Globalisation and the Sustainability of Cities: A Methodology for Determining their Relationship

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Abstract: At the very core of the relationship between sustainability of the world's cities and globalisation are the linkages between these cities and regions around the globe. These linkages, and all they embody in terms of transfers and flows, have changed most dramatically as a result of globalisation. From an economic, cultural, social and political perspective, the ever developing links between cities have had a fundamental impact on what occurs within them, how urban expansion and form are structured and how they relate to each other and their hinterland regions. The city-region-nation paradigm has entirely changed through globalising forces and as a result a city's sustainability is now far more dependent upon the world city network within which it exists than its previous *raison d'être.* Significant work has emerged over the past decade on mapping the geography of the contemporary world city network, however very little empirical evidence exists on the impact the growing connections amongst cities is having on their sustainability. The purpose of this paper is to specify a methodological model to determine how globalisation is affecting the sustainability of cities. The proposed model may be used for a cross-sectional and longitudinal study to chart the development of a city's economic, cultural, social and political linkages to other localities and examine how these connections have impacted on its sustainability.

Keywords: *Globalisation; Sustainability; Cities; Network; Urban Form; Measurement Methodology*

1. INTRODUCTION

At no time in history have cities existed in isolation. They have always had some level of connection to their hinterlands and indeed to other cities and regions. Braudel has gone as far as to say that the town must dominate an empire, however tiny, in order to exist. In China, the urban hierarchy was expressed by suffixes added to the names of towns, like *fu* for a town of the first order, *chu* for one lower down, and *hieu* for one lower still (Kostof, 1991). The defining influences of a city's form and structure are therefore not confined to that which occurs within the city but to how the city is linked to others. While this has arguably always been the case, it is today through globalisation, that cities more than ever before are becoming increasingly dependent upon other cities and regions in the world city network. Cities have become nodes in a dynamic and hierarchical network. As we move further towards the informational mode of development, the intensification of this network has taken a certain amount of autonomy away from cities. Cities have become vulnerable through the sensitivity of the web that connects them. The integrity of the world city network is such that should a city become disengaged, the network will adjust through realignment of connections to other cities. Indeed the world city network operates as a system such that change in one city will affect others. The new economy consists of a global metanetwork of complex technological and human interactions, involving multiple feedback loops operating far from equilibrium, which produce a never-ending variety of emergent phenomena (Capra, 2002). Capra (2002: p.140) goes on to say that "Living organisms and ecosystems, too, may become continually unstable, but if they do, they will eventually disappear because of natural selection, and only those systems that have stabilizing

processes built into them will survive. In the human realm, these processes will have to be introduced into the global economy through human consciousness, culture and politics. In other words, we need to design and implement regulatory mechanisms to stabilize the new economy". It follows therefore that at the very core of the relationship between sustainability of the world's cities and globalisation are the linkages between these cities and regions around the globe and how they are managed. It is these linkages and all they embody in terms of transfers and flows, that have changed most dramatically as a result of globalisation. From an economic, cultural, social and political perspective, the ever developing links between cities have had a fundamental impact on what occurs within them, how urban expansion and form are structured, how they relate to each other and their hinterland regions and how the environment within which they exist is affected. The city-region-nation paradigm has entirely changed through globalising forces and as a result a city's sustainability is now far more dependent upon the world city network within which it exists than its previous *raison d'être.*

Significant work has emerged over the past decade on mapping the geography of the world city network (Smith and Timberlake, 1995), however there is little empirical evidence specifically addressing the impact the growing connections amongst cities is having on their sustainability. The purpose of this paper is to specify a methodological model to determine how globalisation is affecting the sustainability of cities.

2. IMPORTANCE OF ESTABLISHING THE RELATIONSHIP BETWEEN GLOBALISATION & SUSTAINABILITY

There is perhaps no greater issue confronting our planet than that of sustainability. While there is much debate over whether or not we have already surpassed the Earth's carrying capacity, there is little argument that many of the world's resources are finite. Since the 1972 United Nations Conference on the Human Environment in Stockholm, sustainability has emerged as a significant challenge to both global and local policy makers alike. In order for city policy makers to determine how to direct the strategic development of their cities to ensure sustainability, they must understand the impact that globalisation is having on them both internally and externally. According to neoliberal doctrines of economic globalisation, free trade agreements such as those imposed by the World Trade Organisation will ultimately increase global economic expansion and reduce poverty through the "trickle down" effect. This position is certainly not shared by all and a strong alternate view suggests that corporate economists have ignored the social and environmental costs of economic activity, thereby seriously undermining sustainability. For example the dismantling of local production in favour of exports and imports, which is the main thrust of the WTO's free trade rules, dramatically increases the distance "from farm to table". In the USA, the average ounce of food now travels over a thousand miles before being eaten, which puts enormous stress on the environment (Capra, 2002). In a world of growing environmental problems and limited natural resources, high unemployment and urgent needs for work, the right economic policy would be for governments to ensure that labour is available at the wage that will employ it, while making use of land, water and other resources, especially energy, as expensive as socially acceptable, thus creating the right incentives to achieve global and local sustainable development (Hall and Pfeiffer, 2000).

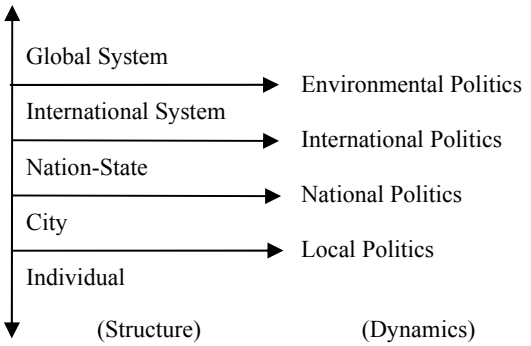
Globalisation may indeed be a double edged sword, bringing both prosperity and poverty, as many commentators contend. The Asian financial crisis of the late 1990's was undoubtedly a globalisation driven event that clearly demonstrated the fragility of equitable growth. Indonesia, for example, was making significant ground in lowering the number of its poor, only to see sharp increases of those in poverty after the crisis (McGee, 1998 in Lo and Marcotullio, 2001). It is therefore important to determine the relationship between globalisation and sustainability in order to begin addressing how to resolve the problems globalisation brings.

3. THEORETICAL CONTEXT

Prior to establishing what may constitute an appropriate model, it is useful to begin by establishing a theoretical context. What reason do we have for believing globalisation and sustainability are linked? Lofdahl (2002) has demonstrated that Lateral Pressure Theory (LPT) is an appropriate linkage theory for determining the impact of globalisation on the environment. The LPT has traditionally been one of several theories developed by the realist school of thought to explain warfare between states. The theory contends that growing populations and improving technologies put pressure on nation-states to expand their resource base beyond their borders. The LPT is guided by the following concerns (Choucri and North, 1975 in Lofdahl, 2002):

- Domestic growth and external expansion of interests
- International competition for resources, markets, and arms superiority
- The dynamics of crisis.

Figure 1 indicates an amended version of LPT which acknowledges the dependency of society on the natural environment with politics being the dynamic linking component of the various spatial scales. Growth is tied to LPT's three predominant variables – population, technology and resource access.



Source: (Lofdahl, 2002) amended

Figure 1. Lateral Pressure Theory

In figure 1, the city is included to develop further LPT to link the global system to the city system. Politically, Multi-National Corporations (MNCs) have dominated the world economy since World War II. With the globalisation of MNCs, their attendant service firms have followed, establishing themselves in major cities throughout the world. The aggregated actions of multiple MNCs, each expanding their own international activities, increase the scale of international trade, thereby increasing the crossing of national borders and of lateral pressure (Lofdahl, 2002). Systematically, international trade introduces additional connections and complexities into the international system because it spatially disassociates production, transportation and consumption activities (Lofdahl, 2002). Within the context of LPT, a distinct structural relationship can be extrapolated between the development of world cities and the global system (i.e. the natural environment), with globalisation forming the dynamic bond. Lofdahl (2002) has used LPT as the organising theory for empirical analysis to demonstrate, through complex modelling, that contrary to accepted economic wisdom, international trade hurts the global natural environment. The outcomes of Lofdahl's work therefore, begin to suggest that globalisation, or at least aspects of it, may be adversely affecting the sustainability of cities.

The idea that exports are the basis of a region's economy, propelling it to ever greater heights, has become well accepted. As Friedmann (2001) points out, when a region's growth is stunted at very low levels, and its trade with other regions runs a long term deficit, with imports outpacing exports by a large margin, the region becomes a natural candidate for transfer payments from elsewhere (the national treasury, Brussels, bilateral aid, the World Bank etc.) and will also begin to draw down its initial fund of wealth creating resources by a process of *systematic neglect or disinvestment.* Six interrelated resource complexes are required to sustain a region's ability to export; "mining" them undermines and ultimately destroys its capacity to produce future wealth. The six are - human capital, social capital, natural resources, environmental resources, economic & social infrastructure and directly productive plant & equipment (Friedmann, 2001). When analysing the sustainability of a city, it is these elements that must be considered in terms of how globalisation is affecting them.

The contemporary world has fundamentally been viewed and mapped as a geography of nations, rather than cities and regions. It has been relatively recently that researchers have begun to address the deficiency of city specific data in an attempt to understand the relationships between cities rather than nations with their arbitrary borders. In order to examine the relationship between globalisation and sustainability, an empirical basis must be established to determine the affect globalising influences are having on urban regions.

To understand the extent of the world city system's components, Smith and Timberlake's. (1995) typology as shown in figure 2 provides a basis from which globalisation's effects on sustainability can be considered. These linkages go well beyond economics and incorporate cultural, social and political flows which collectively begin to form the software of the global urban system. These linkages not only affect a city's position within the network but also influence the structure and urban form of the city system itself. Urban expansion patterns and urban form have traditionally evolved as an expression of society and the role the city has taken on. Historically, under agrarian and industrial modes of development, a city's existence was generally based upon a geographic or locational advantage such as a supply of fresh water, a natural harbour or the presence of a mineral resource. As we move further into the informational mode of development, a facilitating factor in contemporary globalisation, a hierarchy of cities has evolved within the world city network less dependent upon

previous geographic or locational advantages. As cities' geographic or locational advantage erodes, other factors are affecting their sustainability, not least of which is their increasingly reinforced connection to other cities and regions. For example, Sydney's competitive advantage over other Australian cities derives partly from its major airport's dominance as the hub of air traffic into and out of Australia (Murphy and Wu, 2001).

Function	Form		
	Human	**Material**	**Information**
Economic	Labour Management	Capital Commodities Natural Resources	Business phone calls Faxes, Telexes Emails Technology transfer Advertisements
Cultural	Exchange students Dance troupes Rock Concerts Theatre	Paintings Sculpture Artefacts	Feature films Videos & VCDs Music CDs & Tapes
Political	Troops Diplomats Social Workers	Military Hardware Foreign Aid	Treaties Political Threats
Social	Families NGOs	Remittances Foreign Aid	Post Cards Phone calls Emails

Source: (Smith and Timberlake, 1995) - modified

Figure 2. Conceptualising Inter-city Linkages: A Typology

Figure 2 demonstrates the particular complexity in determining the types of linkages and how they may affect the city structure. Globalisation clearly takes on a variety of forms and functions in terms of how it manifests itself into the shape of cities. Cities within the world network are potentially taking on new informational roles and functions which mean that the urban fabric must adapt to accommodate their new regional function. Similarly, with a new role comes social change and if we consider our urban form to be an expression of society then as society changes so too does the urban structure and form required to support it. The typology of inter-city linkages in figure 2 indicates the three primary forms being human, material and information. These variables of exchange are similar to LPT's three primary variables of growth - population (~human), technology (~information) and resource access (~material). A city's growth, with its consequential effect on the natural environment (the global system), is intrinsically linked to globalisation and its various functional flows and transfers.

4. GLOBALISATION

Due to the complexities of the world city system and its many connections and interdependencies it is difficult to decompose the system so that the resulting model retains sufficient integrity to remain meaningful. While the engine of globalisation has undoubtedly been economics; the cultural, political and social inter-city connections are not insignificant in terms of their effects on the sustainability of cities. The linkages indicated in figure 2 provide a sound basis from which to measure the flows of people, materials and information, however collecting the data at the city level over a reasonable period of time to determine how these flows affect sustainability remains the current challenge. Three different methodologies have been offered by Beaverstock et al. (2000) to specify a world city's external relations – surrogate, labour and organisational. The surrogate measure analyses the content of business news, the labour measure assesses inter city migration through 'practitioner interviewing' and the organisational measure analyses service producer office locations. While the three measurements have their respective pros and cons, combined they begin to provide an overall picture of world-city relations.

To better understand a city's relationship with other cities and regions, additional indicators of inter-locational flows must be measured to not only assess how the city has become economically linked to other localities but also how it has become culturally, socially and politically linked. Given that it was during the 1970's that a new technological paradigm emerged from the United States that facilitated the current era of globalisation (Castells, 1996), it is appropriate to commence any longitudinal study involving globalisation at a point prior to the 1970's.

4.1 Economic Globalisation

An indication of a city's changing economic globalisation level can be determined by assessing the presence of global service firms over a period of time as per the methodology described by Beaverstock et al. (2000). The same 100 global service firms used by Taylor et al. (2001) can be used as the first method to chart how a city's economic globalisation level has changed since 1960. Initially this may be achieved through reviewing the city's telephone directory for presence of these 100 services firms in 1960, 1970, 1980, 1990 and 2000. Depending on the number of firms present, the data may be refined through direct survey to determine how these firms interrelate with other branch offices in other cities. The second manner of measuring a city's economic globalisation is as per Beaverstock et al.'s (2000) surrogate method. This involves

reviewing the first page of the business section of the local newspaper for 24 issues in each of the years 1960, 1970, 1980, 1990 and 2000. To ensure a range of week days are used, the first working day of each month plus the same day the following week should be used.

4.2 Cultural / Social Globalisation

A number of methods may be used to chart a city's cultural and social level of globalisation. Firstly the city's telephone directory may again be reviewed to determine the presence of international aid organisations over the same 10 year intervals from 1960. Depending on the number of organisations present, direct survey may again be used to refine this data and provide further clarity on their inter-city relationships. As further indicators of cultural and social flows into a city, data may be sourced on non-business trips, numbers of foreign student enrolled in Universities, residents born overseas, international telephone traffic outside of business hours and imported food consumption.

4.3 Political Globalisation

A city's political globalisation level may be measured by assessment of three indicators. The first is the number of foreign consulates or embassies present in the city. This may be determined again by review of the city's telephone directory in the years 1960, 1970, 1980, 1990 and 2000. Secondly, the number of cities with 'Sister City' or 'Friendship City' relationships may be determined. The third indicator is official overseas travel by Government ministers. Determination of destinations, number of trips and their duration will indicate the level of importance attributed to other cities by the government.

5. SUSTAINABILITY OF CITIES

Cities must reconcile the conflict between being part of a competitive global city network and satisfying the day to day requirements of their own inhabitants. For the city to be considered sustainable as an element within the global network, it must develop and operate in a way that is considered in the common global good (the Net) and additionally as a system within itself, whereby it must develop and operate in way acceptable to its own inhabitants (the Self) (Egger, 2003).

'The Net' relates to the impact the city has on other regions around the world through its deliberate linkages of trade, foreign investment, migration, etc. and its non-deliberate linkages such as global warming, pollution, natural resource depletion, etc. The sustainable city must recognise the rights of other regions to equitable access of common capital, whether it is people, the environment, natural resources or money.

'The Self' relates to how the city develops to meet the needs of its own inhabitants and how the city may adapt to protect itself from disturbances over which it has little or no control. The indicators of sustainability from this perspective are therefore grouped into firstly condition indicators and secondly capacity indicators. The first group relates to the measurement of development outcomes to determine city condition. While these indicators don't provide any indication of the city's ability to maintain a healthy condition they do provide a baseline from which to track changes in the city condition. The second group relates to measurement of the city structure to determine capacity for adaptation and sustainability.

The challenge lies in the fact that many of the appropriate indicators are only available at a national level rather than at the city-region level. For further comment on determining an appropriate model for a sustainable city, including indicators, refer to Egger (2003).

6. CONCLUSION

In order to understand the relationship between globalisation and the sustainability of cities, it is important to dissect and correlate the various indicators of each. Globalisation appears to be substantially uneven as it delivers positive outcomes for certain cities, or even segments within cities, while disregarding or excluding others. Additionally, if a city's inter-relationships with external regions become stronger or more important than its intra-relationship with its own society then it faces the prospect of allowing segments of its own social fabric to disconnect from the city. Once this fragmentation begins to occur, the urban system becomes unstable and therefore unsustainable.

The various components of both globalisation and sustainability can be assembled in a matrix as depicted in figure 3. While the ultimate correlation between globalisation and sustainability is important, it is the outcomes of other intersections in the matrix that begin to indicate how the relationship between globalisation and sustainability is structured. The correlations between matrix components need to be assessed

for both a variety of city types (cross-sectional analysis) and over a period of time (longitudinal analysis). For example, in assessing these component relationships, it will be possible to examine in greater detail how economic globalisation is affecting common global capital, the condition of cities and the capacity for cities to adapt to changing circumstances. Similar assessment can be made for cultural, social and political flows between cities and how they affect the various components that define a sustainable city.

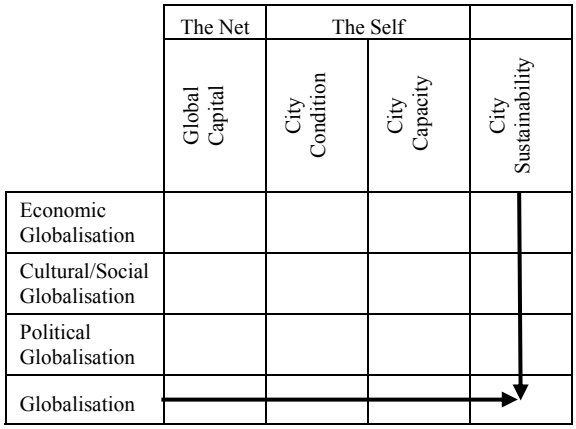


Figure 3. Globalisation – Sustainability Matrix

By undertaking a cross-sectional analysis of a range of city types, results can be evaluated in accordance with the primary variables of LPT – population size, city GDP and access to natural resources (i.e. cities within regions that export large amounts of natural resources). Taylor et al. (2001), have extensively measured inter-city relations for a cross-section of 316 cities. The outcome of this work was essentially a global network connectivity index for each city based on the presence of 100 service firms. Of the top 100 cities in terms of their connectivity index, about two-thirds of the cities were from the "north", defined as having a greater global share of GDP then population. This indicates that globalisation is not confined to the wealthy north (despite having a greater stake), but takes in all types of cities. Further analysis is required to determine how these inter-city relationships are affecting the city's sustainability and whether the wealthy north is sustaining itself by exploiting the south.

The intention of correlating data between the various globalisation and sustainability components is to determine where patterns and trends are occurring. Once an empirical basis has been established in determining the relationship between globalisation and sustainability, the issues relating to how to deal with any interactions can be better addressed.

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