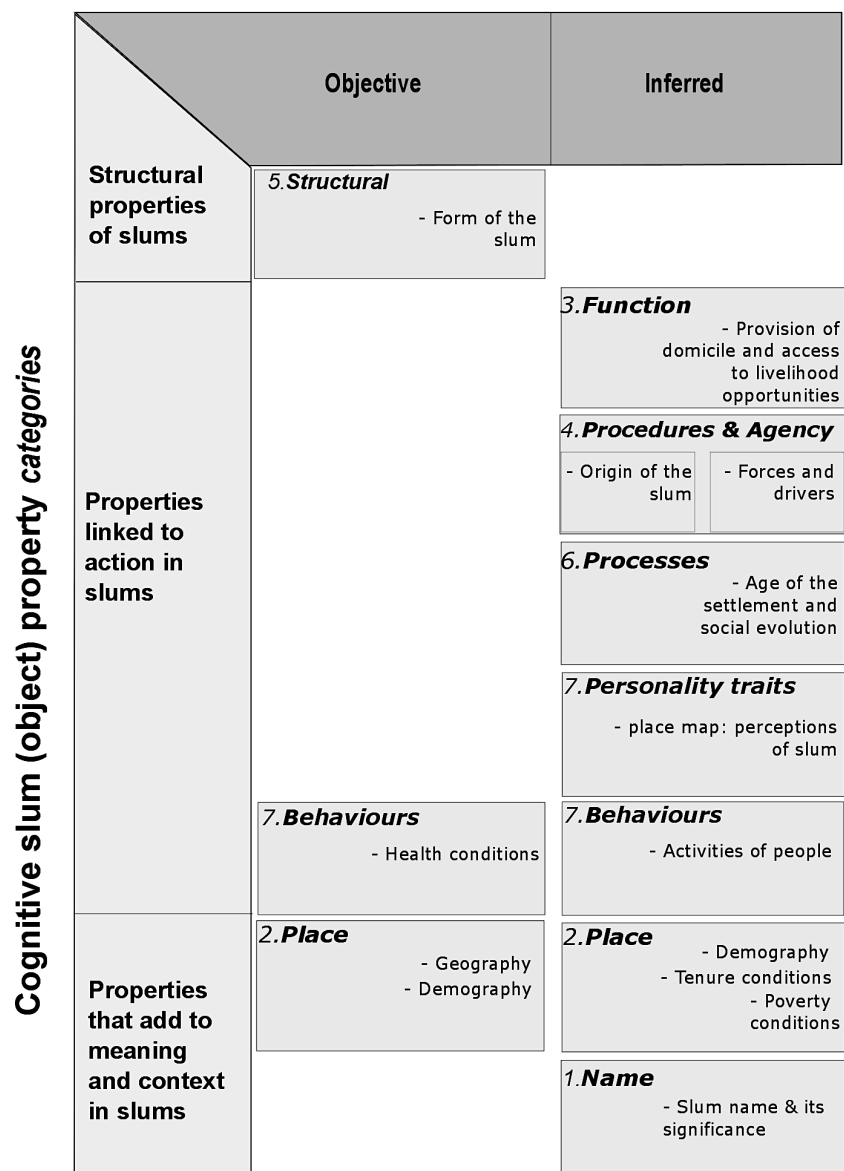

Figure 4. The slum property map (SPM) showing the interactive framework of properties to comprehensively describe and form the narrative of slums (Source: Authors).

Together, the framework of slum properties with all embedded sub-properties propose a standard and rigorous way of investigating and representing the ontology of (any) slum, as well as a narrative of its existence. It builds a comprehensive image of slums inclusive of the social and spatial along with the physical traits, as well as its challenges and positive potentials. For investigations into the nature of slums to be clear and detailed, the SPM also proposes how to find or analyse these slum properties – using thresholds, and profiles – guided by their context and the *type* (notion) of property they portray.

TELLING THE STORY OF THE SLUM: LINKING IT ALL TOGETHER AND BUILDING NARRATIVES

It is essential to establish a narrative of the slum, deriving and forming meaningful associations between the varying properties (especially its physical observable properties and those linked to action (see (Cordier & Tijus, 2001)) that describe it. One can know the distinctive characteristics that make up the slum, but unless the way they interact to generate its profile is understood, meanings will be lost. There are apparent associations in the theoretical contexts (discussed in previous section) of properties which we gathered from literature and the way in which they interact to reveal the nature of the slum. We use this knowledge to propose associations that take place between properties, for investigations to be unbiased in forming the slum's narrative. These associations consider how the profile of one property can *affect/influence/trigger* a change in another (and/or vice versa), thereby becoming a tag/anchor to it in forming the slum's narrative (this is seen in figure 5). At the same time, these associations reveal the degree to which the various dimensions of the slum play a role in its narrative (this also shown by the sizes of property nodes in figure 5). The theoretical context of properties, the unique descriptions of slums that they capture, and associations between them also reveal a hierarchy of importance as to how they generate the slum narrative. This hierarchy may not be reflected in the degree of impacts that properties play in the slum narrative, but is rather essential to understanding slums. As shown (by the depth of property sectors in the outer circumference) in figure 5, we posit that to tell the story of (any) slum, one should generally consider:

1. The (1) slum name and its significance as it is an identity of it that can also assert meaning, functionality and knowledge of it relative to existing social, spatial and physical contexts of slums. Due to this, it can therefore be affected/influenced/triggered by profiles of place, slum's structure, procedures, process – for example, Kumbarwada, a sub-sector of Dharavi, is named after the community of potters (demography) that have settled there (Jacobson, 2007).

2. The place properties of (1) geography, (2) the demography, (3) tenure conditions, and (4) poverty conditions, as they are the varying physical, social, economic contexts within which slums (objects) exist. Due to this they can affect/influence/trigger slum structural profiles, function, types of procedures to develop slum, and processes – for example, geographic location and attributes (e.g. valley) can influence people to consider it for a place of domicile (function) and carry out informal settlement (procedure), and building forms that develop (structural) (see (Karlsson, 2012; Leitão, 2008)). In reverse, changes to the above properties will affect/influence/trigger change in place properties, including name (on social place – demography) – for example, where slum spatial structure expands to accommodate more people. Still yet, because the place properties are varying social, economic, and physical contexts they can affect/influence/trigger each other (adjacent relations) – for example, landscape

hazard (e.g. landslides) (geography) profiles, can define conditions of tenure (in)security (Leitão, 2008)), or geographic location to city can affect access to work (demography), which can enhance/reduce forms of poverty (Gulyani & Bassett, 2010) etc.

3. The function of the slum is the (1) provision of relatively available and accessible domicile for those who cannot afford, or access, the standard city as it is the general purpose for which the slum (object) exists to fulfil. Thus, it affects/influences/triggers how it starts – procedures with the outcome or changes to structure and place properties.

4. The procedure & agency properties of (1) origin of slums – by activities and built form - and (2) forces and drivers of slum development respectively - as they describe practices that are decisive to how the slum (object) originates – is developed, transformed and used to provide relatively available and accessible domicile. Due to this, origin of slums can affect/influence/trigger development of slum's structure – building types, and spatial patterns etc. (Fernandez, 2012). Similarly, because forces and drivers are agencies to procedures that develop slums, they can affect/influence/trigger origin of slums, and function of slums (considerations for the slum as a place to settle, including which functional attribute is more prevalent – inability to afford and access due to poverty, or access standard city domicile due to other forces and drivers, or a combination of them).

5. The structure properties of (1) the form of the slum as they capture compositions of the physical image of the slums (objects). These can affect/influence/trigger procedures to develop slums if we consider that procedures also include making use of, and transforming slum (objects) to fulfil its purpose – for example an unused and/or deteriorating building being informally settled to become slum (see (Shuford, 2015)), or irregular (and unregulated) spatial patterns that encourage further informal settlement. Furthermore, to consider how the varying forms of the slum affect/influence/trigger change in each other (in layers of adjacent interactions) because they are different compositions of it which interact to reveal its nature – for example, in slums conditions of infrastructure will affect sanitary conditions, water safety, building durability (Gulyani & Bassett, 2010; Satterthwaite et al., 2015); or, high densities affecting sanitary conditions (Taher & Ibrahim, 2014); or, irregular spatial patterns defining levels of infrastructure (Fernandez, 2012; Gulyani & Bassett, 2010)) etc.

6. The process properties that describe (1) age of settlement and social evolution of the slum, as these are a documentation of the slums (objects) existence. Therefore, processes will capture relevant evolution of name, structure profiles, procedures that develop slum, place profiles, and behaviours that map them, and are therefore affected/influenced/triggered by all of them – for example, changes and adaptations to buildings (structure). Also, because they capture varying physical and social events and conditions etc., the properties in this cluster can affect/influence/trigger each other (in layers of adjacent interactions) – for instance the types of social structures (cultural, social, interest communities etc.) that develop in slum can support spatial (and physical) consolidations of place (Hamdi, 2010; Neuwirth, 2005; UN-Habitat, 2003), and changes to these will reflect in the history of slum etc.

7. And lastly, the personality traits of (1) place map: perceptions of slum, and behaviour properties of (2) health conditions, and (3) activities of people as they are the intelligent agencies that are also intermediaries to continuous change between all other social, physical, and spatial profiles of slums (objects) – all other properties of it – highlighting how they interact. Thus, personality traits and behaviour properties are influential to slum profiles as well as outcomes of it. These properties will be vast and many. Hence, we posit that for the purpose of understanding the slum and for practical intervention, one should consider the perceptions of slum, health conditions, and activities that are specifically the effects/outcomes/responses for all other slum property profiles formed (name, place, procedures, structure, and processes) – for example, recycling activities to counter poverty (place property), due to the presence of solid waste (structure property) (Hamdi, 2010)), or lack of access to water infrastructure (structure property), because it is peripheral to city (place property), influencing harassment and exploitative activities (Gandy, 2006). Also, because behaviours respond to influences of personality traits, one should as well consider health conditions and activities that are the effect/outcome/response to place map: perceptions of place – for example, where meanings attached to the name of a slum causes people distress that they take civil action to change it (Robertson, 2014; Wood, 2007)).

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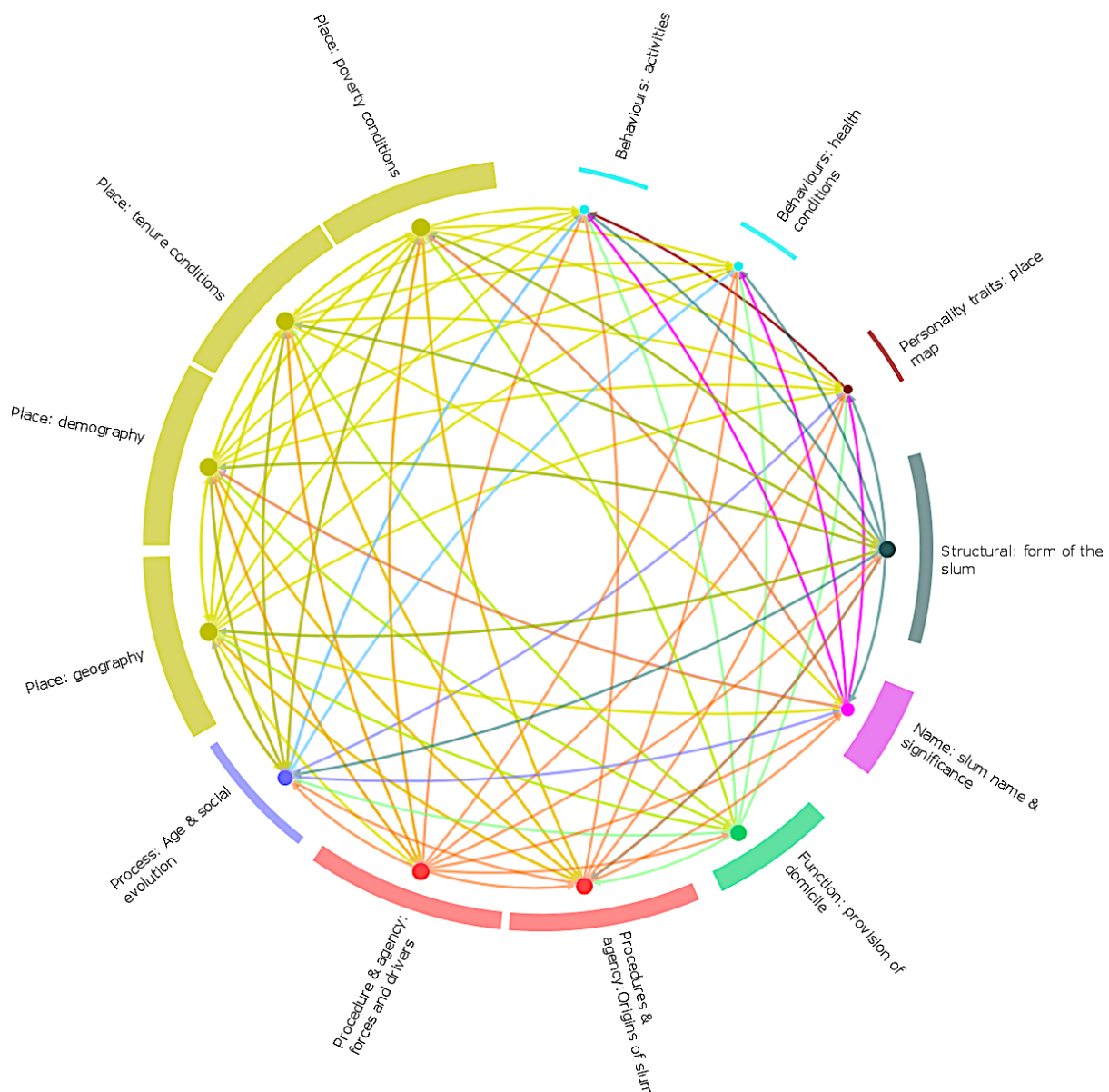Archnet-IJAR, Volume 11 - Issue 2 - July 2017 - (34-54) – Original Research Papers

Figure 5: The Slum Property Map (SPM): here a network map is used to show the interactive framework of properties; associations that take place between properties which should be considered and explored in forming the narrative of slums; the degree of importance that each property cluster plays in the narrative of slums; and the property hierarchies to forming the narrative. In the network map, the varying properties are represented by the different coloured nodes (disks), and the interaction between properties by the ties that link them. The graduation of property node colours and arrows from one to the other shows the affect/influence/trigger relations, with those that are not reciprocated having singular colours. The degree to which properties play a role in this narrative is indicated by the size of the disks as well as the length of the sector in the outer circumference – place properties have the highest degree of importance (and therefore, anchors) in the slum narrative, followed by procedures and agency, structure, processes, name and function, then personality traits and behaviours – which play a stronger role (in reverse) as effects/outcomes/responses that can mediate between properties. The proposed property hierarchies to forming this narrative are indicated by the depth of property sectors in the outer circumference of the map, which reflects the discussion of properties in this section – name, followed by place, function, procedure & agencies, structural, processes, and personality traits and behaviours. Source: Authors

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The conceptual framework of properties, therefore, presents interactive paragraphs within which the story of the complex nature of slums can be told in a contextual manner. This story can be relative to what is, and how it has reached the way it is (complete image); or/in combination, a narrative can be found on impacts or effects that are envisaged – a **heuristic** profile. At the same time, this narrative can be approached by any stakeholder, from any conceptual angle, or relative to the type of story of the slum (considering properties of interest with associations that can occur) that one needs to tell, irrespective of the apparent hierarchy. In all, whatever approach is taken to form a narrative of the slum, the profile generated will be one that tells the essential story of the slum, as it is, and without any bias to it.

CONCLUSIONS: UNDERSTANDING SLUMS IN RELATION TO PROSPERITY

Slums are a consistent reality in the growth of Developing Country cities, and from all accounts have become a growing form of urbanism that is here to stay. Their effective management lies at the helm of ensuring sustainable as well as progressive human development, but is however, challenged by the complex perceptual, contextual, and dynamic nature of slums. The Slum Property Map proposes an approach towards comprehensively grasping such complexities of slums through a framework of properties for defining them; and in this way, aims to guide interventions appropriate to their nature and peculiarities. We suggest that it fulfils the four outlined requirements that are essential to defining slums, and it is an applicable conceptualisation tool: (1) the framework of slum properties was built from established theories in the philosophies of perception and reasoning; (2) it guides the formation of context specific slum profiles through an outline of properties that, while not exhaustive, offers suggestions on how to complete it according to specific needs, thus paving the way towards a truly comprehensive definition of slum; (3) it captures a complete image of slums – linking physical, social, cultural, spatial, and even subjective properties; (4) because it is developed as a conceptualisation framework, it can be applied in a **dynamic** way to define slum, as it is, and when changes occur; (5) it is a non-linear as well as heuristic framework that encourages the forming of associations between the property profiles of the slum to have a clear narrative that guides engagement with it.

The SPM is part of broader research whose goal is to frame slums in relation to prosperity. We expect that extending efforts towards more progressive definition and effective slum management will contribute to their re-interpretation as potential stakeholders to broader city prosperity, rather than an inconsistency to it.

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