Making Urban Agglomeration Green Engines of Growth: Theoretical Underpinnings

Tumbenthung. Y. Humtsoe
Ph.D. Scholar,
School of Economics, University of Hyderabad.
Hyderabad, India.

Abstract: Urbanization is justifiably the buzzword, today, and it is here to stay for long, both as a phenomenon and in terms of policy discourse. The comprehension of economic rationale of spatial organization of economic activities in urban agglomeration (or more precisely cities) is critical to counter the theses of 'over urbanization', 'hyper-urbanization,' or 'Urban hypertrophy,' and to appreciate and leverage urbanization as a *resource*. Concurrently, to make cities as a *green and sustainable engine of growth*, environmental reckoning has to be incorporated in the planning and development of cities; and argued in the paper likewise.

Key Words: Cities, Over-urbanization, Growth, Environment.

1. Introduction:

Humankind has made a remarkable stride in material wellbeing. In this economic headway, urban spaces have been and continue to be a key driver and facilitator. In ancient times, port towns and cities, by means of sea haulage, were prosperous centers of cultural and commercial exchange, providing rich revenues to royal exchequers. Today, the economic reality is such that cities are the prime generators of the wealth of nations. Nonetheless, cities of today are not without challenges. And in grappling with these issues, the salience of grasping the theoretical underpinnings on the economics of cities is unparalleled. The current study is thus motivated and an attempt towards that direction.

Cities are sprouting and enlarging at a rapid pace the world over, more so in Third World countries. In India, for instance, the number of cities and towns increased by 3 times between 1901 and 2011. During the same time period, urban population swelled by 13 times (Mohanty and Mishra, 2017)-suggesting an enlargement of the existing urban spaces-which is further projected to more than double between 2011 and 2050 – from 377 million to 814 million (ibid). This undoubtedly presents a policy challenge, but also an opportunity to leverage the same as a *resource* for socio-economic development, trotting along a green growth path. The current study makes a case towards that, foregrounding on theoretical underpinnings.

Section 1 is an introduction to the study. In *Section 2*, a kind of *inverted pyramidal approach*, beginning with heterodox theory of the firm (and not uniquely neoclassical theory of the firm), of comprehending why it makes economic sense to organize production in urban spaces is elucidated. The theses of 'over urbanization', 'hyper-urbanization,' or 'Urban hypertrophy,' are critiqued in *Section 3*, and it is instead argued that urbanization should be perceived as a *resource* and leveraged likewise. Building up further on the argument, the thesis of urban agglomeration as engines of growth is expounded, substantiating the same with empirical evidences. *Section 4* takes up the case for making cities *great*, as a green and sustainable engine of growth. And finally, *Section 5* concludes by arguing for planning and acting towards an agglomeration economies augmenting, congestion mitigating, and resource generating cities.

2. Economics of Cities:

> **"**Cities are perhaps one of humanity's most complex creations, never finished, never definitive, they are like a journey that never ends. Their evolution is determined by their ascent into greatness or their descent into decline. They are the past, the present and the future."
>
> (UN-Habitat, 2008)

Urban spaces are chiefly defined in terms of the size and occupational structure of population inhabiting an identifiable space. Put it another way, "the definition of urban area is based on population density because an essential feature of an urban economy is frequent contact between different economic activities, which is possible only if firms and households are concentrated in a relatively small area" (O'Sullivan, 2009). Census of India (2011) similarly defines and classifies urban area into Statutory Towns, Census Towns and Urban Agglomerations. Statutory Towns are notified under law and have a Municipality, Corporation, Cantonment Board, or other such authority. Census Towns are settlements with a minimum population of 5,000; a density of population of at least 400 persons per sq. km; and at least 75 per cent of the male main working population engaged in non-agricultural pursuits. Urban Agglomerations or cities are a continuous urban space comprising of a town or more contiguous towns, with or without their outgrowths[1]. Such an "Urban Agglomeration must consist of at least a statutory town and its total population (i.e. all the constituents put together) should not be less than 20,000 as per the 2001 Census" (ibid).

How do urban spaces in general come about? Sketchily, three conditions must precede for such a space to come about and flourish. Firstly, there should be agricultural surplus (more precisely food surplus) from rural areas to feed the urban dwellers. Secondly, urban dwellers must produce certain products to exchange for food from rural dwellers. Finally, a transportation system should be in place to make the exchange possible between the spatially segregated rural and urban spaces (O'Sullivan, 2009). The emergence of cities was thus made possible about 7000 years ago only after the increase in agricultural surplus (Bairoch, 1988, cited by Mohanty, 2014). Historically, factors like locational advantages (say, access to waterway, natural resources, suitable climate, etc., together called as "first nature geography"), defense rationale, and political patronage played central roles in the evolution of cities. However, only these exogenous forces related to geography and historical events cannot wholly explain the dynamics of cities. Apart from those, "spatial organization of economic activities [in cities] also made good economic sense" (Mohanty, 2014). The multifarious positive externalities can be appreciated through an *inverted pyramidal approach*, starting with the spatial organization of production under *one roof*, and then in an *industrial district*, and finally in cities. These agglomeration economies (also referred to as "second Nature geography") are categorized as: internal economies of scale (firm level), localization economies (industry level), and urbanization economies (city level). We enunciate this point, starting with the theory of the firm.

At the outset, a firm is a particular form of group activity. Spatially, there can be two broad forms of organizing production, to wit, either spatially 'scattered' or 'integrated'. Outsourcing production to guilds, like in the 'putting out system,' is a case in point for the 'scattered' kind of production. There are costs involved in this nature of production, which can be avoided in an integrated organization. By integrating the group activity under one roof, the entrepreneur not only has greater controls over the product and the production process but eliminates the costs associated with collecting (from spatially scattered producers) and transporting the final products to a common market. According to Landes (1986), economies of scale and production in anticipation of demand necessitated the organization of various operations under one roof.

[1] Outgrowths are clearly identifiable units like railway colony, university campus, military camps, etc., possessing urban features in terms of infrastructure and amenities, which have come up near but outside a statutory town limits, nonetheless, physically contiguous with the core town of the Urban Agglomeration.

Smith (1776) approached the rationale for organizing production as a *group activity* through his acclaimed argument of 'division of labour,' which with its fruit of increased productivity, can be greatly facilitated and enhanced when workers are brought together and coordinated through an organization. Post division of labour, the worker now specializing in and repeatedly doing a particular operation, experiences an increase in dexterity, comes up with certain innovations and tools that are better suited to his work, and saves time previously lost in moving from one place to another.

We see in Marx's exposition on *group activity*, the possibility of enhancing productivity through cooperation. The hitherto independent and individual workers, when brought together in one place become social labours, bringing forth varied positive implications. With cooperation, differences in individual capabilities are compensated, thus, entailing fixed minimum efficiency to each social labour. The means of production are now consumed in common on a larger scale than before. The various parts of the work previously done step-wise, now progress simultaneously, thus, churning out more output. Cooperation also occasions emulation and raises animal spirits of the workers, thereby, ushering in increasing returns. What is most striking, above all, is the fact that the workers, in isolation cannot produce what they could produce together. In other words, their combined working day produces, relatively to an equal sum of isolated working days, a greater quantity of output, or, in certain special cases, an outcome that would simply be impossible, if carried out, single-handedly, in equal sum of working days (Marx, 1887).

Firm as a *group activity* reduces transaction costs by reducing the need to negotiate and conclude highly asset specificity[2] and recurrent nature of contracts (See Coase, 1937; Williamson, 1985); and also help solve the problem of uncertainty and the consequent need of forecasting (What, How and For whom to produce), with this role being taken up by a special class of entrepreneurs; and furthermore, firm occasions an 'imperatively coordinated group' (Weber, 1947);

Regarding the gains from co-location of firms, Marshall's (1920, cited by Mohanty, 2014) 'industrial district argument' remains a classic.

> "…So great are the advantages which people following the same skills trade get from near neighborhood to one another. The mysteries of the trade become no mysteries; but as it were in the air…Good work is rightly appreciated; inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with the suggestions of their own; and thus it becomes the source of further new ideas…subsidiary trades grow up in the neighborhood, supplying it with implements and materials, organizing its traffic, and in many ways…"

He further adds,

> "…[A] localized industry gains a great advantage from the fact that it offers a constant market for skill. Employers are apt to resort to any new place where they are likely to find a good choice of workers with special skill which they require; while men seeking employment naturally go to places where there are many employers who need such skills as theirs and where therefore it is likely to find good market."

On the consumption side, Marshall rightly observes,

> "…There is also the convenience of the customer to be considered. He will go to the nearest shop for a trifling purchase; but for an important purchase he will take the trouble of visiting any part of the town where he knows that there are specialty good shops for his purpose. Consequently shops

[2] Asset specificity here refers to the specific or unique characteristics of the product that is exchanged.

which deal in expensive and choice tend to congregate together; and those which supply domestic needs do not."

Regarding Urbanization economies, Porter (1990, cited by ibid) observes, "successful firms concentrate in particular cities or states within a nation." Why? Jacob (1969, cited by ibid) opines that knowledge transfers occur between rather than within industries; and this transfer facilitates search and experimentation that lies at the heart of innovation. A greater diversity of economic activities in cities facilitates greater knowledge exchange across enterprises and individuals.

Any discussion on the economics of cities will be incomplete without citing New Economic Geography's (hereafter as NEG) perspective. Paul Krugman's "Geography and Trade" (Krugman, 2010) is generally considered the beginning of NEG. This new perspective brings insights from geography discipline into economics discipline, while also emphasizing that economic model can yield new and interesting insights when applied to geographical questions. In passing, mention can be made that this new development has been increasingly gaining appreciation among economists and international economic agencies; for instance, in World Bank's World Development Report (2009), geography was accorded primary concern (ibid). This very recent development in economics showed that economies are not dimensionless points in space; rather that spatial dimension of an economy has a lot to say about the nature of economic forces.

NEG's models implied that the geographical structure of an economy depends on a few key parameters like transportation costs, economies of scale, and factor mobility. NEG's models consider location patterns to be the result of the interplay between agglomeration or centripetal and dispersion or centrifugal forces. Agglomeration forces or increasing internal and external returns may "push firms to locate their activities in regions with bigger markets to be able to serve more consumers or where, through concentration of suppliers, the firm's input costs are lower than otherwise" (New Zealand Government, 2014) and to reap Marshallian trinity. Likewise, agglomeration returns may push households to locate in regions of bigger agglomeration, say to reap the benefits of comparison-shopping, more and better job opportunities, etc.

Operating against the centripetal forces are centrifugal forces. Agglomeration also brings with it after some point diseconomies, say, increasing costs of land and labour, which are observed in cities across the world, and traffic congestion in increasingly many cities. Such increase in 'costs' and dispersed availability of natural resources act as dispersing forces. Certain sections of the people who cannot cope with the increasing 'costs' are push out to the *fringes* of the city (say slums and poor people colonies on the periphery of cities). The increasing 'costs' also restrict people from moving in.

Urban economics theory thus suggests that cities come about and expand due to external economies of agglomeration and knowledge. The gains from 'integrated' organization of economic activities led to denser habitations. Spatial proximity, contiguity, and density stimulated "efficiency in manufacturing, commerce and administration, which would have been impossible in a dispersed pattern of settlements… It is primarily economic forces that made cities grow, stagnate or decline" (Mohanty, 2014).

3. Urbanization as a Resource:

The world has witnessed Industrial Revolution (18th and 19th centuries), and many economies including India have also witnessed Green Revolution (20th century), and according to Mohanty (2014), "the twenty-first century will witness urban revolution sweeping across the developing countries." Exploiting this rapidly occurring urbanization as a resource through agglomeration economies augmenting, congestion-mitigating, resource generating cities will generate huge opportunities for economic growth, poverty reduction, and rural development. Justifiably, in recent times urbanization has been increasingly gaining prominence in the global

policy discourse. Perhaps, urbanization will be the single most important policy concern for national, provincial, and local governments in developing countries (Ibid).

For long, urbanization studies in Third World countries forwarded the views of 'over urbanization', 'hyper-urbanization,' or 'Urban hypertrophy.' It was contended that, "urbanization in the Third World countries are outpacing industrialization" (Hoselitz, 1955, 1957; cited by Mohanty, 2014), and that the rate of urbanization in relation to GNP per capita growth rate is "excessive" when compared to the experience of developed countries (Bairoch, 1988; ibid). Hence, "Third World cities were cramped by too many migrants 'pushed off' from agriculture…. 'queuing' for industrial jobs while seeking shelter in slums" (Todaro; ibid). Together with this conception of "over urbanization" thesis, the "Urban Bias" theories (suggesting 'biased' government policies in favour of politically powerful large cities (Lipton, 1977; ibid) portrayed a somewhat negative view of urbanization in poor countries. However, this view is now substituted by a new thinking led by urban economists who regard the current trend of urbanization in development countries as a welcome development, while emphasizing the need to mitigate the accompanying urban issues. They suggested that over urbanization thesis is a fallacy, as they ignored economic geography and agglomeration externalities in cities. Besides, "the precarious state of cities in developing countries…[indicate] an anti-urban bias" (ibid).

To further build up on the thesis being advanced, we shall take up the case for cities as the prime generators of wealth of nation. "… Among all the various types of economies, cities are unique in their abilities to shape and reshape the economies of other settlements, including those far removed from them geographically" (Jacobs, 1984). The recognition of the advantages of larger cities goes back to the time of the ancient Greek. In his work, "Cyropaedia", Xenophon (c. 440-c. 355 BC), a student of the great philosopher, Socrates, "tells of the advantage accruing to a large, as opposed to small, city in the opportunity for specialization by trade-for division of labour" (Galbraith, 1991).

It is now a familiar established fact that cities are the *engines of economic growth*. "Theoretical and empirical research suggests that agglomeration externalities, in interaction with knowledge externalities, act as powerful drivers of growth" (Mohanty, 2014). Urbanization is historically associated with economic and social transformations, and the United Nation's 'World Urbanization Prospects' (2015) captures this fact, "The process of urbanization…have brought greater geographic mobility, lower fertility, longer life expectancy and population aging. Cities are important drivers of development and poverty reduction in both rural and urban areas… urban living is often associated with higher rate of literacy and education, better health, greater access to social services, and enhanced opportunities for cultural and political participation."

Cities present four kinds of basic gains: Economies of "density, scale, association, and extension. Density results in a reduction in the cost of interacting, learning, organizing, producing, transporting, consuming, and providing services. Scale economies, emanating from the sheer volume of economic opportunities, spread fixed costs and risks over large number of agents… [Association economies] reflect collaborative efficiencies in devising joint strategies, undertaking innovation, and inventing solutions. Extension economies are associated with cost efficiencies of cities from extending their organized strategies to other cities and rural areas" (Mohanty, 2014).

Cities are subjected to the above agglomeration economies, which make them storehouses of skill and capital; hubs of knowledge and innovation; sources of informal and formal employment; hopes of millions of rural-urban migrants; and generators of public financial resources for socio-economic development including rural development. Nagaland Vision 2030 (2016) document recognizes that "in the present century the urban areas are emerging as the 'engines of economic growth' as agglomeration and densification of economic activities stimulates accelerated economic growth and better opportunities. They are not only strategic centres of economic activity and living, but they are also critical for achieving inclusive growth as they provide ample

social and economic opportunities". In short, cities are evidence that increasing returns and positive external economies play an important economic role (Krugman, 2010).

Numbers too speak of the economic significance of cities. Urban-based economic activities account for up to 55 percent of GDP in low-income countries, 73 percent in middle-income countries, and 85 percent in high-income countries (Mohanty, 2014). According to Mckinsey Global Institute analysis (2010), cities accounted for 58 percent of India's GDP in 2008, and is projected to account nearly 70 percent by 2030 (Also See Table-1 on the same subject, and Table-2 on agglomeration economies).

Table 1: Urban India Contribution to National Income

Source: Mohanty, 2014.

Year	Share of Population (%)	Share of National Income (%)
1951	17.3	29.0
1981	23.3	47.0
1991	25.7	55.0
2001	27.8	60.0
2007	29.7	62-63
2021		75 (Projected)

Table 2: Empirical findings on agglomeration economies (adopted from Mohanty, 2014).

Studies' Authors	**Findings**
Shefer (1973)	Doubling city size upturns productivity in a group of 20 industries by 14-27 percent across US metropolitan areas.
Sveikauskas (1975)	Doubling city size upturns labour productivity in an average manufacturing industry by 6-7 percent in the US.
Kawashima (1975)	Elasticity of output with respect to city size measured 0.20 in US metropolitan areas.
Segal (1976)	Labour productivity is 8 percent higher in US metro areas with population above 2 million than in remaining metros.

While the economic significance of cities is unparalleled, on the other hand, most cities of today are not without issues. And in order not to negate the benefits of urban agglomerations, the urban challenges and issues have to be taken care of. It is often the case that there is a divergence between private costs/benefits and social costs/benefits, and this gap has to be bridged in order to minimize negative externalities like air pollution, that plague many cities. The New Urban Agenda (2017; intended to guide the policy approach of the UN member states towards sustainable urbanization for the next 20 years) represents a global consensus and recognition that "our future is urban". And to make our future (read as cities) sustainable, gender-equity, youth-empowerment, participatory planning, "right to the city" or inclusive public space, "leave no one behind" or reducing urban inequality, etc. are some of the emphasized goals.

Against the backdrop of the increasing significance of and call for cities to be *robust, green, inclusive and sustainable engines of growth*, we will briefly look at the relationship between cities and environment.

4. Cities and Environment:

Economic entity of any kind interacts with the natural systems of the environment, directly or indirectly. Cities as a distinct economic entity are no exceptions. In fact, the *ecological footprint* of cities has always been high, and with fast-paced urbanization, it is increasing at an exponential rate. Urban dwellers have a 'higher consumption pattern' than those in rural spaces, in the sense that they consume comparatively much more resources (food, energy, land, durable goods, etc.). "This increased consumption is a function of urban labor markets, wages [income], and household structure" (Torrey, 2004), and urban lifestyle.

The burgeoning urban population is adversely impacting the environment through the consumption of resources and the generation of waste in the process. Firstly, lands with varying degree of biodiversity in them are being cleared to make way for cities to spring up or spatially expand; or to grow food, and extract resources beneath the land to sustain the cities. Secondly, urban consumption of fossil fuels (energy) has polluted the air-both locally and globally, and also created *heat islands*. Thirdly, urbanization unfavorably affects the weather and hydrologic patterns of wider regional environments. For instance, "regions downwind from large industrial complexes…see increases in the amount of precipitation, air pollution, and the number of days with thunderstorms… Urban areas generally generate more rain, but they reduce the infiltration of water and lower the water tables. This means that runoff occurs more rapidly with greater peak flows. Flood volumes increase, as do floods and water pollution downstream" (ibid). Finally, there are the other *consequent* environmental problems like inadequate water and sanitation, lack of rubbish disposal, and industrial pollution.

All these environmental issues and the consequent health problems are a major drain on the economy by way of lost workdays, costs of treatment and other capital costs of cleanup activities. It may seem intuitively logical to assume that the environmental bads and the incidental economic costs increase with the upturn in the spatial extent of cities. However, what is to be remembered here is that, "many of the effects of urban areas on the environment are not necessarily linear. Bigger urban areas do not always create more environmental problems. And small urban areas can cause large problems. Much of what determines the extent of the environmental impacts is how the urban populations behave — their consumption and living patterns — not just how large they are" (ibid). Besides, cities improve their environmental health with growth (as resources available for *cleaning up* increases), the pace of enhancement being quickened if accompanied by good urban governance.

It is true that humankind's historic tendency has been to place the development of cities above environmental conservation. The need for economic growth and social justice (job creation, etc.) has often been cited as the rationale or justification. However, as opposed to the conventional notion that cities *normally* degrade the environment, there is a counter argument that 'cities can be good for environment,' qualified by the phrase, 'if managed aptly.' How cities can be good for the environment? First, cities, as we have been discussing, contribute to higher productivity owing to agglomeration and scale economies. This implies that output can be

produced using fewer resources with urban agglomeration than without, thereby, potentially reducing the ecological footprint. Likewise, for the same reasons, environment-friendly public infrastructure and services are much easier and more economical to construct, maintain, and operate in an urban setting. Second, density is a key determinant of energy use. Thus, high density of cities, if not negated by traffic congestion, reduces the length of trips, and makes public transport more viable, thereby reducing energy use. Third, cities, as already discussed, drive innovation, including green technologies, which is making *green economy* possible. Fifth, the higher standard of living associated with urbanization foster pro-environment stance, as mentioned earlier. Finally, cities generate revenues that fund research and development (including green technology) and green infrastructure projects, which reduce congestion and other environmental bads, thereby improving public health (Wan, 2012).

To make cities *great*, or to make a city as a *green and sustainable engine of growth*, environmental thinking has to be incorporated in the planning and development of cities. Towards this, Wan (2012) suggested the following recommendations. First, improving energy efficiency and conservation through appropriate pricing, regulations, and public sector investment. Getting prices right is required to encompass the full social costs and benefits (thereby affecting the behavior of economic agents), and ensure the efficient allocation of resources. This can be achieved by means of market-based instruments like congestion and emission charges, carbon taxes, removing inefficient subsidies, introducing/increasing block pricing for water, electricity, and other public utilities. Regulations and standards should be framed on time to correct market failures on air, water, vehicles, and appliances; to build green industrial zones; and to reduce or prevent urban sprawl. Adequate and quality public transport systems should be planned and provided timely to improve connectivity, reduce pollution, ease congestion in city central hubs, reduce environmental degradation and improve the over all quality of life. Second, promote renewable resources and clean technologies. For instances, constructing waste-to-energy plants to reduce pollution and generate energy; acquiring green technology either by importation or innovation through research and development; building new towns and satellite cities using renewable energy as primary energy sources; tackling urban sprawl by reviving city centers and developing compact, walk able satellite cities centered on efficient train, light rail, or subway systems, without heavy reliance on highways and major roads. Third, help the poor by reducing disaster risks and improving slum conditions. Building dwellings in safe areas, improving housing affordability for the poor, and investing in drainage infrastructure and climate forecast technology can achieve the former. While slum conditions can be improved by providing basic services and granting land titles or housing vouchers to slum dwellers. Fourth, strengthen public finance, transparency, and accountability. Public finance can be improved by broadening the tax and revenue base and by increasing the access of urban governments to capital markets in order to lower infrastructure and public service costs. Politicians should (incentivized by public opinion) disclose city government performance to the public and non-governmental organizations (NGOs), and have healthy national competitions and campaigns to encourage a "race to the top" (say by rewarding high achievement).

5. Conclusion:

The State of the World's Cities Report (2008) elegantly brings out the salience of cities, and the critical function of governance and planning in making and keeping "their ascent into greatness:"

> "Cities contain both order and chaos. In them reside beauty and ugliness, virtue and vice. They can bring out the best or the worst in humankind. They are the physical manifestation of history and culture and incubators of innovation, industry, technology, entrepreneurship and creativity. Cities are the materialization of humanity's noblest ideas, ambitions and aspirations but when not planned or governed properly, can be a repository of society's ills. Cities drive national economies by creating wealth, enhancing social development and providing employment but they can also be the breeding grounds for poverty, exclusion and environmental degradation."

What emerges from the above discussion is that cities exhibit agglomeration economies, and are in terms of socio-economic indicators, relatively better off than almost other spaces of human settlements. For varied reasons and potentials, the economic salience of cities as an agglomeration centre for any economy is immense. They are the administrative nerve centre; important transit routes for intra-country and inter-country logistics; hubs of education and healthcare; larger markets for jobs and goods offering better remuneration to the farmers, etc. Towards realizing all these potentials, SWOT (Strength, Weakness, Opportunities and Threats) analysis should be carried out; and the urban policy should leverage the strengths and opportunities of the city, and mitigate the weaknesses and threats of the cities.

It is quite apparent that the planning and development strategy of most cities has not considered and incorporated key elements from the theories and applications of urban economics, transport economics and environment economics. As a matter of fact there has not been any attempt of comprehensive and integrated transport, agglomeration and environment strategy, in most cities of the world, especially in developing countries. The upshot of this is the many urban challenges confronting the city. To convert these urban challenges into opportunities, policy makers and planners need to understand the economics of cities, transport and environment (Mohanty, 2014) and plan and act towards an agglomeration economies augmenting, congestion mitigating, and resource generating cities. And therein lies the importance of grasping the theoretical underpinnings on the said subjects.

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