Towards a Model of Urban Studies Classification

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Abstract: Evolution of cities is a subject of research for over a hundred years in the organization of urban knowledge systems. Locating five key methodological approaches used by urban scholars and practitioners, this paper demonstrates different relationships between urban studies and classification. Five significant themes form the background of urban studies literature. The first theme sources and literature explore organizing urban materials into sources and literature with a unique dimension of spatiality. The second theme discusses three important facets: scale as a geographic unit of analysis and space as an abstract entity and system as a set of interdependent parts of urban places. The third theme, known as "other" urban, argued for the poor treatment of global south and how it builds inclusivity. The fourth theme, classification and retrieval, investigates the relationship between urban materials and user needs. The last theme, classification schemes, highlights subject treatment of urban in the existing library classification schemes. This paper concludes that the five themes discussed point to a model of urban studies classification. However, this model is not just concerned with urban methods, facets and formats, but explores how each theme interconnects with various sets of people—urbanists, practitioners and librarians—and through studying these actors, established boundaries of urban theories, urban librarianship and knowledge organization are crossed.

1.0 Introduction

The classification in urban research has a long history in urban studies, especially for urbanists, researchers, practitioners and librarians who are trying to understand its theoretical and practical aspects of knowledge organization. The basic subjectivities of urban studies at their foundations remain conceptually elusive and evolving, since cities are delimited in their physical, economic and social terms. Lacking easily identifiable boundaries, the definition of cities is contested and varies across countries and geographies, while globally meaningful classification schema for urban studies is indispensable for knowledge management in urban librarianship (Scott and Storper 2015; McGranahan and Satterthwaite 2014). This significance necessitates understanding what the characteristics of urbanism are and how to organize it as a production and evaluation of special classification as Hjørland (2019) suggested through domain analysis and as a paradigm in domain knowledge organization systems (Smiraglia 2015, 3-4)

Despite efforts of understanding urban knowledge, urban studies remain as an interdisciplinary domain having no canonical base and consensus around its ontological core, but has built epistemological diversity and its necessary tol-

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erance to it as Paddison (2015) discussed. Urban studies as a field of study has its complexity, heterogeneity and interconnections, where the influence of planning, social theories and geography dominated their epistemologies in the past century. However, the proliferating growth of city planning and a corpus of global diversity of urban literature deploying methodical, disciplinary and sectoral views necessitated the organization of it as an engaging area of research on what constitutes urban studies (Brenner 2009). This influx to the urban studies demands understanding the challenges of urban classification and to look at new ways of offering views into the future as Pissourios and Lagopoulos (2017) pointed out for its applications and use cases.

In understanding urban studies as a typical classification scheme of study, this study analyses subject treatment of urban concepts and facets of urban research but cannot be comprehensive. The purpose is to highlight historical features and description, followed by a discussion on issues and processes for improvement. This approach considers arranging real-life objects in practice not just for subject access, hence examines arranging urban knowledge in a specific library and will be used for real-life libraries for use among librarians, urbanists and practitioners. This is also equally relevant to online classification, for instance creating shelf-listings, subject guides and subject headings.

This paper begins with an outline of five different types of methodology distinct in urban studies literature, where each methodology signifies the relationship between classification and urban studies. Next, five of the main themes in urban studies: sources and literature, facets, "other" urban, classification and retrieval and classification schemes are discussed. Through these methodologies and themes, we demonstrate their interrelationships between urban studies and classification to explain an emerging model of urban studies classification.

2.0 Methods

Analysis of urban studies literature reveals that there are five demonstrated methodological approaches: sector, discipline, method, geography and program (IIHS 2019). These five methods in urban classification draw from urban theories and classification to unpack the concepts, key terminologies and their relationships in urban context used by authors and practitioners in urban research. Sector refers to a sociological, economic or political subdivision of a society specific through an economic area or activity in urban areas and in "spatial planning requires continuous horizontal integration across sectors and vertical integration across scales to support the development of integrated cities and territories" (United Nations 2017a).

Discipline in urban studies have overarching and inherently developed areas of research conducted at multi-, inter-,

transdisciplinary and converging levels from sciences, arts to social sciences (Advisory Committee for Environmental Research and Education 2018). For example, the disciplines that dominate the urban studies are design of the built environment (e.g., architecture), policy (e.g., public administration) and social science (e.g., sociology). In a milieu of disparate urbanism, method as an instrument is to investigate cities and city life from multidisciplinary clusters, and, therefore, methods in urban research are built on various schools of thought (Classical School, Chicago School, Frankfurt School and Los Angeles School); theories of human ecology, neo-Marxism, ethnographic methods, spatial analysis, urban history and on contemporary debates around postcolonial, planetary and provincialized urban theories. Urban data and tools (computing, programs and retrieval), medium (audio-video), scale (a conceptual arrangement of space) and form (physical characteristics) are the other methods critical for urban classification.

Being conceptual and action-oriented, the other two methodologies are used less. Geography uses study of urban spaces, urban ways of being and how to approach city and taking part in the intellectual and political stance of critical urban geography. As part of the urbanized world, it means highlighting and participating in attempts to change cities for the better (Jonas et al. 2015). Since it is not defined by one paradigm or canon of work, it further connotes social, cultural, human, political, economic and labor geographies. Program refers to a set of events and initiatives that steer the urban policies at the national, subnational and global level, significantly shaping the history of urban policies. For example, the Vancouver Declaration on Human Settlements (Habitat I) set the stage for urban settlements development and future programs such as Habitat II and Habitat III (Habitat 1976). Most significantly, further on a global scale, programs such as Millennium Development Goals (2000-2015), Sustainable Development Goals (2016-2030), New Urban Agenda (2016-) push for sustainable urban development and are aimed to ensure that cities are inclusive, safe, resilient and sustainable communities (United Nations 2017b).

3.0 Major themes of urban studies

In our analysis of how urban studies classification has evolved, the following five important themes have been found as central in urban studies literature—forming the main body of the paper. This section adapted the five themes framework Lee (2012) proposed in domain modelling as below:

3.1 Sources and literature

Approaching urban study materials into sources and literature is fundamental in urban studies classification, which

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Category	Concept	Attribute	Relationship
Entity	Settlements	Part_of	Abstract-concrete
Property	Urbanism	Approach_of	Characteristics
Activity	Urbanization	Process_of	Cause-effect
Dimension	Urban system	Function_of	Whole-part

Table 1. Categorical relationship in urban studies.

looks at classifying them within urban research based on their form. As common among library classification schemes, Shapackov (1992) stated that all subject matter takes form and Dahlberg (2008) positioned form in International Coding Classification as "general form concept," which is a basis to categorize subject areas. In urban studies, major sources are government documents, images and media, cartographic materials and GIS and statistics and data. Since subject representation is captured through form as a common subdivision, human settlements and their sources of site, data, area and period specifically look at the characteristics of cities, metropolitan regions and urban and suburban areas, whereas the urban literature covers a vast diversity of sources and genres, for example urban literary genres. Since the broad sources of urban documents are fiscal (budget and financial reports), architecture and planning documents at the city, local and regional levels, it is essential to make this distinction as there is a need to have these two prime categories to organize all items, where sources are primary documents as published works and literature is used to mean works whose subject is urban.

This distinction of sources and literature leads to discuss other important ideas about urban classification. Dividing sources and literature can have practical issues, as against conceptual arrangement, since arranging them by format might be preferred by users. As Lee (2012) cited that though multiple other formats exist to integrate into library classification this is, however, dependent upon the sources and literature divide: practical versus conceptual and medium versus format. Understanding this deepens the representation of this divide, including various types of sources, beyond the two-dimensional materials (e.g., geometric shapes) to other three-dimensional objects like artists' books (arts collections) or globes (cartographic collections), which also constitute as sources.

The diversity of sources and urban literature makes it challenging, when there are no pre-existing library schemes to understand, sources and literature divide in urban librarianship. An exception to urban studies is the JEL Classification Code (AEA 2020), which includes collective works and volumes, subject handbooks, and all the other unclassifiable objects to organize scholarly literature in economics incorporating urban aspects within the JEL Code (see their classification in Section 3.5).

Once the sources and literature decision is made, there are two different ways to make this division. First, addressing the debate of sources and literature for settlements and their classification. In urban studies discourse, human settlements formed in site and situation have features that are its population size, density, occupational structures, administrative boundaries and functional activities. Second, using attributes such as pattern, size and housing density and if combined with spatiality, then they are categorized as urban and rural settlements—which is fundamental to organization of urban studies classification. Since the definitions of settlement geography have been rather inadequate, UNSD (2017) cites how challenging are the concepts of locality, urban and rural areas breakdown in urban classification. This is with reference to arranging population and housing census documents and in reporting vital statistics systems, given the distinct population clusters and national differences respectively. Some of the core concepts in urban studies are demonstrated using Dahlberg's categories in domain analysis (2009, 172) in Table 1.

3.2 Facets

Different aspects of sources and literature are used for classification, but urban studies literature focuses on select key facets more. Although medium and form are the common facets—scale, space and system—emerge as important facets for arranging sources and literature. This is specifically for investigating the levels of data in a hierarchy (from metropolitan to local); conceptual arrangement of a location as an abstract-concrete idea from space to place (from India to Bangalore) and how different parts of a whole system function together (built infrastructure, communities and natural environment). Again, this also concerns with understanding scenarios when existing tools of measurement are getting reworked for governing the cities. Being centric around how space is absolute for the physical materials of the world and socially produced, this basically refers to a set of relationships between society and the spaces that society produces. Since cities pose challenges understanding their

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properties and relationships between concepts, urban practitioners, scholars and librarians face difficulties in organizing urban categorization, reclassification and their cartographies amidst scales of growth as to how urban as a space has evolved and why using system as a way of thinking to achieve multiple benefits in outcomes became inevitable.

Scale is a conceptual arrangement of space and is thought in terms of levels—local, national, global—as a key element to understand space. As an appropriate unit of analysis, scale is used by geographers to indicate that geographical processes operating at different levels (e.g., global, national, regional, neighborhood and household). It is increasingly recognized that scale as a process is interconnected in complex ways such as drawing lines on maps and allowing certain activities to take place within certain territories (Jonas et al. 2015, 319). According to Bowen and Gleeson (2019, 116) central place theory, time and space are signifiers for human settlements from hamlets to megacities, since theorizing premodern, modern and postmodern cities in time and cities in space involves economic, political and social conditions on a local, regional and global scales. Library users approach cartographic materials and urban data by their scale and hence arranging these sources by scale would be ideal in urban classification. For example, to arrange geodata, theme and place name, datatypes are used as facets.

Space as a conceptual arrangement brings to light urban as a space of production having inherent inequalities, of places/flows, public and private use and commodified. Referring to a territory in abstract and concrete terms as an idea, space is a term often used in a general sense to indicate geography, location or distance but also used specifically by urban geographers to acknowledge the socially constructed nature of environments (e.g., gendered space, public space and green space). With advancements, this increasingly connotates the social and digital spaces as one of the main divisions of urban studies involving physical and cyberspaces and the technological innovations in these spaces, examples are urban design and smart cities. In urban classification, understanding user needs of space is essential, since spatiality as a facet determines the level of classification from global, national to local sources of urban documents as well as how users approach physical and digital spaces in global cities (NIUA 1988; Mainka et al. 2013).

The United Nations (2017a) puts system as a whole-part of interdependent elements of urban as an entity to achieve multiple benefits in outcomes at multi-scales as a system of system to reinforce the primacy of the relationship between elements and the flow of materials and energy rather than individual elements. As the Advisory Committee for Environmental Research and Education (2018) defined urban systems science captures the spatial and temporal variations in the character of urban nodes or settlements—in any area and the interactions between them, intersecting with built infrastructure, natural environment and communities. Coffey (1998) describes this as composition of a "set of elements (cities) and the interactions (social, economic, financial, informational and so on) within or between them," having influenced and contributed to urban systems research, which in turn used as hard and soft domains of research (Neirotti 2014) in urban classification and significantly contribute to modelling different areas of specialization. For example, urban energy systems and urban education.

3.3 "Other" urban

Since the dominance of urban theories are from the global north, subject treatment of urban from the developing countries as Lawhon (2020) states create space for the inclusion of southern cities in urban theory from the global south, which has increasingly gained attention in urban classification. This has been particularly concerning to authors decolonising the western social theories with the treatment of southern urbanism. There are several factors for this paradigm shift and why the classification of "other" urban is problematic.

The evolving landscape of the global south within urban studies and how classification schemes should be able to keep up with these rapid changes is a possibility. In locating the essence of urbanity, Schindler (2017) viewed the southern urbanism as a distinctive type of settlement, differing from its global north counterparts. Kong and Qian (2017) argue about the Anglophone dominance of urban studies, and that knowledge production from developing countries is dynamic and contentious in urban discourses, issues that were less known but have been collectively transforming globally. Hence, urban classification schemes need to be equally dynamic to cover this epistemic new urbanism.

Beyond the western urban theory, urban literature approaches southern theory for its applications and perspectives notwithstanding Anglo-American hegemony. Issues with the classification of global south theory is not just with the materials of classification schemes but their inherent structure. This is partly because the traditional classification schemes were written before the global south became mainstreamed within urban studies. Therefore, library schemes should be designed to coherently represent views from the global south to be accommodating, inclusive and as representative as possible. The possibilities and limitations of this is felt within urban studies, as the history of urban has structured gaps and biases with north-south inequalities and library classification schemes are not designed to reflect these effects. Examining this, Connell (2014) stated how the southern theories are not a fixed set of propositions but have strong imperatives for inclusivity. Further, Lawhon and Truelove (2020) critiqued the southern urban

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theories of geography towards broadening pathways and possibilities for "more spatially diverse and theoretically robust urban studies (e.g., northern/southern, Euro-America/postcolony and global urban studies)."

Differential treatment of non-western urban works will have consequential effects if the context and relationships of the subject are not understood in urban classification. As an example, from developing countries for persons working at the landfills in waste management, can we categorize them as rag pickers or refuse collectors? It is important to use appropriate terminologies and subject headings from a social justice point of view to understand this as much as from a classification view to categorize people (e.g., urban poor) in urban classification. Here applicability, culture and context of concepts comes to the fore, which may not embody or exist in developed countries like these additional instances such as urban informality, migrant labor and slums. Parker (2015, 35-36) noted how Booth's categories of urban poor in four classes is one classic example based on distinct characteristics of certain topographical areas in the city of London, characterised by living conditions. Another prominent example is urban educator versus urban practitioner, where a significant quantity of urban literature looks at the urban education as a reflective practice but has less discussions as a practitioner face serious criticism. It is very important to discuss these challenges, which only flexible and adaptable approaches of classification can deliver in knowledge organization.

3.4 Classification and retrieval

According to Martin et al. (2003), the relationship between the materiality of research and the language we use to represent urban knowledge is multiple, having parallels across different disciplines and hence cannot have a unitary meaning of a given place, neighbourhood or city. For knowledge discovery of urban materials, accurate retrieval sits at the core of the classification, where it should be expressive, flexible and extensible to be a retrieval-based classification. Since urban studies is one of the highly interdisciplinary subjects, the approach of users is difficult to perceive and to interpret the queries of various users for processing and representation in retrieval should be savvy. Some examples are cities and climate change, gender and planning, cities and towns in literature, urban economics and urban engineering, which warrant assessing the requirements of both subject analysis and keeping the interests of users in classification.

NIUA (1988, v) in organizing a bibliography noted that urban studies were organized combining disciplines and sectors and then into subject and themes. This is explained further for users this way: at the first level of classification by theme and getting in-depth at the second level by subthemes

and at the third level by a spatial dimension, for example, from national to state level documents. Broadly supportive of a critical urban studies, urban literature concentrates upon classification of medium and form of urban sources, which are not limited to images or datasets for retrieval. Urban classification requirements include spatial resolution requirements, urban land cover/use, urban images, urban sound, urban scene and applications of GIS and urban informatics to map urban areas and data processing of urban sources. Hence, the classification and retrieval of urban materials need to organize in the following key areas:

1. Natural resources: use case scenarios and models such as land cover and use, water, energy, air and biodiversity.
2. Physical attributes of built environment: landscapes, types, form, structure, pattern, size, proportion, morphology and scene.
3. Social system: class, race, caste, ethnicity, gender and migration.
4. Urban knowledge: theories, growth, distribution, disciplines and ontologies.

Classification and retrieval should be able to accommodate the localization, since urban studies has many local sources and require local action at the municipal level. For example, local climate change action planning requires the inclusion of retrieval at the regional and state level since climate action cannot be too restrictive at the local level in urban governance. Authority control of persons, non-governmental, bilateral and multilateral organizations should be considered, where academia, practice-based, consultancy-led projects and global organizations are key stakeholders in urban research and practice. Additionally, practitioner, urban scholar, urbanist and policy maker do not have the same level of associative relationships in the urban research, but have different needs; urban practitioner and urbanist were not used much in the earlier generations but are mainstreaming now.

Urban studies have many materials, especially in literary genres where the "subject less" is common and have variety of genres difficult to understand in classification, for example, green humor and urban tales. Nonetheless, this extends as a subject beyond the topical subject headings (e.g., Urbanization—India), subject as a region (e.g., Latin America—Developing countries), subject as era (e.g., Urban policy—21st century) and subject as a genre (e.g., sources, designs and plans, exhibitions and case studies) and should be assessed for its implications in retrieval of urban sources.

3.5 Classification schemes

As Lee (2012) pointed out, there are three classification systems followed in domain KOSs: a section of general scheme, a special scheme for the subject or a home-grown scheme

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R.   Urban, Rural, Regional, Real Estate, and Transportation Economics
R5   Regional Government Analysis
R51   Finance in Urban and Rural Economies
N.   Economic History
N9   Regional and urban history
O.   Economic Development, Innovation, Technological Change, and Growth
O18   Urban, Rural, Regional, and Transportation Analysis, Housing, Infrastructure
P.   Economic Systems
P2   Socialist Systems and Transitional Economies
P25   Urban, Rural, and Regional Economics

Table 2. Urban aspects in JEL Classification Code.

designed at an individual library. Delimitation of the urban places and their classification into physical, historical, socio-cultural and functional classes determine the following three urban classification schemes prevalent in literature: census classification, subject classification and city classification. These classification schemes in the urban literature are categorized further as below:

1. Classification in use case scenarios (Pissourios and Lagopoulos 2017). Urban/rural classification; urban use case scenarios for land use, zoning, urban settlements and structure types; land use/cover planning ontology and urban ontologies.
2. Urban innovation and engineering in digital and physical spaces of global cities (Mainka et al. 2013) and core infrastructures such as energy, water, solid waste, buildings and transport for city planning (Neirotti 2014).
3. Application of technology for cities and applied urban environments for sustainable development and smart growth (e.g., sustainability indicators, smart city rankings, urban resilience frameworks) (National Research Council 2010).

From the quantity of these classification schemes what widely accepted is that no classification can fit for all geographies as Pateman (2011) argued. First the conceptual, disciplinary and thematic boundaries are highly distributed; organization of urban systems are complex as Bretagnolle et al. (2009) cited, and deciphering the characteristics of urban/rural areas are challenged for their definitional, economic, political and governance underpinnings, while the existing generic library classification schemes for urban studies are rather generic. Settlements in library classification schemes are organized under different disciplines. For example, settlements are classified under geography in UDC (911.37) and LC classification schemes (GF 101-127); in *DDC*, it goes under social sciences (307.76) and the arts (711); and UDC treats urban in the arts (71) disciplines (Dewey et al. 2011; UDC Consortium 2013).

With disciplinary diversity, specialty and heterogeneity, Balaji (2019) found that the subject treatment of urban in library classification schemes is fragmented. Among all the classification schemes, by far the richest classification covering urban concepts is the *DDC*. Urban regions under Table 2 Areas (—17 Socioeconomic regions) by concentration of population (—173), classify urban areas into urban regions, suburban regions and rural regions as three classes. This notation specifies urban areas that can be added to main class numbers in *DDC23*, standardizing their socioeconomic status and/or combining any main subject with urban properties (Dewey et al. 2011). UDC (UDC Consortium 2013) under the common auxiliaries of place—Table 1e—categorize urban areas as political and administrative units. According to Mills and Broughton (1977), in the Bliss Bibliographic Classification auxiliary schedule 2, places classify urban as regions by land and resource use and population.

As a subject, the context of urban is treated differently in library classification schemes. In *DDC* and *LCC*, communities were strongly represented as part of the development and planning in social organization, whereas UDC has a geographical focus of settlements. JEL Classification Code followed by the American Economic Association (AEA 2020) has an urban focus on following areas of economics as a subject classification (see Table 2).

4.0 Conclusion

Th urban studies domain in all its complexity and richness is one of the contested landscapes of cultural representation and social experience globally, helping to model urban studies classification. The first theme, sources and literature, discusses various sources of urban materials in classification and how spatiality is a third dimension unique to urban classification. Second, facets in urban studies classification are scale, space and system, which explore how these three facets provide a useful exploration of analysis of urban areas in terms of hierarchy, abstract ideas and elements. "Other" urban includes the literature from the global south, which

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is for mainstreaming but also has strong imperative in urban discourses for inclusion. Classification and retrieval show the different needs of users for retrieval of urban sources, highlighting the relationship between users and needs. The fifth theme elaborates on how the pre-existing schemes of library classification deal with urban studies as a subject.

As demonstrated above, what emerges from this analysis is an interesting set of core concepts drawing on five methodologies and themes in urban studies classification. The five themes discussed point to a model of urban studies classification, based upon the ontological and epistemological relationships, intersecting with the disciplinary boundaries of urban theories, urban librarianship and knowledge organization. Our further research will identify key hierarchical themes and research areas within the urban studies domain for a specialist classification.

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