Urban Diversity: Necessity and Strategies

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Abstract

This paper explores the necessity of maintaining diversity in cities. Diversity has been proven to be a driving force in ecosystem health in natural settings, where resilience against unpredictable perturbations is essential. Economic, social, and biological diversity is of prime importance in urban settings, where inevitable changes may challenge even the most prosperous human environment. Diversity contributes to urban fabric, it ensures long-term resilience, and it enhances sustainability. However, the pressures and expedients of economic and physical growth tend to obfuscate the importance of diversity. Balancing development with growth, maintaining a broad economic base, preserving history, and nurturing appropriate green spaces all contribute to urban diversity. I will discuss several examples of North American cities that "should have known better" as a way to explore solutions that enhance urban diversity.

Keyords: *diversity, ecology, economy, history, resilience, sustainabilit*

Introduction

Broadly defined, urban diversity is circumscribed by physical, biological, social, economic, and historical parameters. Balancing development with growth, maintaining a broad social and economic base, preserving historical spaces, and nurturing appropriate biotic environments all contribute to urban diversity. Diversity has been demonstrated as a positive characteristic in ecosystem health in natural settings. The survival of species and the continuation of complex ecosystems depend upon variability (diversity), which confers selective advantages for resilience against unpredictable environmental perturbations. Economic, social, and biological diversity are also desirable in urban settings, where long-term changes may challenge even the most prosperous human-built environment. Diversity contributes to urban fabric, it ensures long-term resilience, and it enhances sustainability. However, several factors militate against diversity. First, the pressures and expedients of economic and physical growth tend to obfuscate the importance of diversity. The steamroller of "progress" may wipe out diversity, at least temporarily. Second, self-selected or socially imposed segregation of urban activities, ethnicities, and economic regions may result in zones of low diversity. Finally, anomalous regions of lower diversity within high-diversity environments may result in unforeseen consequences that challenge the urban fabric. This paper focuses on examples of these [120]

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anomalies and their challenges. As a way to explore solutions that enhance urban diversity, this paper will address regions of low diversity within high-diversity cities, providing examples from North American cities.

Natural and Urban Diversity

Many researchers have addressed the characteristics of biologically diverse ecosystems, which show enhanced resilience over systems that are less diverse (Sudgen, 2000). Diversity in natural systems protects them from environmental perturbations such as natural disasters (Moretti et al., 2006), drought (Fischer et al., 2006), and predators (Steneck et al., 2002). Diverse ecosystems, regardless of scale, are better able to regenerate after perturbations than are less diverse systems (Peterson et al., 1998). In an interdisciplinary study examining both natural and social systems, Adger et al. (2005) suggested that the vulnerability of diverse ecological and social communities is reduced, even when regions are exposed to massive destruction caused by hurricanes, typhoons, and tsunamis. Folke (2006) highlighted the complexity of analyzing resilience in social systems.

The study of urban diversity and urban resilience requires an interdisciplinary approach. It is therefore reasonable to consider urban diversity within overlapping structural, biological, social, and economic frameworks. Within these frameworks, urban diversity has been addressed in numerous studies. Diversity has been widely recognized as a favorable, even ubiquitous urban condition (see for example Jacobs, 1969; Ottaviano and Peri 2006). Quigley (1998) recognized “heterogeneous features of modern cities” as enhancing economic efficiency. Because of their concentrated population and high rates of consumption and waste production, urban regions drive environmental change (Grimm et al., 2008). Ironically, urban regions themselves exhibit considerable biological diversity (Kloor, 1999). Some authors suggest further introduction of biodiversity to the city through gardening and other strategies (Gaston and Gaston, 2011). Others suggest that urban spaces are inherently diverse iterations of natural systems (Lundholm, 2011). To an extent, the concept of diversity itself is a controversial issue. Some authors, for example Fainstein (2005) challenged the importance of planning for diversity, and attributed the “orthodoxy” of urban diversity concepts to “the postmodernist/ poststructuralist critique of modernism’s master narratives.”

We can agree that cities are by nature diverse. Even tightly planned, structurally uniform “grid” cities develop diversities and hierarchies due to intense communication, movement, and other urban activities (Figueiredo and Amorim, 2007). But the differentiation of urban space, both physical and social, may lead to regions of relatively lower diversity (see Portugali et al., 1994). Like any dynamic system, cities may consequently harbour patterns of lower diversity physically, socially, and biologically. These may be seen as part of a “natural” process (see Denbigh, 1989) but they are not without consequences.

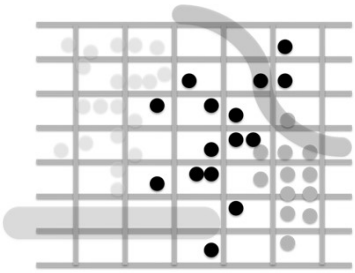

Fig. 1: Patterns of diversity in the urban grid
Source: author

Redlining and "Blockbusting" in Chicago

Cities or parts of cities that are racially or ethnically segregated may demonstrate zones of low local diversity. This may be the result of self-selected social concentrations or it may be reinforced politically, economically, and through imposed legislation. These loci of low diversity may impact the benefits that accrue from diverse populations. In the case of many cities in North America, especially during the 1950s-1970s, distinct geographic boundaries arose, block by block, between socially segregated regions. "Redlining" of racially segregated districts in Chicago, USA, resulted in tension along geographically demarcated "black" and "white" parts of the city. It also contributed to economic decline in terms of real estate values and tax revenues. Redlining threatened the urban fabric of the city and contributed to the flight of middle class "whites" to the suburbs. The results of redlining, which reached its apogee in the 1950s and 1960s, are still being addressed today (Pogge, 1992; Squires and Kubrin, 2005).

Banking and insurance practices literally mapped "red lines" around parts of the city where minorities (mostly African-Americans) lived in poorer, racially and socially segregated neighbourhoods (Illinois General Assembly 1975). Differentially prejudicial insurance and mortgage loan terms were applied to these areas of the city, reinforcing strict geographical segregation. In the late 1950s-early '60s, unscrupulous real estate practices, in consort with certain banking interests, took advantage of residentially segregated racial lines and began the process of "blockbusting" (see Helper, 1969; Pietila, 2010). Blockbusting played on the fears and prejudice of upwardly mobile white residents who feared the loss of property values by the presence of African-Americans on "white" blocks. Real estate agents manipulated white homeowners into selling their properties at lower-than-value rates, subsequently selling them to African-American buyers at much higher prices. One result was the expansion of racially segregated African-American neighbourhoods, destabilization of former middle-class "white" neighbourhoods, and the exacerbation of racial tensions in the city. A lower tax base and disinvestment by businesses and by the city resulted in large swaths of Chicago falling into neglect. Poor schools, decaying infrastructure, and high crime rates reinforced the social misery of these neighbourhoods. Chicago "pioneered" in blockbusting but the phenomenon was repeated in many large American cities.

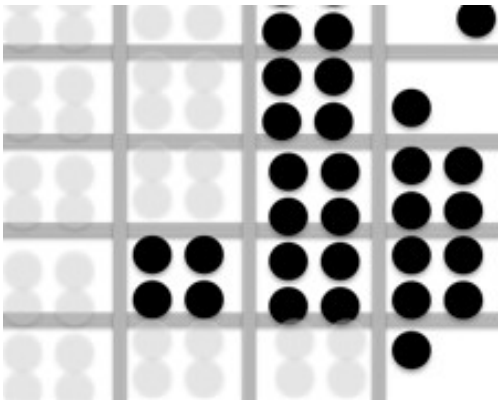

Fig. 2: Local patterns of low diversity and their boundaries
Source: author

The decline of Detroit

Cities or sectors of cities dominated by a few major economic activities may suffer from market, production, or financial perturbations that are a consequence of societal change. In the United States, there are many examples of "company towns," which derived the foundation of their economies from a few corporations. Detroit, Michigan, USA is the most striking example of a large-size, once-prosperous city whose economy was based on a few corporations, the automotive giants Ford, General Motors, and Chrysler. The factors that led to the decline of Detroit are complex (see Wilson, 1992) but the automotive industry was central to the problem. Detroit suffered from decline following decades of change in the automotive industry and decline of the automotive market (Bukowczyk, 1984; Thomas, 1990), but most striking was the intentional de-industrialization of Detroit by the "Big Three" automakers. Starting in the 1950s, these corporations physically moved their manufacturing operations out of Detroit to communities with cheaper labour, fewer minority residents, and higher tax incentives. Federal and local government policies exacerbated the situation. The population of Detroit fell by more than 50% from 1960-2010 partially caused by the loss of ca. 150,000 jobs starting as early as the 1950s (Gibson, 1998). The most dramatic decline in population came in the decade between 2000-2010, when Detroit lost 25% of its population. A by-product of the de-industrialization and depopulation of Detroit was the increasingly segregated nature of the city, as poorer, less mobile residents remained. Detroit is now one of the most racially segregated cities in the United States (Darden et al., 2010). Approximately 83% of its population is African-American, with a median income and per-capita income several thousand dollars lower than overall averages for the United States. As in the case of Chicago, infrastructural neglect and economic disinvestment followed deindustrialization and "white flight." Comparable American cities that were dominated by one or two industries, for example Pittsburgh, Pennsylvania and Rochester, New York, have fared deindustrialization much better, perhaps because of in-city universities and the deployment of "intellectual capital," (see Duranton and Puga, 2001) which I will discuss below.

Dutch elm disease and urban monocultures

As a biologist I am particularly interested in plants in urban spaces. Trees enhance the urban environment in a number of ways. They influence temperature, air quality, and soil health (Dwyer et al., 1992). The proximity of residential property to the urban forest is linked to real estate prices (Tyrväinen and Miettinen, 2000) as well as intangibles like "quality of life." Similar to monoculture practices in agricultural settings, single species monocultures in the city may

suffer irreversible destruction when faced with pathogens, climate change, or other external threats. An example: Dutch elm disease. The disease is caused by a fungal pathogen *Ophiostoma ulmi* spread by beetles. The disease spread effectively through monocultures of the American elm (*Ulmus americana*) that lined the streets of cities in the central and eastern United States (Santamour, 1990). Ironically, the streets had been densely planted with this North American native in order to take advantage of its shape. The high archways that develop when mature trees abut one another on two sides of a city street provide a magnificent shaded setting reminiscent of the interior of a gothic cathedral. First recognized in the continental United States in the 1920s, Dutch elm disease spread east-to-west, arriving in the Midwest between 1950-1960 (Karnosky, 2001). The eradication of urban American elm populations, which had no resistance to the pathogen, was the result. Because the trees were planted in long rows, a peculiarity of urban forest form, the disease literally swept across cities over a matter of a few years. The loss of these graceful shady trees threatened to disrupt the urban fabric almost as profoundly as social unrest in the cities. Plantings to replace the elm have been varied in their success. No one tree species has been able to perform like the elm. Varied species grow and mature differentially, producing irregular shade, interfering with power and telephone lines, and requiring maintenance on an unpredictable schedule. Other than aggressive chemical treatments or disease-resistant cultivars, no solution has been found that will allow widespread re-planting of elms. The American elm, which was a symbol of urban order, was made more susceptible to disease because its sector of the urban forest was non-diverse.

Are diversity strategies a possibility?

Urban landscapes, like natural ecosystems, are complex. Diversity is part of an evolutionary process, a random natural development that requires time, space, and variety (see for example Hubbell, 2001). Natural ecosystems are historical as well as biological. They form over time and reflect an evolutionary history. The mechanisms by which diverse systems arise are poorly understood, which have led to intense discourse about the nature of diversity and how to protect it. Diversity in ecosystems appears to be driven by unseen and difficult-to-monitor processes, for example microbial activity (see Van Der Heijden et al., 2008). Interactions among species and the many gradations of symbiotic relationships contribute immensely to biological diversity and yet are poorly circumscribed (see Kottke et. al., 2008). These observations suggest that we do not yet have the means by which to inventory the biotic factors that influence diversity. Further, the patterns of species distributions are so varied, and our methods of measuring species distributions are so inconsistent, that any one conservation plan based on these measures would seem to be ineffective (see Elith & Graham, 2009). Combined with this, random environmental perturbations such as climate add a dimension of threat that can, at best, only be estimated (Heller & Zavaleta, 2009). Human-induced perturbations are a short-and long-term threat (Brittain et al., 2010). But because humans are both a threat to biodiversity and recipients of its benefits, the answers to preserving natural biodiversity must be sought among our species. At all scales of landscape, stakeholder participation in conjunction with scientists appears to provide a beneficial approach to maintaining biological diversity (Reed, 2008). Yet there is a limit to what humans can foresee. For example, no one planting a street of elms in 1890 could have imagined the consequences of the urban monoculture. Perhaps we would now, depending on our approach to decision-making in this arena. What can we learn about urban diversity from the models discussed here?

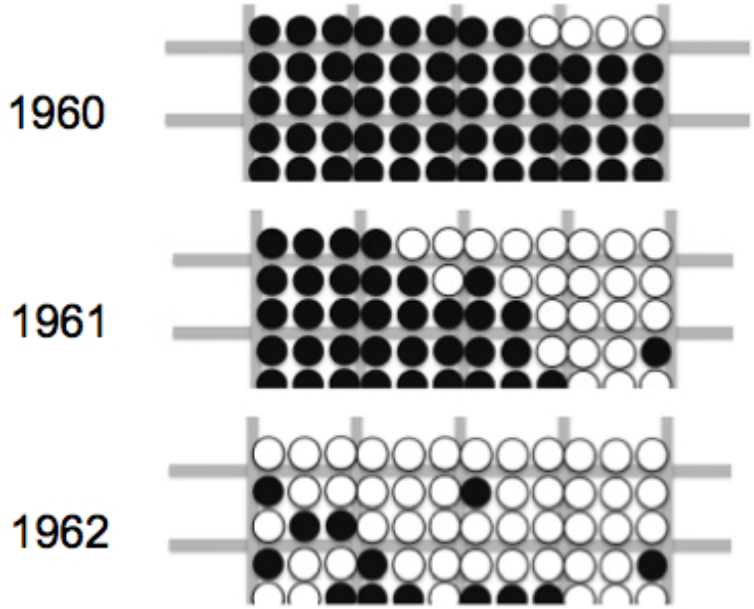

Fig. 3: Progression of a pathogen in an urban monoculture (white circles = dead trees)
Source: author

First, we acknowledge the complexity of human ecosystems within cities. Similar to our findings in natural ecosystems we encounter challenges in describing, circumscribing, measuring, predicting, and designing for diversity (see Day, 2003). Second, urban habitats are historical, dynamic, changing entities. Likewise, planning goals aimed at urban human welfare are dynamic because societal values and priorities may shift over time (Arapoglou, 2012). How can we assure individual and communal freedom at the same time as encouraging diversity (see van Leeuwen, 2010)? It seems that planning alone cannot provide an adequate answer for several reasons. First, professional planners may be well intentioned but lack intimate knowledge of an urban area, for example a neighbourhood or street. Similar to microbial ecology, unseen factors may influence the intimate local environment of a city. Second, a plan is an ideal endeavour that may address diversity goals, but which may be overridden by forces of commercial growth. For example, a commercial and residential tower built in a poor but diverse and historically significant neighbourhood such as Slave Island, Colombo. Finally, “plans” are a top-down product, expensive and carefully crafted but difficult to launch “on the ground.” The alternative is the slow, frustrating, but potentially robust public forum (see Basset, 1993). If we are to preserve diversity in our built environments it seems that we must involve the diverse people who live in those environments.

The future of diversity: warning signs

My own city, Cambridge, Massachusetts, is adjacent to Boston. In part because of its long history of citizen involvement, our city is nicknamed “The Peoples’ Republic of Cambridge.” Planning initiatives at every scale and stage are mandated by law to include public discourse. Cambridge is small in comparison to Chicago or Detroit (ca. 100,000 residents), but dynamic in its own right. The home of Harvard University, Massachusetts Institute of Technology (MIT), and several other institutions of higher learning, Cambridge is a magnet of intellectual capital, an exporter of ideas,

design, and entrepreneurship. Cambridge is an employment hub, with approximately half of the workforce (ca. 100,000 people), commuting into the city every day. Over the past few decades Cambridge has struggled to maintain its racial and ethnic diversity and it has done so partly by a careful planning process. However, community demographics reveal fewer families, fewer children, and fewer elderly residents, along with a higher median income than in past decades (City of Cambridge 2011). Unprecedented high costs of housing, something that cannot be planned, threaten the historic social diversity of Cambridge, where poorer families cannot afford to live.

Like much larger cities in North America, Cambridge experienced social and ecological fluctuations during the mid-20th century. The problems of de-industrialization, the movement of people, capital, and the tax base away from the city, and even Dutch elm disease were threats to the urban fabric. These threats were reversed in the 1980s as the city entered a period of industrial re-tooling and subsequent wealth. But at the present time Cambridge is threatened by a loss of economic diversity, not just in terms of its residents, but in terms of its industrial base. In addition to Harvard and MIT, just a few industries, for example international "big-pharma" corporations like Biogen, Novartis, and Genzyme, are some of the largest employers. Information technology giants like Google and Microsoft both have headquarters in Cambridge. These have triggered an explosive growth of wealth in Cambridge, similar to the early decades of the automotive industry in Detroit. Industries bring many jobs to the city, an enviable condition, but they have also changed the fabric of the city. Our wealth has many benefits but as we have seen with other American cities, which experienced unprecedented wealth along with economic and population growth, Cambridge's "success" threatens its economic and social diversity. Will the "intellectual capital" of our city and the huge wealth that it attracts come to outweigh frustrating but effective citizen participation of the "Peoples' Republic?" It is impossible to look 50 or 100 years into the future. But one wonders whether intellectual capital, the current infrastructure, and a few gigantic industrial employers will provide the resiliency to protect Cambridge from future catastrophic environmental changes, climatically, economically, and socially.

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