



0807

**CREATIVITY AND INDUSTRIAL CITIES:
A CASE STUDY OF BALTIMORE**

by

**Zoltan J. Acs
George Mason University**

**Monika I. Megyesi
University of Baltimore**

Number of Pages: 21

The *Papers on Entrepreneurship, Growth and Public Policy* are edited by the
Group Entrepreneurship, Growth and Public Policy, MPI Jena.
For editorial correspondence,
please contact: egppapers@econ.mpg.de

ISSN 1613-8333
© by the author

Max Planck Institute of Economics
Group Entrepreneurship, Growth and
Public Policy
Kahlaische Str. 10
07745 Jena, Germany
Fax: ++49-3641-686710

CREATIVITY AND INDUSTRIAL CITIES: A CASE STUDY OF BALTIMORE

Zoltan J. Acs
George Mason University
zacs@gmu.edu
703-993-1780
703-993-2284 fax

Monika I. Megyesi
University of Baltimore
monika@megyesi.org
240-274-0834

January 2007

Abstract

Creativity is changing the way cities approach economic development and formulate policy. Creative metropolises base their economic development strategies, at least partly, on building communities attractive to the creative class worker. While there are countless examples of high-tech regions transforming into creative economies, traditionally industrial cities have received much less attention in this regard. This research draws on Baltimore to assess the potential of transforming a traditionally industrial region into a creative economy. It analyses Baltimore's performance on dimensions of talent, tolerance, technology, and territory both as a stand-alone metropolitan area and in comparison to similar industrial metropolises. Using data from the US Census Bureau and research on creativity measures, this case study concludes that Baltimore has the opportunity to capitalize on the creative economy because of its openness to diversity, established technology base, and appealing territorial amenities. An important consideration in the transformation towards a creative economy is Baltimore's geographic proximity and access to the largest reservoir of creative talent in the US: Washington, DC.

Keywords: creativity, creative class, creativity index, creative cities, talent, technology, tolerance, territory, bohemian index, gay index, old industrial cities, Baltimore, economic development, economic growth, entrepreneurship

Introduction

The concept of creative class, as a plausible paradigm for contemporary economic growth, awakened significant interest among academics and the civic leadership community. In his book, *The Rise of the Creative Class*, Richard Florida (2002) correlates a region's economic development with its share of creative talent, tolerance towards diversity, capacity to invent or improve technology, and richness of public amenities.

In a nutshell, amenity-rich communities with a high degree of diversity attract young, educated, and creative people that contribute directly to economic growth. Members of the creative class—including: scientists, engineers, architects, designers, educators, artists, musicians, entertainers, etc.—stimulate a region's economy by introducing new ideas, new technology, or new content. Knowledge workers who engage in complex problem solving that involves a great deal of independent judgment also belong to this category.

Today, broadly defined, the creative sector of the US economy employs more than 30% of the workforce and accounts for nearly 50% of all wages and salary income. This ratio becomes increasingly important considering that lack of diversity, tolerance, and a knowledge-based economy leads to an out-migration of creative people, or brain-drain, to other regions.

Creativity, as the new economic force, changed the way cities compete. Across the country, creative metropolises base their economic development strategies, at least partly, on building communities attractive to the creative class worker. There are countless examples of such transformations among high-tech regions such as the Silicon Valley, Seattle, Boston Route 128, etc.

What has received less attention is how traditional industrial cities in the old industrial parallelogram—bordered by Green Bay, WI; St. Louis, MO; Baltimore, MD; and Portland, ME—have fared as creative cities. Baltimore, as a South-East anchor of this parallelogram, incorporates many unique aspects of traditionally industrial regions. Industrial regions have had a difficult time emerging as creative centers. Nevertheless, among metropolitan areas with population of one million or more, Baltimore ranked 17th in percentage of Creative Class population and is the first industrial city to begin a turnaround.

While Baltimore does well when compared to its peer cities, it does exceptionally well when combined as part of the Washington—Baltimore Megalopolis. Baltimore’s true strength and potential lays in its proximity to Washington, DC. This unique positioning provides Baltimore with a competitive advantage because Washington, DC is a truly modern, creative and high-tech epicenter.

As integral part of the greater Washington metropolitan, in the overall Creativity Index, Baltimore outranks the three largest consolidated metropolitan areas and is ahead of New York-Northern New Jersey-Long Island, Las Angeles-Riverside-Orange County, and Chicago-Gary-Kenosha (Table 1). Furthermore, the Washington-Baltimore Megalopolis is nationally ranked No. 1, based on its concentration of creative talent in the region. The tremendous importance of this ranking is understood as Baltimore’s immediate access to the most significant economic force of our age: creativity.

Table 1
Creativity Index Ranking Within Size for Benchmarked CMSAs
(Rank Ordered List by the Creativity Measure)

Target Statistical Area	Within Size Creativity Rank	Within Size Technology Rank	Within Size Talent Rank	Within Size Tolerance Rank
Washington--Baltimore, DC--MD--VA--WV CMSA	8	15	1	16
New York--Northern New Jersey--Long Island, NY--NJ--CT--PA CMSA	13	23	10	14
Los Angeles--Riverside--Orange County, CA CMSA	18	19	31	10
Chicago--Gary--Kenosha, IL--IN--WI CMSA	23	29	18	30

This case study explores the potential of Baltimore's transformation into the first industrial metropolis establishing itself as an inclusive, diverse, and creative economy.

Baltimore, more than any other city in the region, has the opportunity to capitalize on the creative economy because of its openness to diversity, established technology base, and appealing territorial amenities.

The feasibility of this claim is demonstrated in the following pages starting with a review of literature on entrepreneurship and a short description of the theory on creativity. After addressing methodology for this research, an analysis of Baltimore's performance on dimensions of talent, tolerance, technology, and territory follows. This analysis depicts Baltimore both as a metropolitan area and how it compares to similar industrial metropolises. The paper is concluded with a short summary of findings.

Literature on Entrepreneurship

Lee, Florida, and Acs (2004) divide academic approaches to entrepreneurship into two major categories. The first category focuses on entrepreneurs and tries to explain why a person decides to be an entrepreneur and start a new firm. The second category explains regional variation in firm formation at an aggregate level by looking at structural variations in geographical areas. These two approaches will be explained in this section.

Traditionally, studies of entrepreneurship have focused on the individual characteristics of successful entrepreneurs. According to Storey (1994), Acs and Storey (2004), these studies focus on the role of factors such as personality, human capital, and ethnic origin. Personality studies have found that entrepreneurship is associated with characteristics like entrepreneurial vision, alertness to business opportunities, proactivity, and family tradition (Blanchflower and

Oswald 1990, Chell et al. 1991). According to Evans and Leighton (1990), human capital studies have found that entrepreneurship is related to educational attainment and work experience. Researches showed that people with higher educational attainment tend to found new business more often than those with less educational attainment.

Jones, McEvoy, and Barrett (1993) have found entrepreneurship to be associated with ethnic origin. Lee (2001) found that Jews and Korean are more successful entrepreneurs than African Americans because they enjoyed better access to capital through family or ethnic networks than others. Yoon (1997) suggests that immigrants are more likely to be entrepreneurs, arguing that because new immigrants lack networks and contacts in existing businesses and are poor in communication skills and suffer from discrimination, they are more likely to start new firms and be self-employed. Evans and Leighton (1989) found that men with more financial resources and with more confidence in their own ability are more likely to be self-employed by using the data from National Longitudinal Survey of Young Men and Current Population Survey.

Another line of researches have examined the factors at regional level, which effect regional variations in new firm formation. Early studies focused on factors such as tax rates, transportation costs, and scale economies at the plant level (Bartik 1989, Kieschnick 1981). Reynolds, Storey, and Westhead (1994) found that factors such as unemployment, population density, industrial clustering, and availability of financing were important in explaining regional variation in firm birth rates. More recently, Armington and Acs (2002) found that industrial intensity, income growth, population growth, and human capital were closely related to new firm formation. Kirchoff et al. (2002) found academic research and development expenditure to be significantly associated with rates of new firm formation across regions.

A number of studies have suggested that regional rates of entrepreneurship are associated

with levels of immigration (Reynolds et al. 1995, Saxenian 1999, Kirchhoff et al. 2002). The entrepreneurship of the immigration can be approached in two ways. While most of immigrants are less educated and lack skills for success in the U.S., some of them are extremely well educated and equipped with a good skill set. Although it is hard to find a common property between two groups, one they have in common is the fact that they are risk-takers. A study of immigrants in California found that immigrants with a good educational background were involved as founders in 20% to 25% of new high-technology firm formation in Silicon Valley (Saxenian 1999).

Studies noted the importance of networking in entrepreneurship. Saxenian (1999) found that extensive networks of Chinese and Indian workers help people start new firms by providing contacts and financial supports in Silicon Valley. Stuart and Sorenson (2003) argue that businesses cluster because geographical proximity enables them to utilize ‘social ties necessary to mobilize essential resources’. Their findings imply that an entrepreneur’s social relationship is crucial in utilizing critical business resources, which is essential to start a firm or set up a new organization.

This paper refers to entrepreneurship in the context of clustering. The clustering of people and industries has been studied seriously in the literature. Following Park’s (1925) initial attention to the role of cities in concentrating and spurring human creativity, Jacobs (1961) explained how cities function as ‘open systems’ to attract talented people from various backgrounds and stimulate their creative capacities. She argued that open and diverse cities attract more talented people, thus spurring creativity and innovation, which are the underlying forces of entrepreneurship.

Thompson (1965) was among the first to suggest that cities function as ‘incubators’ of

new ideas and innovation. Lucas (1988) formalized the insights of Jacobs to provide a basic theory, arguing that cities function as collectors of human capital, thus generating new ideas and economic growth. Following Jacobs, Desrochers (2001) argued that economic diversity is a key factor in city and regional growth, as creative people from varied background come together to generate new and novel combinations of existing technology and knowledge to create innovation and as a result, new firms.

Building on these contributions, Lee, Florida, and Gates (2002) showed that creativity, diversity, and human capital have positive and significant relationships with regional innovation measured as per capita patent production. Also Florida (2002) argued that creativity is an important element in regional economic success and Florida and Gates (2001) found that diversity has a positive association with regional high-tech output and growth.

This research builds on this line of thinking, arguing that creativity and diversity of a region work together to increase regional capacity to generate entrepreneurial activity. Creativity and diversity are kinds of social infrastructure entrepreneurs and policy-makers can tap into. Creativity and diversity are quite distinctive since they cannot be easily measured or even defined properly. They are more fundamental than critical resources for entrepreneurship such as tax rate, human capital, venture capital, or entrepreneurial zone. We can regard it as social habitat.

How can diversity promote entrepreneurship? We argue that more diverse regions tend to have lower entry-barriers which make it easier for human capital with various backgrounds to enter the region and stay within. If we can agree that the central focus of entrepreneurial studies is the entrepreneur themselves, it is natural to think that lower entry-barriers can play an important role in attracting creative human capital to come to a region and stay welcomed with a

sense of membership. Hence a more diverse region could enjoy comparative advantage in attracting and retaining creative human capital.

How is creativity related to entrepreneurship? Sternberg (1988) defines creativity as ‘the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints)’. According to Sternberg’s definition, entrepreneurship is a form of creativity and can be labeled as business or entrepreneurial creativity because often new businesses are original and useful. Cattell and Butcher (1968) argue that ‘creativity is perhaps best acquired by association with creativity’. We assume that the presence and concentration of bohemians in an area creates an environment or a milieu that attracts other types of talented or high human capital individuals and promotes business creativity.

Attracting Creative Talent

Human creativity, the driving force in contemporary urban development, is a consequence of nurturing and stimulating environments. Talented people are highly mobile and attracted to regions that offer not only economic opportunities, but also amenities for a variety of lifestyles. According to Florida (2002), key to understanding the new economic geography of creativity and its effects on economic outcomes are the 3Ts of economic development:

- talent: or creative share of the workforce, based largely on demographic, educational, and occupational characteristics
- tolerance: or diversity, based on indexes related to sexual orientation and bohemianism culture
- technology: or innovation, measured by patent activity and the high technology share of the economic base

Each T dimension is a necessary—and by itself insufficient—condition to attract creative people, generate innovation, and stimulate economic growth. Richard Florida combines the 3Ts into a Creativity Index, to rank the creative potential of metropolitan regions. Additionally, this paper expands on a fourth T—territory—to account for Baltimore’s territorial and communal amenities. Based on relevance and availability of data, the dimensions of 3T (talent, tolerance, technology) and 4T (talent, tolerance, technology, territory) are used interchangeably.

Table 2
Creativity Index Ranking for All Statistical Areas
 (Rank Ordered List by Creativity Index)

Target Statistical Area	Creativity Index	Talent Index	Tolerance Index	Technology Index
Austin TX	0.991	0.956	0.790	0.848
San Francisco CA	0.988	0.957	0.939	0.844
San Jose CA	0.985	0.990	0.863	0.896
Raleigh-Durham NC	0.982	0.976	0.646	0.809
Seattle WA	0.979	0.956	0.789	0.808
Oakland CA	0.976	0.920	0.900	0.795
Boston MA-NH	0.970	0.967	0.671	0.677
Sacramento CA	0.967	0.802	0.778	0.703
Washington DC-MD-VA-WV	0.964	0.986	0.824	0.694
Atlanta GA	0.961	0.824	0.720	0.743
Portland OR-WA	0.955	0.838	0.714	0.829
Dallas TX	0.946	0.849	0.793	0.765
San Diego CA	0.940	0.820	0.839	0.778
New York NY	0.927	0.886	0.866	0.545
Phoenix AZ	0.909	0.659	0.739	0.779
Minneapolis MN-WI	0.906	0.890	0.613	0.676
Baltimore MD	0.903	0.874	0.671	0.497
Los Angeles CA	0.888	0.727	0.902	0.484
San Antonio TX	0.870	0.621	0.634	0.708
Philadelphia NJ-PA	0.867	0.812	0.595	0.619
Denver CO	0.861	0.887	0.763	0.557
Chicago IL	0.855	0.811	0.724	0.616

Source: Kevin Stolarick, PhD - Carnegie Mellon University

The Creativity Index and the 3T Indexes are ranked on a scale from 0 to 1 to provide reliable basis for comparison among analogous regions based on population statistics. Table 2 specifies the creative performance of the top metropolitan areas with a population of 1 million and above.

The top five creative regions are Austin, TX; San Francisco, CA; San Jose, CA; Raleigh-Durham, NC; and Seattle, WA. Baltimore joins this group of creative regions in the top 10th

percentile of the Creative Index. It ranks 17th on this national list, with an overall Creativity Index of 0.903.

Table 3
Creativity Index Ranking for Benchmarked Statistical Areas
(Rank Ordered List by Creativity Index)

Target Statistical Area	Creativity Index	Talent Index	Tolerance Index	Technology Index
Baltimore MD	0.903	0.874	0.671	0.497
Philadelphia NJ-PA	0.867	0.812	0.595	0.619
Chicago IL	0.855	0.811	0.724	0.616
St. Louis IL-MO	0.698	0.716	0.408	0.533
Milwaukee WI	0.559	0.701	0.525	0.450
Cleveland OH	0.498	0.589	0.436	0.465
Pittsburgh PA	0.438	0.655	0.242	0.589
Detroit MI	0.272	0.725	0.534	0.350

Source: Kevin Stolarick, PhD - Carnegie Mellon University

The region performs even better in the context of peer cities that fit the old industrial parallelogram. On a list of seven comparable metropolises Baltimore ranks first, showing unique potential in becoming the prototype of an industrial region successfully integrating an open, inclusive, and diverse economy (see table 3). While Baltimore is at the forefront measured both by the Creativity and Talent Index, it is outperformed only by Chicago on the Tolerance Index. The Technology Index places Philadelphia in the lead and Baltimore into fifth place among the benchmarked regions.

The 3Ts explain why cities like St. Louis and Pittsburgh fail to grow despite their deep reservoirs of technology and world-class universities. They have not been sufficiently tolerant and open to attract and retain top creative talent. The interdependence of the 3Ts also explains why cities like Miami and New Orleans do not make the grade even though they are lifestyle meccas: they lack the required technology base. The most successful places such as the San Francisco Bay area, Boston, Austin and Seattle put all 3Ts together. They are truly creative places.

Methodology

This paper analyzes the extent to which the Baltimore Metropolitan Statistical Area (Baltimore MSA), in the State of Maryland, represents an environment that attracts and stimulates creativity on the dimensions of 4T: talent, tolerance, technology, and territory.

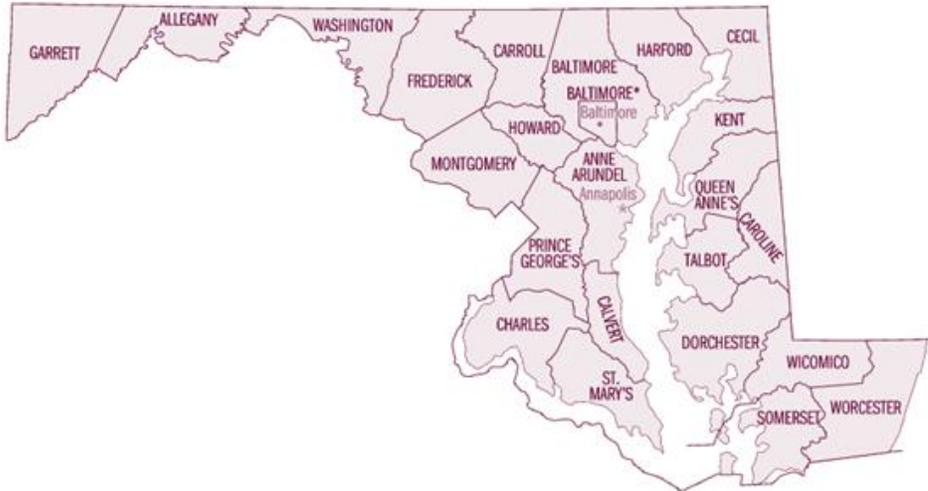
Measures of the talent dimension include data from the U.S. Census Bureau on population 25-34 years of age, educational levels of population 25+, migration of population aged 5+ to the region, information on foreign born population, and data on occupations considered creative.

Data on the Gay Index and Bohemian Index was provided by Dr. Kevin Stolarick of Carnegie Mellon University, who has done extensive statistical research in various measures of creativity. These two indexes give an insight in the analyzed regions' tolerance dimension.

Aptitude in technology will be shown by data on utility patents granted by the U.S. Patent and Trademark Office. Finally, the dimension of territory will be described with focus on the Wage Inequality Index and Housing Inaffordability Index provided by Dr. Stolarick, and data on housing costs from the U.S. Census Bureau.

The 4T dimensions of the Baltimore MSA are studied both independently and as compared to seven similar industrial regions. The Baltimore MSA incorporates Anne Arundel County, Baltimore City, Baltimore County, Carroll County, Hartford County, Howard County, and Queen Anne's County (see graph 1).

Graph 1
 Baltimore MSA:
 Anne Arundel County, Baltimore City, Baltimore County, Carroll County,
 Hartford County, Howard County, and Queen Anne's County



The benchmarked Metropolitan Statistical Areas (MSA) and Primary Metropolitan Statistical Areas (PMSA) are: Chicago, IL; Cleveland, OH; Detroit, MI; Milwaukee, WI; Philadelphia, PA; Pittsburgh, PA; and St. Louis, MO. These regions were selected because they fit the old industrial parallelogram and are comparable to Baltimore.

Talent Dimension

The statistical correlations between the Talent Index and the creative class centers are understandably among the strongest of any variables in the analysis because creative class people tend to have high levels of education. Baltimore, being ranked first among the peer industrial cities, outperforms its benchmarks with a higher talent rank for the percent of its population that is a part of the creative class (see table 4).

Table 4
Talent Index Ranking for Benchmarked Statistical Areas
 (Rank Ordered List)

Target Statistical Area	Talent Index
Baltimore MD	0.874
Philadelphia NJ-PA	0.812
Chicago IL	0.811
Detroit MI	0.725
St. Louis IL-MO	0.716
Milwaukee WI	0.701
Pittsburgh PA	0.655
Cleveland OH	0.589

Source: Kevin Stolarick, PhD - Carnegie Mellon University

Population 25-34

When it comes to converting human creativity into economic output, the individuals aged 25-34 play a particularly important role. Representing the majority of today's creative class, this is the hardest working segment of the population at the peak of their mobility.

Table 5
Population Aged 25-34
 (Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Chicago, IL PMSA	1,280,225	143,847	13%
Cleveland, OH PMSA	295,069	-12,443	-4%
Pittsburgh, PA PMSA	284,780	-41,583	-13%
Detroit, MI PMSA	644,314	-123,458	-16%
Milwaukee, WI PMSA	205,841	-48,381	-19%
Philadelphia, PA--NJ PMSA	686,005	-162,936	-19%
St. Louis, MO--IL MSA	345,294	-84,502	-20%
Baltimore, MD MSA	352,427	-91,977	-21%
Howard County	36,519	-2,717	-7%
Anne Arundel County	72,235	-7,824	-10%
Harford County	28,685	-5,301	-16%
Carroll County	17,896	-3,354	-16%
Queen Anne's County	4,724	-981	-17%
Baltimore County	101,340	-23,276	-19%
Baltimore City	93,248	-44,633	-32%

Source: American FactFinder - U.S. Census Bureau

Nationally, the size of this cohort has been shrinking over the past decade. With the exception of Chicago, industrial urban areas are losing their young adult population, what translates into a creative brain-drain. Cleveland experiences considerably less brain drain than its peers. While Baltimore ranks last on this category, the picture significantly improves at the

county level. Howard and Anne Arundel counties—located geographically to the South, between the Cities of Baltimore and Washington, DC—lost less young population than the rest of the MSA (see table 5). Loss of young creative adults encumbers Baltimore’s progress towards a creative economy; however, the region’s proximity to Washington, DC provides a talent resource that can augment the region as long as Baltimore takes measures to attract this talent.

Education Levels

Educational levels are highly correlated with creativity, innovation, and economic growth. Baltimore ranks forth within the benchmarked MSAs, while education levels within the counties forming the Baltimore MSA are even higher (see table 6). At the county level, 58% of the population has a bachelor’s degree or above in areas North of Baltimore City: Carroll and Hartford Counties.

Table 6
Population Aged 25+ with a Bachelor's Degree or Higher
(Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Chicago, IL PMSA	1,586,055	631,110	66%
Cleveland, OH PMSA	350,620	108,834	45%
Pittsburgh, PA PMSA	391,691	114,657	41%
Baltimore, MD MSA	493,842	132,064	37%
Carroll County	15,786	5,793	58%
Hartford County	25,564	9,347	58%
Queen Anne's County	4,606	1,607	54%
Anne Arundel County	62,371	18,894	43%
Howard County	48,210	14,287	42%
Baltimore County	92,487	21,562	30%
Baltimore City	43,746	3,665	9%
Milwaukee, WI PMSA	260,981	66,598	34%
Detroit, MI PMSA	661,889	164,428	33%
St. Louis, MO--IL MSA	428,849	102,532	31%
Philadelphia, PA--NJ PMSA	932,498	210,499	29%

Source: American FactFinder - U.S. Census Bureau

Migration

The mobility of the creative class highly contributes to the social and economic rise or fall of urban regions. Migration can happen at the domestic, as well as international level.

Geographic relocation is probably the fastest way a region can gain creative workers. Although other industrial regions enjoy a considerably higher percentage of inward mobility, Baltimore shows a 6% gain of creative population through domestic migration (see table 7). This figure is expected to increase significantly, as creative talent will be driven from the Washington, DC due to housing inaffordability in that region.

Table 7
Migration of Population Aged 5+ to Benchmarked Statistical Area
 (Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Chicago, IL PMSA	820,247	233,365	40%
Cleveland, OH PMSA	183,719	31,511	21%
Detroit, MI PMSA	361,116	49,320	16%
Pittsburgh, PA PMSA	171,262	22,647	15%
Milwaukee, WI PMSA	155,498	11,385	8%
Baltimore, MD MSA	307,220	17,090	6%
Carroll County	13,778	2,049	17%
Queen Anne's County	5,952	851	17%
Baltimore City	59,479	6,290	12%
Baltimore County	66,995	5,735	9%
Howard County	52,348	2,305	5%
Anne Arundel County	85,086	2,766	3%
Harford County	23,582	-2,906	-11%
Philadelphia, PA--NJ PMSA	477,595	26,264	6%
St. Louis, MO--IL MSA	251,309	11,891	5%

Source: American FactFinder - U.S. Census Bureau

Nationwide, approximately 40% of population growth is the result of international immigration. Comparable to domestic migration, Baltimore receives a considerable share of international talent even if less than other industrial areas (see table 8). At the county level, Baltimore fares even better with impressive results in Howard County, laying South of Baltimore City.

Table 8
Foreign Born Population
 (Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Detroit, MI PMSA	145,532	89,600	160%
St. Louis, MO--IL MSA	41,073	25,021	156%
Milwaukee, WI PMSA	37,044	21,809	143%
Cleveland, OH PMSA	40,630	22,319	122%
Pittsburgh, PA PMSA	24,938	12,755	105%
Chicago, IL PMSA	639,887	325,505	104%
Baltimore, MD MSA	61,275	30,634	100%
Howard County	28,113	16,746	147%
Queen Anne's County	972	498	105%
Carroll County	3,046	1,491	96%
Anne Arundel County	23,211	9,944	75%
Baltimore County	53,784	21,281	65%
Harford County	7,364	2,344	47%
Baltimore City	29,638	6,171	26%
Philadelphia, PA--NJ PMSA	145,971	60,236	70%

Source: American FactFinder - U.S. Census Bureau

While immigration is important to regional growth, it is less important for innovation. Innovation is a measure best described by diversity indexes and detailed later in this paper. Furthermore, places that are open to immigration do not necessarily number among the leading creative class centers.

Creative Occupations

The creative class, as defined by Richard Florida (2002), consists of the super-creative core and of creative professionals. The super-creative core includes occupations like: scientists, writers, artists, educators, architects, engineers, athletes, entertainers, etc. They add economic value to the region through their creativity. Creative professionals incorporate occupations in knowledge-intensive industries such as: high-tech, financial, legal, health, and business management sector. These professionals engage in creative problem solving that typically requires a high degree of formal education.

Table 9 combines data on both the super-creative core and creative professionals. In the benchmarked industrial areas, super-creative core and creative professional occupations show

tremendous increase. Baltimore, once more, ranks fourth with impressive results at the county level.

Table 9
Creative Class Occupations
(Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Chicago, IL PMSA	3,034,880	1,907,431	169%
Cleveland, OH PMSA	797,622	479,935	151%
Pittsburgh, PA PMSA	860,316	500,473	139%
Baltimore, MD MSA	1,085,823	605,048	126%
Howard County	160,244	101,607	173%
Carroll County	62,562	39,092	167%
Queen Ann's County	16,119	10,036	165%
Harford County,	91,669	55,276	152%
Anne Arundel County	211,545	121,580	135%
Baltimore County	332,903	185,977	127%
Baltimore City	210,781	91,480	77%
Philadelphia, PA--NJ PMSA	2,014,021	1,110,070	123%
Milwaukee, WI PMSA	585,560	322,558	123%
St. Louis, MO--IL MSA	976,952	527,075	117%
Detroit, MI PMSA	1,519,267	788,855	108%

Source: American FactFinder - U.S. Census Bureau

Tolerance Dimension

Tolerance is a complex set of relationships that explain how people work and live together to create innovations that stimulate growth through technology and talent. Among the benchmarked MSAs, Baltimore ranks second on the overall tolerance index (see table 10). Creative people are attracted to places that score high on the Gay Index and the Bohemian Index, the main components of the overall Tolerance Index.

Table 10
Tolerance Index Ranking for Benchmarked Statistical Areas
 (Rank Ordered List)

Target Statistical Area	Tolerance Index
Chicago IL	0.724
Baltimore MD	0.671
Philadelphia NJ-PA	0.595
Detroit MI	0.534
Milwaukee WI	0.525
Cleveland OH	0.436
St. Louis IL-MO	0.408
Pittsburgh PA	0.242

Source: Kevin Stolarick, PhD - Carnegie Mellon University

A measure of a region's openness to diversity is its tolerance towards individuals' sexual orientation. The Gay Index ranks a region based on its openness to the gay and lesbian population, and is a good measure of diversity because gays have been subject to discrimination. The Gay Index is a very strong predictor of a region's high-tech industry concentration. This does not indicate a correlation between high-tech professionals and their sexual orientation. It simply means that open areas that tolerate diversity are favored by the creative class worker. Among the benchmarked MSAs, Baltimore is the most open to diversity (see table 11).

Table 11
Gay Index For Bechmarked Statistical Areas
 (Rank Ordered List)

Target Statistical Area	Gay Index
Baltimore MD	1.02
Chicago IL	0.98
Philadelphia NJ-PA	0.96
Milwaukee WI	0.75
Cleveland OH	0.74
St. Louis IL-MO	0.72
Detroit MI	0.69
Pittsburgh PA	0.64

Source: Kevin Stolarick, PhD - Carnegie Mellon University

On the other hand, Baltimore ranks only sixth on the Bohemian Index scale just before Pittsburgh and Cleveland (see table 12). The Bohemian Index takes into account the extent to which the region fosters artists, performers, musicians, etc. and their lifestyles. In a recent

national listing of musical and entertainment events by state, Maryland—including the Baltimore MSA—had absolutely nothing scheduled. A region that does not organize artistic events fails to provide stimuli that attract creative artists.

Table 12
Bohemian Index For Bechmarked Statistical Areas
 (Rank Ordered List)

Target Statistical Area	Bohemian Index
Chicago IL	1.14
Detroit MI	1.10
Milwaukee WI	1.08
Philadelphia NJ-PA	1.00
St. Louis IL-MO	0.98
Baltimore MD	0.91
Pittsburgh PA	0.88
Cleveland OH	0.87

Source: Kevin Stolarick, PhD - Carnegie Mellon University

Florida (2002) makes a distinction between smaller-scale street-level amenities and the traditional big-ticket attractions like professional sports, museums, the symphony, opera, etc. Baltimore is blessed with several such attractions—i.e. the Orioles Stadium and Baltimore Symphony Orchestra—yet Florida found little evidence that big-ticket attractions are effective at attracting talented people and generating high-tech industries. Cultural amenities that are appealing to the creative class are: vibrant street life, readily available outdoor recreation, and a cutting-edge music scene. These vital and potentially effective street-level amenities have been neglected in Baltimore, which gives rise to serious concern.

Technology Dimension

The Technology dimension is quantified by the Technology Index and Innovation Index. Both innovation and high-tech industry are strongly associated with locations of the creative class and of talent in general. Fifteen of the top twenty high-tech regions also rank among the top

twenty creative class centers, while fourteen of the top twenty regions on the Innovation Index do so as well.

Table 13
Technology Index Ranking for Benchmarked Statistical Areas
(Rank Ordered List)

Target Statistical Area	Technology Index
Philadelphia NJ-PA	0.619
Chicago IL	0.616
Pittsburgh PA	0.589
St. Louis IL-MO	0.533
Baltimore MD	0.497
Cleveland OH	0.465
Milwaukee WI	0.450
Detroit MI	0.350

Source: Kevin Stolarick, PhD - Carnegie Mellon University

While Baltimore is located in proximity to the I-270 Technology Corridor, it ranks only fifth among peer metropolitan regions on the overall Technology Index (see table 13). However, the Innovation Index—measured by utility patent outputs—ranks Baltimore first among the benchmarked metropolitan area (see table 14). Patents translate the society’s underlying creativity and innovation into economic outcomes. At the county level, Queen Anne’s County shows above expectation results with 250% patent grant increase from 1990 to 2000.

Table 14
Utility Patents by Benchmarked Statistical Area
(Rank Ordered List by Percent Change)

Target Statistical Area	1999	Change 1990-1999	
		Number	Percent
Baltimore, MD PMSA	664	295	80%
Queen Anne’s County	14	10	250%
Harford County	64	39	156%
Carroll County	44	25	132%
Howard County	152	74	95%
Baltimore City	142	63	80%
Baltimore County	164	70	74%
Anne Arundel County	84	14	20%
St. Louis, MO-IL MSA	743	307	70%
Philadelphia, PA-NJ PMSA	1,849	636	52%
Detroit, MI PMSA	1,964	622	46%
Chicago, IL PMSA	2,929	843	40%
Cleveland, OH PMSA	786	181	30%
Milwaukee, WI PMSA	530	119	29%
Pittsburgh, PA MSA	809	68	9%

Source: US Patent and Trademark Office

Territory Dimension

From a territorial perspective Baltimore is unique. The wealth of territorial amenities is a major selling point for the Baltimore Region: from winning sports teams through the uniqueness of Fells Point to the wealth of green spaces, parks and trails. It is the home of the railroad, Fort McHenry, the Naval Academy, the Inner Harbor, and the Chesapeake Bay. The Baltimore waterfront presents the region with an opportunity to improve its territorial assets and create an open, inclusive, and diverse community through a working harbor designed for both work and leisure. The city has a great urban fabric connecting universities, water, excellent transportation, and affordable housing.

The latter category, translating into housing costs, affects the attractiveness of a community especially for young adults at the beginning of their careers and peak of their mobility. When assessing the number of households spending less than 35% of their income on housing costs (including: renters, owners with mortgage, and owners without mortgage), on the MSA level Baltimore's share increased but not at the rate this phenomenon occurred in similar industrial cities with Chicago in the lead (see table 15). At the county level, Baltimore fared surprisingly well once more.

Table 15
Households Paying Less than 35% of Income for Housing
 (Rank Ordered List by Percent Change)

Target Statistical Area	2000	Change 1990-2000	
		Number	Percent
Chicago, IL PMSA	1,927,092	481,543	33%
Cleveland, OH PMSA	629,102	116,895	23%
Pittsburgh, PA MSA	683,302	93,641	16%
Milwaukee, WI PMSA	417,831	38,339	10%
St. Louis, MO--IL MSA	736,290	64,880	10%
Baltimore, MD PMSA	694,902	47,051	7%
Howard County	69,333	17,942	35%
Harford County	59,791	13,763	30%
Carroll County	40,409	9,207	30%
Queen Anne's County	10,326	2,152	26%
Anne Arundel County	136,411	24,126	21%
Baltimore County	228,171	19,556	9%
Baltimore City	171,891	-18,265	-10%
Detroit, MI PMSA	1,222,496	73,890	6%
Philadelphia, PA--NJ PMSA	1,331,992	75,650	6%

Source: American FactFinder - U.S. Census Bureau

The importance of affordable housing is highlighted by Florida (2005) in his second book, *The Flight of the Creative Class*. To express this dimension statistically, Dr. Kevin Stolarick of Carnegie Mellon University compiled the Wage Inequality and Housing Inaffordability Index. The Wage Inequality Index shows a population's tendency to earn considerably above or below average salary. There is a strong correlation between inequality in wages and creativity: more creative regions show more prominent income inequality. Baltimore ranked first on the Wage Inequality scale, meaning that the income divide is great in the region (see table 16). While a good number of people earn above average income, a considerable segment of the population earns below average salaries.

Table 16
Wage Inequality Index Ranking for Benchmarked
Statistical Areas
 (Rank Ordered List)

Target Statistical Area	Within Size Ranking
Baltimore MD	17
Philadelphia NJ-PA	30
Pittsburgh PA	33
Chicago IL	36
Detroit MI	40
Cleveland OH	45
Milwaukee WI	47
St. Louis IL-MO	52

Source: The Flight of the Creative Class, by Richard Florida

The latter segment may be the reason why Baltimore ranks only sixth on the housing costs table (see table 15) and fourth on the housing inaffordability table (see table 17). The Housing Inaffordability Index is calculated using total housing costs categorized by housing types (rental, owned, mortgage, no mortgage, etc.) and weighed by the number of people in each type. This index is significantly and negatively correlated with total population.

Table 17
Housing Inaffordability Index Ranking for Benchmarked
Statistical Areas
 (Rank Ordered List)

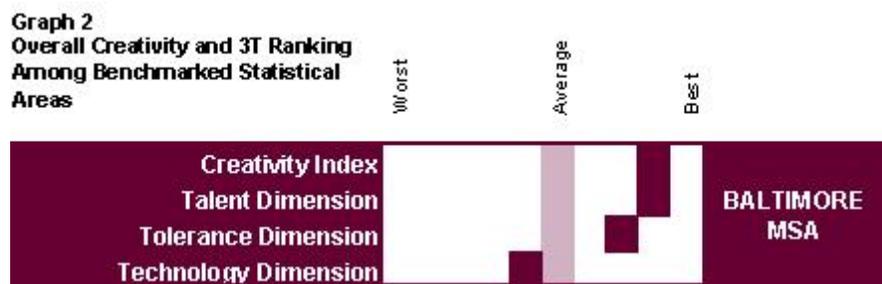
Target Statistical Area	Within Size Ranking
Chicago IL	26
Philadelphia NJ-PA	28
Cleveland OH	38
Baltimore MD	45
Milwaukee WI	46
Pittsburgh PA	53
Detroit MI	57
St. Louis IL-MO	60

Source: The Flight of the Creative Class, by Richard Florida

Conclusion

While there are lots of examples of high-tech regions becoming creative (Silicon Valley, Seattle, Boston Route 128), what we need are examples of creative economy transformations for

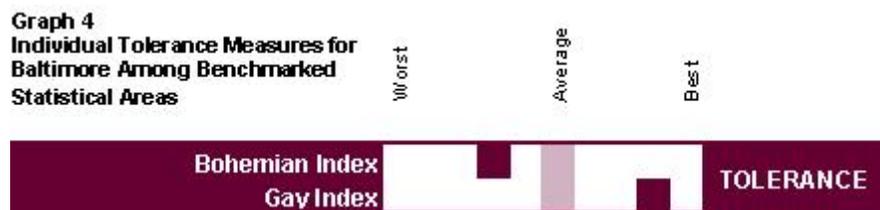
industrial cities. Baltimore, as a South-East anchor of the old industrial parallelogram, more than any other city in the region has the opportunity to capitalize on its creative economy. This unique opportunity is given by the region’s proximity to Washington, DC and its high ranking on dimensions of talent, tolerance, and technology. The Baltimore MSA ranks 17th in the creativity index among all cities of over 1 million inhabitants—right after Minneapolis and before Los Angeles (see table 2)—and first on the Creativity Index among benchmarked metropolitan areas (see table 3). Baltimore also ranks favorably in overall measures of 3Ts when compared to Philadelphia, Chicago, St. Louis Milwaukee, Cleveland, Pittsburgh and Detroit (see graph 2).



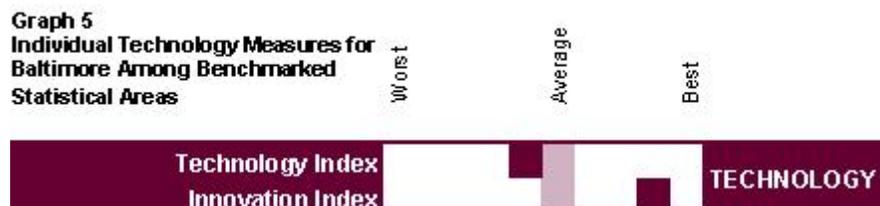
Along individual measurements of 4T, Baltimore shows both strengths and areas of improvement. The region fares relatively well in its population’s educational levels and concentration of creative occupations in the region (see graph 3). Nevertheless on both these categories there’s room for improvement. On the Talent Dimension, Baltimore’s greatest weakness is its declining population aged 25-34. Also, the current rate of inward migration is not actively attracting creative talent.



The region shows capacity to nurture creativity with high overall tolerance levels, ranking second among peer cities (see graph 2). The Tolerance Dimension is strong in Baltimore's profile, with high ranking on the Gay Index (see graph 4). Areas of improvement in the diversity dimension are expressed through the Bohemian Index. The Baltimore region and Maryland in general fails to adequately invest resources in its arts and entertainment scene.



The region is a leader in technological innovation and has shown great signs of success in the Technology Dimension. Nevertheless, there is still room for growth. Baltimore ranks very high in creative high-tech indexes and has a high number of biotechnology companies compared to the national average. The region's strengths are its potential for technological innovation through utility patents (see graph 5). Nevertheless, Baltimore needs to find ways to tap into Washington, DC's creative labor pool and leverage talent from the reserve provided by local universities in order to further improve in this dimension overall (see graph 2).



On the Territory Dimension, the Baltimore MSA has a lot to offer: access to the Atlantic Ocean through the Chesapeake Bay, four state parks in Baltimore County, historic towns, and ethnic neighborhoods. Housing costs in the region became more affordable to an additional 7% of population over the past decade, with an even greater impact at the county level. The region

shows capacity to attract creativity with high wage inequality and low housing inaffordability measures (see graph 6). Baltimore's Wage Inequality Index suggests strong presence of the creative class, but housing affordability could be increased to attract even more talented young professionals to the area.



Baltimore fits the model of a creative community, especially considering its traditionally industrial profile. Moreover, its proximity to Washington, DC—a truly modern and creative high-tech nucleus—and access to the largest reservoir of creative talent in the nation provide grounds for this region to pioneer an unprecedented economic turnaround. Baltimore owns resources and can develop further capabilities to pull creative talent from its surrounding area. Nevertheless, to do that, civic and community leadership must come together to actively seek policies that favor creativity and implement a strategic plan towards harnessing the creative potential.

Acknowledgements

The authors are extending their special thanks to Richard Florida, of George Mason University, for his intellectual contributions and engagement over the span of several discussions and to Kevin Stolarnick, of Carnegie Mellon University, for providing research data on various creativity measures. Additionally, our gratitude is offered to Wim Wiewel, Provost at the University of Baltimore, for his support and funding. We also thank Annabel Acs, undergraduate student at Boston University, for her input as Research Assistant.

References

- Acs, Z. J. and Storey, D. B. 2004 Entrepreneurship and regional development: Essays in honour of David Keeble, *Regional Studies*, **38.8**: 871-877.
- Armington, C. and Acs, Z. 2002 The determinants of regional variation in new firm formation, *Regional Studies*, **36.1**: 33-45.
- Bartik, T. 1989 Small business start-ups in the US: Estimates of the effects of characteristics of states, *Southern Economic Journal*, **55**: 1004-1018.
- Blanchflower, D. and Oswald, A. 1990 What makes an entrepreneur, *Journal of Labor Economics*, **16**: 26-60.
- Cattell, R. B. and Butcher, H. 1968 *The prediction of achievement and creativity* (Indianapolis: Bobbs-Merrill).
- Chell, E. Haworth, J. M. and Brearley, S. 1991 *The entrepreneurial personality: Concepts, cases and categories* (London: Routledge).
- Desrochers, P. 2001 Local diversity, human creativity, and technological innovation, *Growth and Change*, **32**.
- Evans, D. S. and Leighton, L. S. 1989 Some empirical aspects of entrepreneurship, *American Economic Review*, **79**: 519-535.
- Evans, D. S. and Leighton, L. S. 1990 Small business formation by unemployed and employed workers, *Small Business Economics*, **2**: 319-330.
- Florida, R. 2002 *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life* (New York: Basic Books).

- Florida, R. 2005 *The Flight of the Creative Class: The New Global Competition for Talent* (New York: HarperCollins)
- Florida, R. and Gates, G. 2001 *Technology and Tolerance: The Importance of Diversity to High-Technology Growth* (Washington DC: The Brookings Institution).
- Jacobs, J. 1961 *The Death and Life of Great American Cities* (New York: Random House).
- Jones, T. McEvoy, D. and Barrett, G. 1993 Labour intensive practices in the ethnic minority firm, in Atkinson, J. and Storey, D. (eds) *Financing and the small firm* (London: Routledge)
- Kieschnick, M. 1981 *Taxes and Growth: Business Incentives and Economic Development* (Washington, DC: Council of State Planning Agencies).
- Kirchhoff, B. Armington, C. Hasan, I. and Newbert, S. 2002 The influence of R&D expenditures on new firm formation and economic growth. Research report prepared by BJK Associate for U.S. Small Business Administration.
- Lee, S. 2001 Entrepreneurship and business development among African Americans, Koreans, and Jews: Exploring some structural differences, in Cordero-Guzman, H. R. (ed.) *Migration, transnationalization, and race in a changing New York*, (Philadelphia: Temple University Press), 258-278.
- Lee, S. Florida, R. and Acs, Z. J. 2004 Creativity and entrepreneurship: A regional analysis of new firm formation, *Regional Studies*, **38.8**: 879-892.
- Lee, S. Florida, R. and Gates, G. 2002 Innovation, human capital, and creativity. Software Industry Center Working Paper, Carnegie Mellon University.
- Lucas, R. 1988 On the mechanics of economic development, *Journal of Monetary Economics*, **22**.

- Reynolds, P. Miller, B. and Maki, W. 1995 Explaining regional variation in business births and deaths: US 1976-1988, *Small Business Economics*, **7**: 389-407.
- Park, R. Burgess, E. and McKenzie, R. 1925 *The City* (University of Chicago Press: Chicago)
- Reynolds, P. Storey, D. and Westhead, P. 1994 Cross-national comparison of the variation in new firm formation rates, *Regional Studies*, **28**: 443-456.
- Saxenian, A. 1999 Silicon Valley's new immigrant entrepreneurs. Report prepared by the Public Policy Institute of California.
- Sternberg, R. J. 1988 A three-facet model of creativity, in Sternberg, R.J. (ed.) *The nature of creativity: Contemporary psychological perspectives* (Cambridge: Cambridge University Press), 125-147.
- Stolarnick, K. 2005, Personal Communication.
- Storey, D. 1994 *Understanding the Small Business Sector* (New York: Routledge).
- Stuart T. and Sorenson, O. 2003 The geography of opportunity: spatial heterogeneity in founding rates and the performance of biotechnology firms, *Research Policy*, **32**: 229-253.
- Thompson, W. 1965 A preface to urban economics. Report prepared by the Johns Hopkins Press.
- US Census Bureau:
http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=datasets_0&_lang=en
- Yoon, I. 1997 *On my own: Korean businesses and race relations in America* (Chicago: University of Chicago Press).