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# ASSESSING QUALITY OF LIFE THROUGH PHYSICAL PARAMETERS

## INTRODUCTION

As cities keep growing in size, it becomes more and more important that urban expansion takes place a planned way, so that cities can satisfy the needs of its population. Unplanned growth or planned growth with scarce implementation lead to environmental degradation, traffic jams, urban sprawl, pollution, low access to basic services and equipments, loss of identity, communities' disintegration, pockets of poverty, etc.

Urban planning is the set of tools through which interventions attempt to create urban spaces that contribute to the quality of life of citizens in the context of urban design. This can be defined as the relationship of inhabitants with the different elements that constitute urban space. Urban design determines, directly, the physical component of urban space, and indirectly, its socio-economic, political and cultural elements, influencing the relationship between the urban environment and its components.

## LITERATURE REVIEW

The urban quality of life theory originated from a sustainable development framework. This concept is defined as individuals' perceptions, feelings and experiences within the space in which they live. In addition to the traditional triple bottom line of social, economic, environmental, other cultural and personal factors have an effect on the quality of life. Wish (1986) proposed some such basic factors of urban quality of life: economic vitality, feeling of place, cultural activities, good quality housing stock, easy access to services like health, sports, education, shopping, child-care, social organisations, need for forming a sustainable environment, security and privacy. Several scholars had developed this concept further during the 1990s (Brown et al., 1993; Felce and Perry, 1995; Cummings, 1998; Parfect and Power, 1998). Several other authors are adding operational approaches to

the subject (Findlay et al., 1998, Rogerson et al., 1989; Savageau and Loftus, 1997). Cummings (1999) defined quality of life in both an objective and a subjective manner. He pointed to seven important characteristics, namely, welfare, health, productivity, privacy, security, population, and emotional welfare. Kampt et al. (2003) proposed a graphical framework that stands out, as it encompasses the public and the private spheres of quality of life, in relation to the physical environment, natural resources, goods, services, community development, personal development, and security and health.

McRea et al. (2006) studied the strength of the link between subjective and objective indicators of urban quality life. Knowing that subjective and objective indicators of urban quality of life are rarely related to each other, they tried to link them by using Geographical Information Systems (GIS) to locate respondents in the B2003 Survey of Quality of Life in South East Queensland,as well as to gather objective indicators about their urban environment within the region with regard to services, facilities and overcrowding. Structural Equation Modelling (SEM),showed that the relationship between these objective indicators and subjective indicators can be weak, and suggests that care should be taken when making inferences about improvements in subjective urban quality of life, as more in-depth researchis needed to link those indicators.

## GUIDELINES FOR ANALYSIS

Some important points can be drawn from previous studies undertaken for Portuguese cities which are: (i) quality of life in cities can be described by characteristics; (ii) characteristics are associated with particular aspects of living in an urban context; (iii) quality of life characteristics can be described by indicators, which can be objective or subjective; (iv) characteristics and indicators can be combined by attributing them different levels of importance (weights) based on a subjective judgment.

This theoretical and applied framework allows for different combinations of characteristics and associated weightings lead to different definitions, more or less personal, that can be customised to the interests, motivations, and preferences of a social group, a company, an institution or an individual citizen. While this evaluation model developed at the University of Minho for the scoring of the indicators describes nine characteristics, namely climate, shopping and services, crime, unemployment, housing, mobility, built heritage, purchasing power, and pollution, the model of another Portuguese higher education institution (ISCTE - University Institute of Lisbon) omits important characteristics, such as built heritage, air and noise pollution. Apart from this, there is not a single set of weightings as all the indicators are given the same weight and added arithmetically.

## GIS MAPPING

To complete this model, a GIS approach was used to compile and analyse both the quality of life scoring and urban pollution. This GIS Mapping enables the performance of a spatial analysis.

The GIS approaches have already been developed by several researchers, such as Gomes and Lins (2002), who studied quality of urban life in Rio de Janeiro using the Geographical Information Systems (GIS) integrated with Multi-Criteria Decision Analysis (MCDA) to assist spatial decisions. One of the main advantages is the ability of GISmethods to clarify the decision making process and provide structure to a non-structured decision making process; even so, further research is required.

Apparicio et al. (2007) reported that using

several spatial databases in GIS helped their study identify various combinations of advantages and disadvantages, within the urban living environment in which Montreal's public housing buildings have been located, according to three dimensions: the social environment, the physical environment, and the accessibility of services and facilities.

## INDICATORS FOR URBAN SUSTAINABILITY

It has been argued before that the urban quality of life concept emerged from the sustainability framework. Therefore increasing the scope of the study to encompass broader sustainability concerns can deepen the understanding of the core subject of urban quality of life indicators, as well as showcase some of its limitations.

Classic indicators of Quality of Life or more precisely Quality of Urban Life, increased to encompass an ever expanding field of communication based utilities. The ability of communities to encourage and stimulate innovation and businesses, that foster integration of all members of their community and manage to successfully interact with its members is as important as attracting new people to foster its growth and to influence other communities, with possible far reaching consequences.

Low-Carbon Cities and Sustainable Cities indicators can be diverse. The first deal principally with carbon foot-printing of urban environments, the second with the long term sustainability of cities as a whole. The exact indicators chosen to describe and quantify the carbon foot-printing and sustainability can vary depending on several factors, including strategies used to reach the ultimate goals of carbon neutrality and sustainability. As a reference, Table 2 shows some of the most recent indicators in use by various groups, emanating from a small sample of Sustainable Cities' Indicators in use in January 2012 grouped according to different categories.

Although the goal of reducing carbon emissions in cities is relatively straightforward to understand, the techniques and methodologies developed to measure them have producedever more complex indexes, which take into account the carbon balance, proper planning, the continuous improvement of any given city toward the carbon neutrality goal. They have all become important factors to compare the performance of different urban centres. As an example, Table 3shows a small excerpt of indicators developed for use in Chinese cities (Prince et al., 2011)for a project supported by the China Sustainable Energy Programme of the Energy Foundation (through the U. S. Department of Energy).

The examples shown in both tables are, of course, only a fraction of such indicators currently being used to gauge sustainability and the carbon foot-print of cities. Most indicator tables however are heavily influenced by factors such as thecountry of origin, the researchers involved (architects, engineers, environmental analysts, alternative energy experts, urban planners, etc.), the purpose of the underlying study, etc.

Without going into the scope of the problem of integrated interdisciplinary research in this field (a subject discussed by other authors, such as Shmelev, S., and Shmeleva, I., 2009), it is still clear that the filtering of the subject through multiple disciplines, multiple cultural backgrounds and disparate national priorities, will produce different indicators. Despite the multiplicity of indicators already produced, some researchers are taking different approaches altogether, such is the case of Intelligent Cities.

Even before Finland introduced broadband as a fundamental constitutional right[1],the potential of internet communication to become the new globalising empowering force of the

twenty first century was already there. This was supported by recent political and social events in 2011 when social movements were almost completely organised by using social media. Indicators like the penetration of broadband, innovation, digital inclusion and advocacy, have become a reasonable means of measuring the success of a city.

Funded by Canada, the Intelligent Community think tank defines a number of indicators based on key competitive factors in what isknown as the "broadband economy". These indicators are broadband connectivity, knowledge workforce, innovation, digital inclusion, marketing and advocacy. The indicators reward municipal support for high-tech start-up companies, high tech job creation, and appropriate implementation of technologically sustainable solutions which create jobs or save taxpayers' money.

Nevertheless, the classic doubt remains to which extent these new indicatorsare charting new paths to quality of life and lasting prosperity for the citizens.There is a clearly visible trend towards increasingly organic patterns, following technological advances but without ignoring societal or human needs.

## INDICATORS FOR URBAN DESIGN

Turning technocratic city development models round to serve more human centric priorities has long been defended by many urban planners. A classic model by Jacobs and Appleyardis shown here which uses different theoretical hangers as the basis of planning models for urban development.

Jacobs and Appleyard opposed the cost effective, grey skyscraper block tendencies which pervaded the decades of the 1970s and 1980s, defending a set of characteristics which they considered to be vital for positive urban living (Jacobs and Appleyard, 1987: 171-174). Their manifesto against high density public and private development projects is now fully supported by current trends prioritising a high quality of life standard. The practice of continuous renewal of cities also leads to a loss of heritage, as the places and buildings of a city can become living material memories, thus bearing meaning and value in themselves as elements of place.

A series of qualitative and quantitative indicators may be used to characterise urban space and evaluate urban design. A qualitative assessment may evaluate the urban structure, the street system, the existence of equipment and open spaces, or the diversity of land uses, for example.

Urban space may have an open or closed structure. Open space can be axial or organic in turn. Grid structures can be regular or irregular. The grid is often used on flat land while organic grids are the more sustainable choice for steep sloping sites. However, most often cities show a mix of them. Only cities planned from scratch, such as Brasilia, or extensively planned cities such as Barcelona, may be closer to pure categories. It is important to emphasise that urban design must be adapted to the territory. San Francisco may serve as an example of an urban regular grid structure badly adapted to its topographic environment.

The urban structure may determine car dependency and therefore pollution; conversely, it can make urban spaces more liveable, support public transit, facilitate access to services and leisure, make cities safer, promote more efficient cities, etc.

Urban space is also characterised by its street pattern, which is a major determinant of urban structure. It structures the city, serves as a support to infrastructure and conditions accessibility. It can be non-linear, discontinuous, diagonal, organic, orthogonal. Cul de sac which is common in suburban developments is

an example of a street pattern that limits accessibility. As opposed to arterial streets which may integrate or divide, traffic may be distributed more evenly by avoiding concentration in downtown, promoting alternative uses of certain neighbourhoods, or by upgrading unsafe residential neighbourhoods or enhancing historical areas.

Additionally, urban space is valued through the existence and location of public infrastructure and services, public spaces, green areas and focal points. Numerous studies defend the positive contribution of these public amenities to the overall comfort of the inhabitants of such neighbourhoods, as well as to their higher real estate values.

Finally, another set of indicators helpscharacterise the design of urban space. Urban space may be framed or non-framed, articulated or non-articulated, cohesive or without cohesion, varied or monotonous, and may or may not have self-identity.

Urban design may be assessed via quantitative analysis or, via qualitative analysis, by assigning a value to different qualitative indicators of the urban space.

The land occupancy index can also be collected using approved detailed plans, thereby providing a general overview of the types of buildings present in the selected area. For example, for a possible matrix to identify the distribution of land use.

After computing these areas as well as vacant land, simple compact city indexes can be graphically designed to make urban diagnosis more explicit.

## CONCLUSIONS

At a time of economic changes and crisis, urban planners have to reconsider their models of thinking and envisage new avenues forurban living.

They need to re-discuss and re-think the urban regeneration and urban expansion operations of the last twenty years with very open minds. This is a preliminary crucial step to prepare future creative paths for urban planning and action. Time has come to open up, and to really listen to the inhabitants and others who use a specific city, to understand the city´s DNA, feel its vibe, but also to make the inhabitants understand planning paradigms, their rational and and technical bias, to allow them to set their own trends according to their own values, however without giving up a 100 year history of technical knowledge. The indicators presented in this paper can portray a first assessment of an urban area. The next step after applying themis to engage in real communication and to get involved in the realities they showcase to understand and design improvements of urban areas which are really needed.

1. http://www.bbc.co.uk/news/10461048 [accessed: January 2012]

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