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Development of Urban Agglomerations in Pakistan: Theoretical Considerations

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ABSTRACT

Background: Population and industries cluster in the cities and their peripheries or sub-urban areas, making urban agglomerations. These urban agglomerations are the growth poles for the spread of business activity from central city to periphery. Apart from creating positive economies, this clustering of population and industries create various socioeconomic and environmental impacts for the agglomerated cities, collectively. Cities in Pakistan are also facing many such challenges in the emerging urban agglomerations.

Aim of the Stud: The present study attempts to define and review the growth and development of urban agglomerations in Pakistan, and the associated challenges faced by our big cities.

Methodology: The study conducted qualitative research design and data was collected from secondary sources. The study focuses on the theoretical deliberations of the concept of urban agglomerations. The concept of urban agglomerations evolves with human civilization, and the development of cities. Theoretically agglomeration means the clustering of population and industries in together, for economic activities.

Findings: Urban agglomerations have numerous socioeconomic and infrastructural benefits. However, socioeconomic and environmental challenges faced by urban agglomerations of Pakistan exhibit that the cost of urban development is very high in metropolitan cities. It clearly affects the sustainability process of urban development and necessitates strategies for urban growth with emphasis on shift towards development of secondary cities.

Conclusion: Policies are needed for control and mitigation of out-migration that occurs towards larger cities. The study suggests for empirical studies for the cities of Pakistan to measure the expansions of cities and to analyze the socioeconomic and environmental impacts of urban agglomerations on the overall health of the cities.

Keywords: Urban Agglomerations; Core-periphery; Urban Clusters; Metropolitan; Megapolis.

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Background of the Study

The study focuses on the theoretical deliberations of the concept of urban agglomerations. The concept of urban agglomerations evolves with human civilization, and the development of cities. Theoretically agglomeration means the clustering of population and industries in together, for economic activities. Broadly, because of structural changes, people migrate from rural to urban areas, or from less developed to more developed areas in expectations of better living conditions. The present research investigates the theoretical literature available on the idea of agglomeration, and how different researches have defined the term. It attempts to provide a measure for urban agglomerations for the urban areas of Pakistan, based on existing literature.

Development of Urban Agglomerations

Historically, the term urban agglomeration has been used in socioeconomic and human development studies in different manners. It has been called as urban regions, urban clusters (1992; 1999), clustered cities (1933;1939), concentrated urban areas (1931;1989), metropolitan areas (1980; 1991), urban economic zones (1920;1980), urban-rural integrated regions (1980;1989;1999), mega-metropolitan regions, megapolis (1957;1964;1985), and new urban cluster belt (Fang & Yu, 2017).

Previously, there was no widespread consensus about the definition, identification, and physical delineation of contiguous regions, making urban agglomeration a dispersed and nebulous idea (Glaeser, 2008). Presently, population densities are typically taken into consideration in studies of urban agglomeration. In literature, metropolitan areas are referred to as urban agglomerations. Developments of services, transport, and the economy have vital impact on global networks of cities. It has been argued more recently that cities create cultural, environmental, land use, and economic ties. This phenomenon is called urban agglomeration (Wei, Taubenböck, & Blaschke, 2017). Urban agglomerations are defined by the city-size, connected with separate urbanized areas, contiguous economic and social relationships, and population concentrations (He et al., 2016; Lang, Chen, & Li, 2016).

Urban demographic and geographic studies, urban planning, environmental protection, and other applications have all demonstrated the value of studying population distributions (Wei, Taubenböck, & Blaschke, 2017). The phenomenon of agglomeration can be elucidated in two different ways. First, by the population's territorial migration determined by natural, historical, and ethnic economic characteristics; and secondly, by the unique network that was created throughout the settlement's dispersal and brought together by social, economic, and geographic ties (Shmidt, Antonyuk & Francini, 2016).

Urban agglomerations exhibit different development patterns and levels in different continents of America, Asia, and Europe. Nonetheless, the utmost driving force of urban agglomeration is population growth and migration towards cities. Migration is associated with certain push-pull factors referring to economic, social and housing conditions. The transport infrastructure and spatial structure impact urban governance and development of agglomerations (Loibl et al., 2018). Large labor pool and co-location of enterprises for input suppliers are examples of supply-side agglomeration externalities (McCann & Oort, 2019). These agglomerations create many economic benefits for cites. However, these agglomeration benefits are countered by cities' unbridled population growth and industrial expansion, which leads to agglomeration diseconomies in terms of traffic congestion, pollution, disease prevalence, and real estate competition (Duranton & Puga, 2020; World Bank, 2022).

Measurement of Urban Agglomerations

Cities progressively become small metropolises through intercity resource exchange, and thereafter expand into urban agglomerations (Fang & Yu, 2017). A core-periphery pattern[1] is the result of unequal resource exchange across states during the early stages of urban agglomeration development (Fang & Yu, 2017; Huang et al., 2018; Liu et al., 2022). Stated differently, intercity resource exchange can lead to the

[1] an over-concentration of resources in core cities and underdevelopment in peripheral cities

unjust distribution of resources and unequal urban development, but it can also help cities that complement one another. Consequently, it is essential to examine the best practices for coordinated regional development inside urban agglomerations as well as the features of intercity resource interchange and underlying driving forces (Yin, et al, 2023). Urban agglomerations are characterized as continuously built-up areas that are shaped by one core city, or numerous surrounding cities. These cities share industry, infrastructure, and housing, and have a high population density level (Fang & Yu, 2017). The expansion of the local population is the primary impetus behind the formation of urban agglomerations (Loibl et al., 2018).

The term urban agglomeration is defined in six different and distinctive perspectives. Firstly, urban agglomeration is a self-emerging, ecological process. Secondly, it is statistically a specific spatial form[2]. Thirdly, an urban agglomeration is functionally interconnected and accessible, based on urban economic zones, commuting and urbanization perspective. Fourthly, when a city reaches a specific minimum population size, it is known as an urban agglomeration. Fifth, if a specific minimum population is reached, as well as residential locations in peripheral areas. Sixth, most peripheral areas are accessible from central city (Fang & Yu, 2017).

Ning (2015) described urban agglomerations using another six-criterion for urban agglomerations developed in China. First, for urban agglomerations, rural areas were regarded as fundamental components. Second, there should be two core cities, each with a population of more than a million, one of which should act as the urban agglomeration's growth pole. Third, more than ten million people should live there overall. Fourth, there needs to be a lot of urbanization within the urban agglomeration. Fifth, in order to create an integrated socioeconomic community, there needs to be a convenient transit corridor (or corridors) connecting central city and the periphery. Sixth, there needs to be a strong sense of cohesion and shared regional identity among the areas that make up the urban agglomeration.

Previously, Fang et al. (2011) presented a 9-criterion for urban agglomerations. Among them are: 1) a minimum of three big cities, not exceeding twenty, with a central city housing more than a million people; 2) an urban agglomeration's total population shall not be less than 20 million, with at least 50% of its residents coming from non-agricultural backgrounds; 3) a GDP per capita of $3000 or more and well developed industrialization; 4) an urban agglomeration's economic density must be determined by currency/KM^2 and include a 30% proportion of exports; 5) must have an extremely well-developed transport system, with a road density of 2000–2500 KM/10,000 KM^2 and a railway density of 250–350 KM/10,000 KM^2; 6) the urban agglomeration's regional urbanization level must be more than 50%; 7) core cities' GDPs must exceed 45% and extend across provincial lines; 8) 8) three circumferential peripheral zones should be established based on transportation travel time; 9) at least 15% of the population living in the periphery must commute to the central city.

Urban Agglomerations in Pakistan

Globally, socioeconomic development, rapid urbanization and migration towards big cities and urban areas have created many socioeconomic and environmental challenges, for countries. The global urban population is projected to augment by 2.5 billion dwellers in 2050 (UN, 2019). Similarly, the South Asian urban population is anticipated to rise up to 250 million by 2030 (World Bank, 2016). Nonetheless, South Asian primary[3] and secondary[4] cities are facing challenges due to unbridled population pressures on infrastructure, housing, basic municipal services, and the physical environment. These challenges are worsened by the fact that population growth is expected to increase further in the coming years. Despite

[2] Spatial form includes population density, urban functions and continuity of spatial landscape
[3] Primary Cities (Large metropolitans)
[4] Secondary cities (with population of over 5 million)

this, it has been noticed that medium[5] and small[6] cities have a favorable impact on the expansion of the economy (Deb, 2017).

Pakistan, with a total land area of 770,880 square kilometers, and a total population of 220,892,340 people makes 2.83% of the world's population. It is the fifth most populous country in the world, and the most urbanized country of South Asia, with 35.1% urban dwellers (UN, 2020). The size of urban population is increasing at 3.3% annually as a consequence of structural transformation and internal migration towards urban areas. It is expected that it would further increase to 50% urban population by 2025 (Ghafoor, Nisa, & Akbar, 2022; Mangi et al., 2020; UNDP, 2018). According to recent population statistics of Pakistan, Punjab province is the most populated and Balochistan is the least populated province (Appendix-I). Migration towards big cities is the major cause of rapid urbanization (Ghafoor, Nisa, & Akbar, 2022). Punjab is the recipient of largest size of migrants from all over Pakistan (Appendix-II). The fig. 1 shows that from inception of Pakistan, the urban population is growing at a faster rate, for different socioeconomic, political, cultural and other reasons (Ghafoor, 2023a; Ghafoor et al., 2023b; Ghafoor, Fayyaz, Nisa, & Akbar, 2021).

Cities in Pakistan are producing 55% of the country's total gross domestic product. In addition, Pakistan derives 95% of its total federal tax revenue from the country's 10 most populous cities. Karachi is responsible for 12–15 percent of Pakistan's GDP and earns 55 percent of the country's federal tax revenue on its own. Seven out of Pakistan's ten most populous cities, have per-capita incomes that are higher than the national average. In most cases, urban areas have a lower poverty rate (UNDP, 2018). Because of this growth, more individuals and businesses are drawn to settle in the major urban centers. For this reason, over the course of time, urban agglomerations, which are larger than average both in terms of land area and people, have been growing at an extraordinary rate, in Pakistan (Ghafoor et al., 2021).

Economic Significance and Challenges to Urban Agglomeration in Pakistan

Ten Pakistani cities are considered as urban agglomerations by UNDP 2018 (Appendix-III). It notably shows that the population is rapidly coming towards big cities of the country for different reasons. Lahore city has the highest annual average rate of change in urban population (4.1%). It is projected that during 2018-2030, the city would remain a highly urbanized city among all other agglomerated cities of the country. After Lahore city, Islamabad, and Peshawar cities are projected to be highly agglomerated cities. However, Karachi city, which is currently the most populated city, appears at 4th number after Peshawar city. There may be different factors involved in this population clustering. This rising urban agglomeration with concentration of population and industry in cities, and changing urban lifestyle has brought about various socioeconomic and environmental problems (Khan et al., 2012; Al-mulali, Che-Sab, & Fereidouni, 2012; Du, & Xia, 2018). Hyderabad, a secondary city of Sindh province, is experiencing the same issues. Uncontrolled urban settlements are growing across the Hyderabad city. Mainly urban sprawl occurs over the fertile agriculture land uses (Mangi et al. 2018). Hyderabad's development sprawl often caused by increased in usage of private mobility, less affordability among dwellers, monopoly of real estate developers, and not following the governmental authorities bylaws by responsible stakeholders, etc. (Peerzado, Magsi and Sheikh, 2019; Mangi et al. 2018; Lashari, Mangi, & Samoo, 2023).

Increased income inequality, job insecurity, ageing urban cores, rising housing costs, length commutes, environmental problems, the loss of farmland and biodiversity, traffic congestion, feelings of vulnerability, high blood pressure, rigid muscles, bigotry, and even murder and mayhem are all effects of urban sprawl (DeSalvo & Su, 2017). In recent decades, urban agglomeration in cities has led to rising energy demand and consequential increase in carbon dioxide (CO_2) emissions (Ghafoor et al, 2020). In order to maintain the urban quality of life of cities of Pakistan, it is necessary to improve the urban

[5] Medium cities (with population of 5 million or less)
[6] Small cities (less than 300,000 inhabitants)

environment. These differences noticeably specify the requirement of the cooperating urban environmental model in Pakistan (Shaheen et al., 2018).

Conclusions and Policy implications

Urban agglomerations have numerous socioeconomic and infrastructural benefits. However, socioeconomic and environmental challenges faced by urban agglomerations of Pakistan exhibit that the cost of urban development is very high in metropolitan cities. It clearly affects the sustainability process of urban development and necessitates strategies for urban growth with emphasis on shift towards development of secondary cities. Unchecked urban settlements and expansions should be controlled by the governmental authorities. Long-term integrated action plans for socioeconomic and infrastructure development, institutional strengthening, as well as capacity building for large cities as well as medium and small cities are required to get maximum gains from the urban agglomerations. Nevertheless, decentralization of large cities and creation of secondary cities as a viable instrument for urban administration needs to be chosen as the path forward. Policies are needed for control and mitigation of out-migration that occurs towards larger cities. The study suggests for empirical studies for the cities of Pakistan to measure the expansions of cities and to analyze the socioeconomic and environmental impacts of urban agglomerations on the overall health of the cities.

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Conflict of Interest

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APPENDICES

Appendix-I

Table-I Size and Urban Growth of Population in Pakistan (1951-2017)						
Population (in 000)	**Census Year**					
	1951	**1961**	**1972**	**1981**	**1998**	**2017**
Pakistan						
Total	33780	42880	65309	84253	132352	207774
Urban	6019	9655	16593	23841	45497	75584
Urban population (%)	17.8	22.5	25.4	28.3	34.4	**36.4**
Punjab						
Total	20648	25463	37611	47292	72585	110012
Urban	3587	5461	9183	13052	22699	40387
Urban Population (%)	17.4	21.4	24.4	27.6	31.3	**36.7**
Sindh						
Total	6054	8374	14158	19029	29991	47886
Urban	1768	3169	5726	8243	14662	24910
Urban Population (%)	29.2	37.8	40.4	43.3	48.9	**52.0**
KPK						
Total	4587	5752	8392	11061	17555	30523
Urban	502	758	1196	1666	2973	5729
Urban Population (%)	10.9	13.2	14.3	15.1	16.9	**18.8**
Balochistan						
Total	1187	1385	2432	4332	6511	12344
Urban	133	228	400	677	1516	3400
Urban Population (%)	11.2	16.5	16.4	15.6	23.3	**27.5**
Source: Extracted from the Bureau of Statistics, Government of Pakistan (1951-2017)						

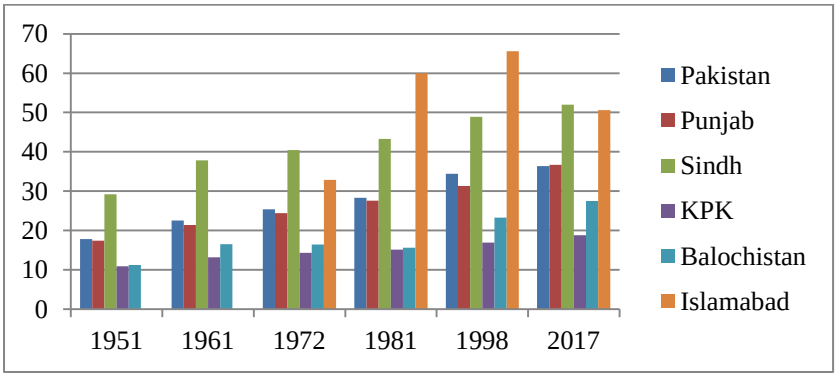

Fig. I: Shows Urban population growth rate in Pakistan

Appendix-II Percentage Distribution of Migrant Population by Place of Present and Previous Residence						
Administrative Unit	**Total**	**KPK**	**Punjab**	**Sindh**	**Balochistan**	**Others***
Pakistan	100.00	14.68	62.43	14.46	1.66	4.77
KPK	12.33	5.81	2.01	1.87	0.26	2.37
Punjab	69.14	6.18	56.34	3.88	0.58	2.15
Sindh	17.63	2.65	4.04	10.51	0.22	0.23
Balochistan	0.88	0.04	0.04	0.20	0.60	--

Others* include AJK, FATA, and Gilgit Baltistan

Source: Pakistan Bureau of Statistics (2017-18)

Appendix-III Urban Agglomerations in Pakistan

Cities	Statistical concept	City Population (thousands)			Average Annual Rate of Change (%)		City Population as a proportion of country's total and urban population in 2018 (%)	
		2000	2018	2030	2000-2018	2018-2030	Total	Urban
Faisalabad	Urban Agglomeration	2098	3311	4401	2.2	2.4	1.6	4.5
Gujranwala	Urban Agglomeration	1209	2110	2883	3.1	2.6	1.1	2.9
Hyderabad	Urban Agglomeration	1210	1782	2323	2.1	2.2	0.9	2.4
Islamabad	City proper	569	1061	1477	3.5	2.8	0.5	1.4
Karachi	Urban Agglomeration	9825	15400	20432	2.5	2.4	7.7	20.9
Lahore	Urban Agglomeration	5576	11738	16883	4.1	3.0	5.8	15.9
Multan	Urban Agglomeration	1251	1931	2552	2.4	2.3	1.0	2.6
Peshawar	Urban Agglomeration	1075	2065	2896	3.6	2.8	1.0	2.8
Quetta	Urban Agglomeration	602	1042	1420	3.0	2.6	0.5	1.4
Rawalpindi	Urban Agglomeration	1477	2156	2805	2.1	2.2	1.1	2.9

Source: The World Cities in 2018, Data Booklet, UNDP

Extracted from PhD Thesis, Naghmana Ghafoor (2023)