

Dot sub-downtown – a new pattern in urban areas of future

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Abstract. The article reveals the concept of a “Dot Sub-Downtown” as a small form of secondary elements in a large polycentric urban area. The dot sub-downtown accommodates two or more functional groups in accordance with the 1933 Athenian Charter (housing, work, recreation, trade and life, transport). However, unlike the historically developed urban centers, or downtowns, dot sub-downtowns does not have a significant area dimensions, being a spatially compact objects. Three volumetric-and-spatial types of dot sub-downtowns are distinguished: “landmarks” (as high-rise buildings, ultra-compact, the most rare), “nodes” (the smaller version of “landmarks”, large mixed-use buildings of citywide significance, often without a high-rise volume), and “quarters” (having a dimension of an urban intersection or a simple quarter of a pedestrian dimension, the most common). Dot sub-downtowns are more often to be found in the middle areas of cities, near downtown or large sub-downtowns, and tend to merge with them in the future. The conscious development of dot sub-downtowns can become a means for the subsequent possible emergence of a larger sub-downtown (sub-center) within the given urban area or for city downtown expansion towards such an area.

1. Introduction

Polarization in the development of territories by enlarging greatest cities and metropolitan areas is likely to remain a steady urbanization trend in many countries around the world for the coming years. The big city attracts a significant part of the modern public by the diversity and constant production of opportunities in labor, culture, consumption, social and technological possibilities. The emergence of new towns today is reduced to exemplary, futuristic "smart cities" and "technopolises" [1]. However, these new towns usually being or to become satellites of historically developed urbanized areas, including large cities and suburban settlements, agglomerations and conurbations.

Polarized development of territories involves many organizational and technological costs. In the 19th and 20th centuries, humankind showed its ability to sustainably bear such costs – either be it the railway and the metro as phenomena of the 19th century largest cities, or be it skyscrapers, highways in the “sea” of sprawled suburban areas amidst global warming process have begun in the 20th century. It can be assumed that throughout the 21st century, the request of civilization for the further priority growth of the largest cities would be maintained. In that case, one of the specific challenges for urban development participants will be emerging multi-nuclei systems of urban centers, which may be described as a polycentricity phenomenon. Subcenters might form together with the further transport infrastructure development, which, in turn, have economic, technological and even spatial limitations in the pace of distribution and densifying.



The polycentricity is already becoming a quite common feature of old and large developed urbanized territories. Most of the largest U.S. metro areas (especially Washington D.C., Los Angeles, Atlanta, Houston), as well as Tokyo, London, Paris, Guangzhou, to a certain extent Moscow [2–7] are the examples of pronounced urban polycentricity, whereas not only domestic local public centers of attraction may emerge, but vaster and more complex sub-downtowns.

Sub-downtowns (or subcentres) are urbanized mixed-use territories relatively comparable to the city downtown in terms of total area and real estate space. Sub-downtowns are secondary significant points of mixed public attraction in the scale of parent urban area.

The biggest sub-downtowns are known worldwide: La Défense in Paris, Uptown Houston, Buckhead Atlanta, Century City in Los Angeles, Bromley neighborhood center in Greater London, Downtown of Songdo, satellite of Seoul, Moskva-City in Moscow, etc.

Sub-downtowns (subcentres) topic is interesting for many urban planners, economists, geographers, architects and other experts who expressed different views on it. After the well-known classification options for large urban centers [3; 5; 8–9], the authors developed a new typology of urban centers based on the multiple-criteria similarity to the main center, or downtown [10]. Such a goal was achieved in R. Zhukovsky thesis research, by studying lots of aerospace and street view images within edge and mid districts of hundreds of world large cities [11]. Some of authors-discovered sub-downtowns' types throughout the world have much in common with Edge Cities by J. Garreau or Secondary Business Districts and Edgeless Cities by R. Lang.

During the thesis research undertaken, we admitted a possibility to determine a special type of sub-downtowns, observed in large cities of countries in the conditions of a continental or desert climate. We have marked such a type as *Dot Sub-Downtowns* – the largest blocks of public & business and residential buildings even though spatially compact, to say being a “hub” or a “dot” from the urban planning point of view. However, these very objects have obviously public appeal above just the local domestic service hubs. While performing the first study considered, authors meant large mixed-use developments and city blocks, including high-rise buildings as being as dot sub-downtowns.

The purpose of this article is to demonstrate examples of dot sub-downtowns and their occurrence in various world cities as promising elements of future urban areas, with the possible refinement of the scientific definition of the objects under study.

2. Methods

The objects of study are dot sub-downtowns of large cities and metropolitan areas with total population of roughly more than 1 million people. Street-view and aerial photographs of the discussed objects in some urban areas (including those studied by the authors earlier), mainly from the countries of the northern hemisphere of the Earth, are analyzed and partially demonstrated. Similarly, masterplans and any known drawings or drafts of yet designed objects of study were considered.

The studied development was analyzed by enlarged functional groups in accordance with the Athenian Charter of 1933 (“Housing, Work, Recreation, Trade and Life, Transport”), spatial compactness and built volumes configuration, the architectural features and basic facts about the reasons to emerge in the city.

Special calculations related to various dot sub-downtowns, either of the average daily attendance or of the habitat visitors' areas was not performed in this study. For the review we took into account the largest and most representative, obviously not competitive in scale objects within a given urbanized territory outside the downtowns. The identification of all potential dot sub-downtowns within a given urbanized area was not an objective of this study.

3. Types of dot sub-downtowns

The survey study showed the need for clarification and a certain extension of the concept of “Dot Sub-Downtown” originally given by the authors, since there are very few objects that exactly correspond to the first concept (marked there also as “Vertically Zoned Mixed-Use Development”, or ^vMXD) [10–11]. Following it, one may find out that dot sub-downtowns are more likely to be phenomenal objects

in every urban region of the world, often arising because of volitional developer's decisions involving the state.

Thus, the identified objects can be classified according to three main types, which can be compared by analogy with the types of the perceived urban environment pieces introduced by K. Lynch [12]: let us call them “Landmarks”, “Nodes” and “Quarters”.

3.1 Dot Sub-Downtowns type “Landmark”

Apparently, today, these objects are the rarest version of dot sub-downtowns, a “vertical city” as a mixed-use high-rise building. High-rises can often be found in the largest metropolises of countries with strong centralized urban planning traditions where authorities have interest in prestigious large-scale architectural projects (Figure 1).

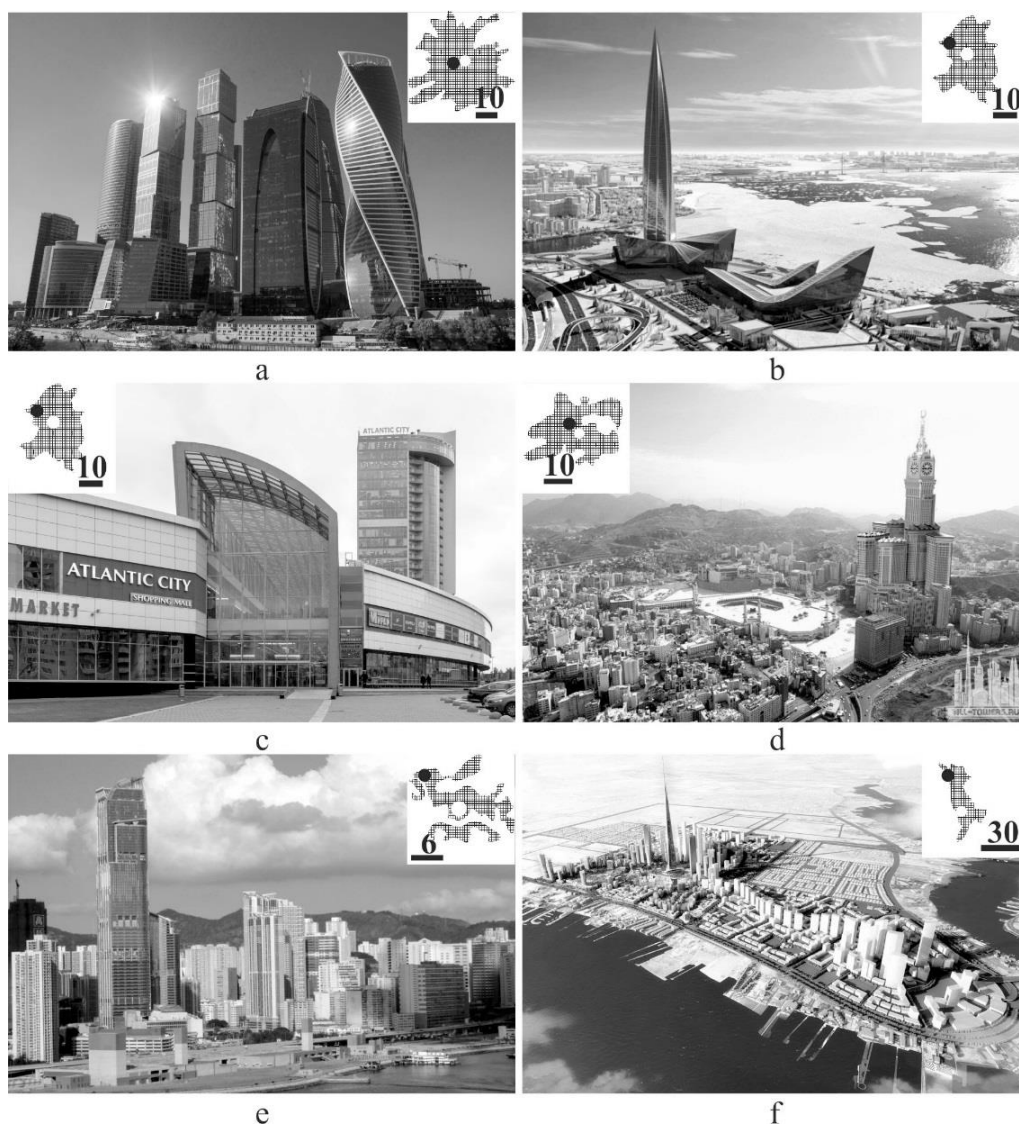


Figure 1. Dot sub-downtowns type “landmark”, a-e – completed, f – ongoing project. a – Moskva-City, Moscow, Russia; b – Lakhta-Center, St. Petersburg, Russia; c – Atlantic-City, St. Petersburg, Russia; d – Abraj al Bait, Mecca, Saudi Arabia; e – Nina Tower, Hong Kong, China; f – Jeddah Tower, Jeddah, Saudi Arabia. On corner maps, hereinafter in the figures: “plaid” hatching – urban area, white circle – downtown (sub-downtown), black circle – dot sub-downtown, number – map scale, kilometers.

“Landmarks” are usually located in the middle, unlikely in the peripheral urban areas, and in years or decades might be absorbed by the expanding (sub-) downtown built territory, as happened during the merger of Lower Manhattan and the once autonomously developed Midtown Manhattan in New York, USA. In this regard, the Burj Khalifa tower is not a dot sub-downtown, but the sub-core of downtown Dubai, as well as the Williams Tower in Uptown Houston, USA (Figure 2).



Figure 2. Dot sub-cores of (sub-)downtowns: a – Burj Khalifa, Dubai, United Arab Emirates; b – Williams Tower, Uptown, Houston, USA.

In different countries of the world objects, which can be attributed to dot sub-downtowns “landmarks”, are being designed nowadays. This type projects constitute a significant workload of such architectural bureaus as MVRDV and UN Studio (Figure 3), and other design offices (Figure 4).



Figure 3. Projects of dot sub-downtowns type “landmark”: a – Sustainable City of the Future (MVRDV); b – Pixel MXD in Abu Dhabi, Jazeerat Al Reem island (MVRDV), c – Beijing International Investment Square (UN Studio), d – Yongjia World Trade Center (UN Studio).



Figure 4. Projects of dot sub-downtowns type “landmark”: a – Rublyovo-Arkhangelskoye Smart City, Moscow, Russia (Zaha Hadid Architects); b – Vertical Village District in Bangkok (SOM).

3.2 Dot Sub-Downtowns type “Node”

Usually found as the largest secondary public attraction centers in cities with a population of up to 1-2 million people. These are large mixed-use buildings containing at one place shopping and entertainment areas, office space, apartments, etc. Within greater metropolitan areas, such objects may be only of local significance and can not be considered as even a “node”-type dot sub-downtown in the presence of obviously larger and vaster sub-downtowns. “Nodes” can be interpreted somehow as a variety of already mentioned “landmarks”, without high-rises (Figure 5).



Figure 5. Dot sub-downtowns, “node” type: a – Ekaterinburg-Expo, Russia; b – Novosibirsk Expocenter, Russia; c – “Ogni” mall and “Ledokol” business center, Barnaul, Russia; Kuntsevo Plaza mixed-use development, Moscow, Russia.

Probably, “node”-type dot sub-downtowns represent the smallest form of sub-downtowns at all. Such objects still can be simultaneously of citywide significance and spatially autonomous with respect to the primary downtown of the city. To note, quite many of mixed-use buildings in English-speaking countries, which can be treated as “node”-type dot sub-downtowns mixing dwellings and some retail space, in Russian conditions, due to the average urban areas of high density, can usually be considered as objects only of local public attraction (Figure 6).

In Europe, “nodes” are often being designed in the inner urban areas close to the historic downtown (Figure 7).



Figure 6. Mixed-use development in Water Street Tampa (Kohn Pedersen Fox Associates), FL, USA.



Figure 7. Ilot Vandamme Block, Paris (MDRDV).

3.3 Dot Sub-Downtowns type “Quarter”

The spreadest type, correlated, inter alia, with such objects as American “Sub-Edge Cities” (R. Lang, 2003 [5]), Russian “Highly Urbanized Nodes” of the “beam”, “tunnel”, and “island” type (S. A. Kolesnikov, 2006 [13]), and “Public Transport Nodes” (L. N. Stepanova, Z.V. Azarenkova, 1997 [14]). “Quarters” are big mixed-use groups of buildings, autonomous with respect to the primary city downtown, forming only one significant and simple open space, so outside or inside that space one can observe mostly of the buildings at once. Such a space would not involve long and complex scenarios of movement within it. Moreover, all distances within “quarter” should be almost exclusively pedestrian, as within the space of literally plain quarter, intersection or a street fragment. “Quarters”, although widespread, in essence, are indistinctive type of dot sub-downtowns. They can be considered as a transitional form between pronounced above dot sub-downtowns types and large, vast sub-downtowns.



Figure 8. Dot Sub-Downtown type “quarter” Oakbrook Terrace Tower, Chicago, USA. a – helicopter view; b – aerial view.

“Quarter”-type can often be found in the smallest cities with population over 1 million of Canada and the USA (Winnipeg, Edmonton, Calgary), Japan (Matsuyama, Sapporo), as well as in the peripheral neighborhoods of multi-million populated metropolitan areas (Figure 8). “Quarters” can spatially develop over time and have a tendency to merge in a single large sub-downtown, being the same built urban area type (Figure 9).



Figure 9. Dot sub-downtowns emerging and merging process over time in Calgary, Canada. Aerial views: a – year 2002; b – year 2019.

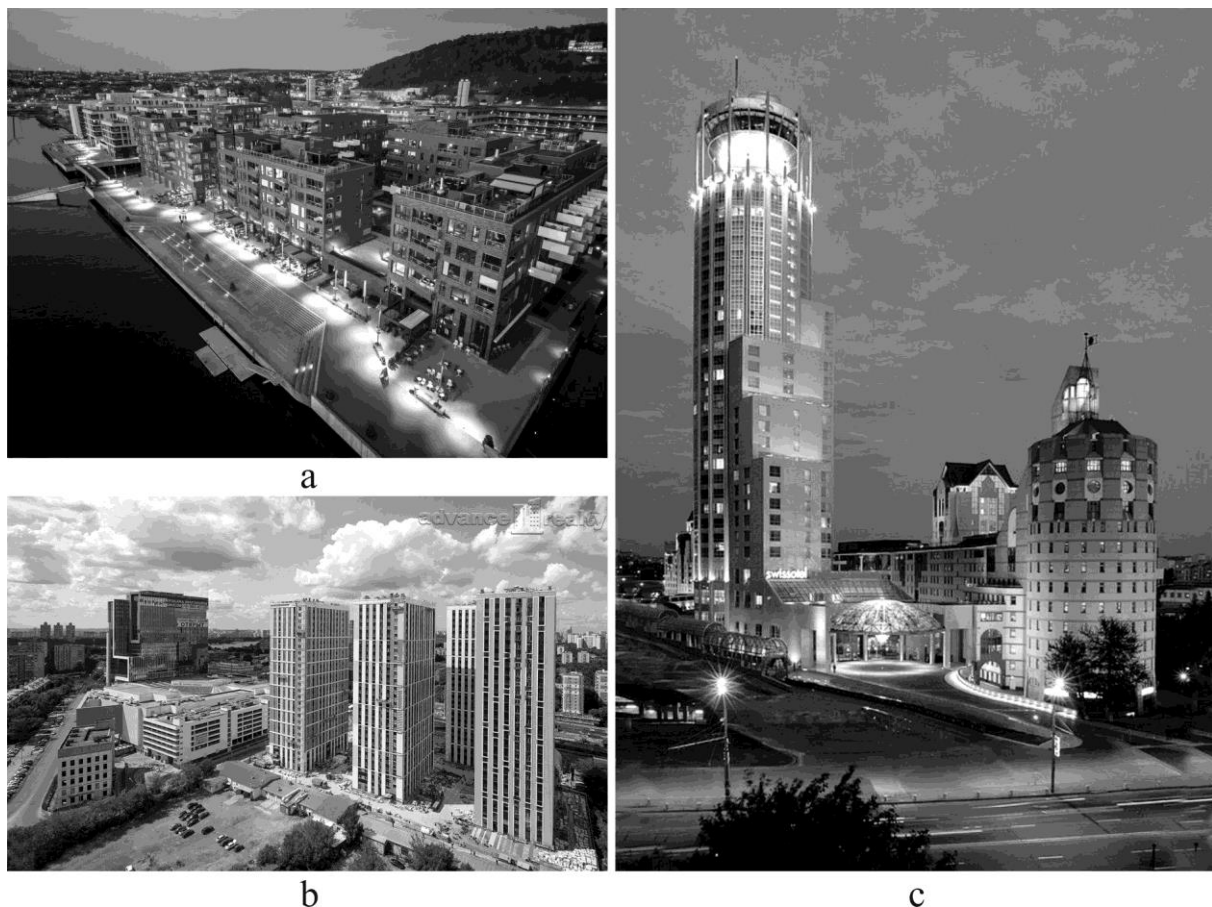


Figure 10. Dot sub-downtowns type “quarter” in Europe: a – Sørenga neighborhood, Oslo, Norway; b – mixed-use district “Vodniy”, Moscow, Russia; c – Swissôtel “Krasnyje Kholmy”, Moscow, Russia.

It is possible to find distinctive “quarters” in European countries (Figure 10), as well as in North American region (Figure 11). Urban areas, identical to “quarter”-type dot sub-downtowns in built space features, may arise also amidst already developed large sub-downtowns (Figure 12).

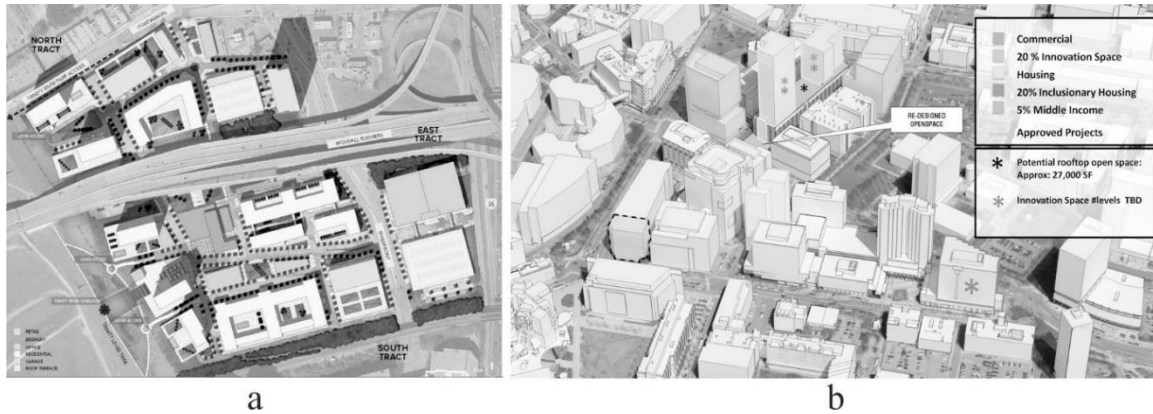


Figure 11. Dot sub-downtowns projects design in USA: a – Dallas 505 Riverfront, b – Kendall Square in Cambridge, MA.

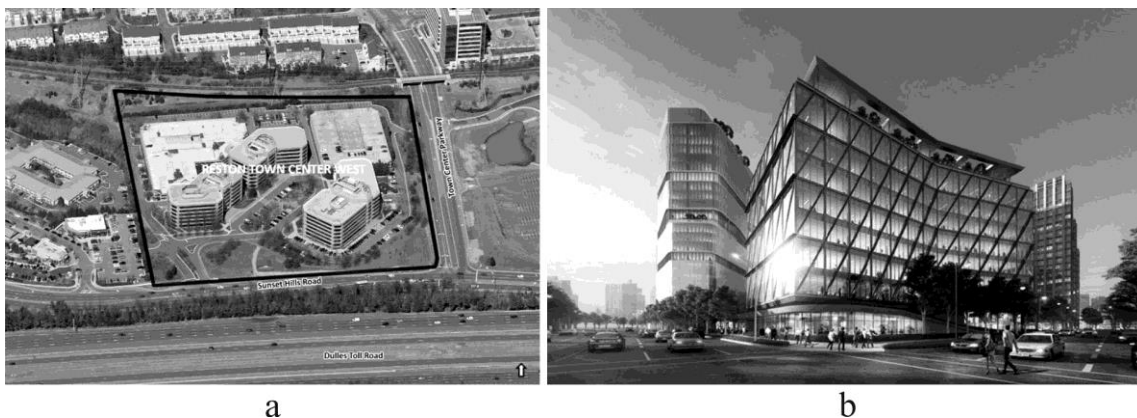


Figure 12. Sub-core quarter in sub-downtown Reston, Washington D.C. metro area satellite town. a – aerial view; b – street view (being project).

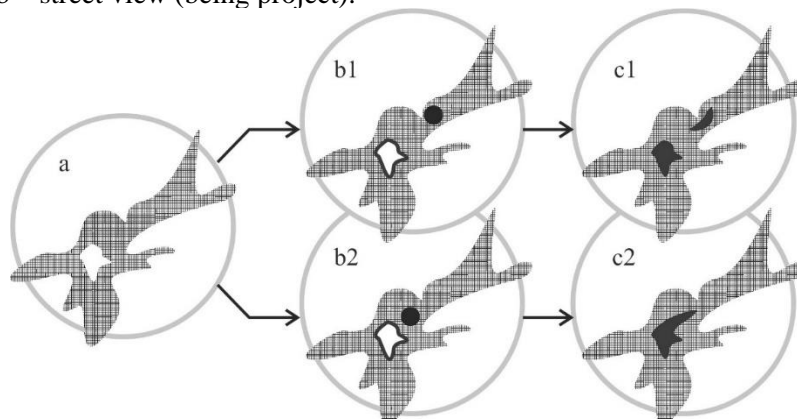


Figure 13. Scenarios of “town-planning involvement” of dot sub-downtowns for the spatial development of multi nuclei urbanized areas towards spatial equality in the provision of downtown-like urban fabric: a – initial state with a single nucleus (downtown); b1 and b2 – dot sub-downtowns emergence, respectively, in outer or inner city with respect to downtown; c1 – development of a larger sub-downtown; c2 – spatial expansion of downtown in a certain direction, with capturing already existed dot sub-downtown.

It can be assumed that dot sub-downtowns as highly urbanized mixed-use areas emerge as a result of socio-economic, infrastructural and architectural “pulling up” of the inner city territories to catch the city downtown level of complex development. This is probably due to a combination of some local developers’ desire to create an autonomous real estate realm with respect to primary downtown as fast as possible, taking into account more affordable land prices, and civil requests from the population on the edge of the city. Both developers and edge-citizens might expect the emerging downtown-like urban pattern in their habitat in the longer term. In this regard, dot sub-downtowns can serve not only for spreading the downtown-like urban fabric to the farther neighborhoods, but also act as triggers for the development of big sub-downtowns in the area, or even to somehow attract specific destinations of primary downtown’s spatial development (Figure 13).

4. Conclusion

a) Dot sub-downtowns are the smallest nuclei of citywide public attraction within polycentric urban area, autonomous with respect to the city downtown, mixed-use spaces with the representation of two or more basic functional groups (housing, work, trade and life, recreation, transport). Dot sub-downtowns represent only one planning unit or the largest mixed-use buildings, including high-rises.

b) According to the volumetric and spatial composition, the following types of dot sub-downtowns can be distinguished: “quarters” (including built intersections, street fragments, and simple quarters with a single space), “landmarks” (as high-rise buildings), and “nodes” (as compact mixed-use buildings in smaller urban areas with population above 1 million). The most common in the world are “quarters”, and the least common, as urban phenomena are “landmarks”.

c) Dot sub-downtowns emerge mainly in the inner-city area, often not very far from the rim of primary downtown. Rare “dots” might be found at the edge of urban areas near the inbound directions.

d) Dot sub-downtowns are an intermediate (primary) stage in large sub-downtown development process. Hereinafter, “dots” may be absorbed by the primary or secondary downtown with incorporation as similar urban fabric. Conversely, similar to dot sub-downtowns urban fabric can develop as sub-cores in large (sub-) downtowns over time.

e) Dot sub-downtowns’ development can be useful in the process of smart polycentric city spatial development and management: in discrete way, implying subsequent possible large sub-downtowns emerging or in continuous way, implying large (sub-) downtown expansion be directed specially to the remote urban areas with yet scarcely designed civil infrastructure and downtown-like urban fabric. As such, dot sub-downtowns will undoubtedly be valuable means to develop large urban areas of future smartly.

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