Understanding the Geography of Access to Cultural Amenities:

The Case of Metropolitan Detroit

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Abstract: Arts and culture organisations are often framed as important actors in urban development efforts; however, questions of equity of access to cultural amenities and the problem of inequities in their distribution remain important concerns. This article explores geographical and demographic differences in access to 335 public and nonprofit cultural organisations located in the four counties of Metropolitan Detroit (Wayne, Oakland, Macomb, Washtenaw). It introduces a comprehensive, multi-component, index of access and uses GIS-modelling approach to investigate spatial distribution of these organisations. U.S. Census Bureau data are further used to analyze possible inequities in the distribution of cultural resources, as well as access that diverse populations have to such organisations. The analysis reveals that cultural organisations are unevenly distributed in the geographic area, and that certain groups of the population have relatively low access to particular cultural amenities. The article discusses implications of the findings and suggests future research directions.

Keywords: index of access, arts and culture organisations, GIS-modelling, Metropolitan Detroit.

The past three decades have seen increasing interest of urban scholars, practitioners, and policymakers in involving cultural sector organisations in various urban development agendas, especially in the context of revival and regeneration (Clark et al., 2002; Gilmore, 2013; Grodach, 2016; Evans, 2016; Hooper-Greenhill et al., 2009; Markusen, 2014; Redaelli, 2013; Stern & Seifert, 2010; Strom, 1999; 2002). The importance of cultural institutions to the revitalization of the U.S. cities is attributed to several factors, including the transformation of the urban political economy away from over-relying on traditional manufacturing industries; the capacity of cultural institutions to improve their neighborhoods, create jobs, generate revenues, and attract other industries; and the restructuring of the cultural market which now includes various organisational forms (Strom, 2002). Furthermore, in recent years the so-called cultural approach[1] to urban policy has emerged in the urban planning literature; it elevates the importance of creative placemaking and integrates cultural aspects in the process of urban development (Redaelli, 2013).

The cultural sector in the U.S. is seen as one of the most dynamic segments of the modern knowledge-based economy (Clark et al., 2002; Moldavanova, Pierce, & Lovrich, 2018; Toepler & Wyszomirski 2012)[2]. The nonprofit sector alone, as represented by visual art galleries and museums, performing arts organisations, cultural heritage groups, arts education organisations, as well as humanities and historical societies, supports 4.6 million jobs and generates $27.5 billion in revenue (Americans for the Arts 2015; Toepler & Wyszomirski 2012). The nonprofit segment of the cultural market relies on a mix of private donor and foundation support, earned income, and modest levels of public funding (Toepler & Wyszomirski 2012). There are also public cultural organisations, such as libraries and municipal museums that rely predominantly on public support. The revenue-generating for-profit arts sector includes industries such as recording, publishing, art dealership, and commercial museums and performing arts (Toepler & Wyszomirski 2012). The

commercial sector is distinct from the other two groups as it sustains via self-generated earned income.

Despite the growing importance of incorporating arts and culture organisations in urban planning and development, there is also some skepticism about negative externalities, particularly the problem of gentrification (Foster, Grodach, & Murdoch, 2016; Grodach, Foster, & Murdoch 2018; Lloyd, 2002; Markusen, 2014; Scott, 2006), as well as questions of equity of access to cultural amenities (Gilmore, 2013; Grams & Farrell, 2008; Hooper-Greenhill et al., 2009; Houston & Ong, 2013; Markusen, 2014). Positive effects of creative industries on local economic development have been contested in studies that challenge the contributions to local communities in that arts organisations, especially the younger ones, may be drawn to the already economically advantaged areas, thus inadvertently exacerbating inequality (Foster et al., 2016). Some new organisations also tend to choose central locations, often exacerbating the center-periphery divide (Paül i Agustí, 2014).

Unlike creative businesses that often have the capacity to choose their location away from struggling neighborhoods and closer to the current centers of economic development (Foster et al., 2016), most public and nonprofit cultural organisations rely heavily on fixed capital that ties them to their historic locations (Brooks & Kushner, 2001; Evans & Foord, 2008; Grodach, 2012, 2016; Moldavanova et al., 2018; Mommaas, 2004; Strom, 2002). Furthermore, in rustbelt cities like Detroit, many of the traditional public and nonprofit cultural organisations face survival pressures due to the increased competition for funding, reduction in the attendance rates, narrowing of the funding base on which they used to depend, and the aging of their core audiences and supporters (Mommaas, 2004; Strom, 1999; 2002). Moreover, there are often negative path dependencies

where current cultural policies are a product of past policy structures shaped by a variety of local institutions and actors (Grodach, 2012).

Importantly, the surging COVID-19 pandemic and the Black Lives Matter Movement drew our attention to the existing social, political, and economic inequalities that the pandemic has exposed and that have existed for a long time, calling on policymakers, donors, and academics to address these urgencies and change conversations around equity and access, especially in urban communities. These conversations have also elevated the importance of public and nonprofit organisations, including those in the arts and culture sector (Bousquette, 2020; Hooper, 2020), challenging them to reexamine their organisational practices, to ensure greater inclusion and access (Scott et al., 2020).

Among other public amenities, however, arts and culture institutions are often among the last on the list when it comes to identifying access priorities. Likewise, at times of economic recessions, arts and culture funding is the first in line to be cut, as arts services are perceived as less essential than food, housing, health and other social services. However, arts and culture organisations perform a number of public serving roles, from making urban and rural areas more attractive to tourists, to fostering economic development, to providing local youth with arts education, to shaping societal discourses on social justice and sustainability among other roles (Markusen, 2014; Moldavanova & Wright, 2020; Redaelli, 2013; Strom, 1999; 2002; Toepler & Wyszomirski 2012). Therefore, the presence of cultural amenities in local communities, as well as the ability of local populations to access them, is a matter of equal opportunity, which has broader significance beyond the arts and cultural organisations themselves. However, there is a dearth of studies specifically investigating the question of equity of access to cultural amenities and the problem of inequities in the geographic distribution of cultural services (Brook, Boyle, &

Flowerdew, 2010; Evans, 2014, 2016; Hooper-Greenhill et al., 2009; Houston & Ong, 2013; Widdop & Cutts, 2012).

This study, therefore, seeks to advance our understating of the geography of access to cultural amenities by focusing on public and nonprofit cultural organisations located in the four urbanized counties of Metropolitan Detroit (Wayne, Oakland, Macomb, Washtenaw). The main research questions investigated are:

1) What are the geographical and demographic differences in access to cultural amenities in a given geographical area?

2) Do residents in different locations within the same geographical area have the same or different opportunities to access various cultural amenities?

The article is based on the premise that the ability of cultural organisations to ensure better equity of access is dependent upon the geography of the access structure. Therefore, scholars seeking to understand access to cultural amenities need to account for the geographic factors. We recognize that there is a variety of other factors that shape access, ranging from individual preferences to quality of cultural offerings (Gilmore, 2013; Leguina & Miles, 2017; Stern & Seifert, 2010). However, this study specifically focuses on the geographical aspects of access. We also recognize that various forms of cultural institutions, including nonprofit organisations, businesses, individual artists, and the informal sector form a dynamic cultural eco-system (Gilmore, 2013; Leguina & Miles, 2017; Stern & Seifert, 2010). However, we focus solely on public and nonprofit cultural organisations, which serve as core elements of the entire cultural infrastructure, and around which many other cultural forms emerge and develop.

This article investigates the spatial distribution of and access to 335 cultural amenities represented by public and nonprofit cultural organisations from five sub-fields (visual arts, music

and performing arts, science institutions, historical institutions, and libraries), as an indication of their capacity to serve the diverse populations in four urbanized counties of Metropolitan Detroit. These institutions include such major organisations as the Detroit Institute for the Arts (visual arts), Detroit Public Library (libraries), and the Detroit Symphony Orchestra (music and performing arts), as well as smaller organisations such as Berkley Historical Museum (history), Belle Isle Aquarium (science), among others. While the majority of cultural organisations have a modest budget of $50,000 or less, major organisations have budgets of over 10 million and some also have substantial endowments. Detroit is used as the setting for this study because it represents the urgency of the urban revival problems that many rustbelt areas face, including the questions of equity of access to various public amenities. Moreover, this geographical area is notable in many instances, including the presence of segregation along racial lines even despite comparable socio-economic status (Rushton, 2005), thus reinforcing the importance of the equity of access concerns. Although placed in a specific metropolitan area, the study nevertheless provides useful insights for a wide range of contexts.

The study relies on a GIS-modelling approach to develop and apply an innovative index of access that considers multiple factors, which are important to understanding the equity of access to cultural amenities. The index presented here focuses on practical factors that can broadly limit an organisation's positioning to serve residents in their surrounding community – including measures of proximity, availability of transportation, and admission policy. The research approach employed here is exploratory, as we neither ask causal-type of questions nor advance or test hypotheses regarding possible predictors of access to cultural amenities. Rather, the article sets out to answer the two research questions on the geography of access to cultural amenities in

Metropolitan Detroit. The index presented here can be used in future studies to answer questions of causality.

This article first provides a brief overview of the cultural sector in Metropolitan Detroit. We then review previous studies on cultural geography and access to cultural amenities. After explaining the research approach, the article analyzes geographic distribution patterns of cultural organisations and their accessibility to diverse population groups. Specifically, we compare traditional density analysis with insights obtained from access index analysis. We further discuss how institutional locations influence organisational capacity to provide access for diverse constituencies. The article ends with a discussion of future research possibilities and offers practical policy implications.

Arts and Culture Sector in Metropolitan Detroit: An Overview

Detroit's arts and culture sector is one of the most diversified and oldest in the nation. Its early development is based upon the efforts of private philanthropic activity as well as support that came from local government. Several of the longstanding cultural institutions in Detroit, such as the Belle Isle Aquarium – the oldest public aquarium in the United States, and the Detroit Institute for the Arts (DIA) – the sixth largest art collection in the country, were fully or partially owned by the City of Detroit, which posed substantial problems during and since the Great Recession of 2007. Some of these problems were similar to those felt in other rustbelt cities, while other issues were unique to Detroit. For example, the City of Detroit filed for bankruptcy protection on July 18, 2013, becoming the largest city to seek for this type of protection and this challenged the fiscal stability of the DIA and other institutions.

To be sure, Detroit's financial problems were long-standing, and its financial health had been deteriorating for a while alongside the decline of the three major automakers (Ford, Chrysler,

and General Motors). For many of the major arts organisations, such as the Detroit Opera Theater (MOT), the auto-making companies served as key sources of funding, in some cases providing close to eighty percent of operational support. During the Great Recession, Metro Detroit arts and culture organisations suffered from losing private and public funding. Some, such as the DIA, have ended up in the center of post-bankruptcy turmoil as the city considered selling some of its cultural assets to meet its own financial obligations. The deal that was reached between the city, the museum, and the philanthropic community is known as the Grand Bargain (Kennedy, 2014). It allowed distancing the museum from the city going forward while also providing philanthropic funds to allow paying some of Detroit's debts.

In 2013, following the Great Recession, there were over 4,000 arts and culture organisations in the four-county area of Metropolitan Detroit (Wayne, Oakland, Macomb, and Washtenaw counties) comprising the nonprofit, for-profit, and unincorporated entities (Sustain Arts, 2014). For every nonprofit organisation, there were six for-profit organisations, all operating under common sub-fields: dance, film and electronic media, humanities (including libraries), literary arts, music, theater, visual arts, and multidisciplinary organisations. Visual arts and film and electronic media are especially dominated by the for-profit sector, while humanities are dominated by the nonprofits. The largest portion of nonprofit organisations is located in Wayne county – home of the city of Detroit. Regardless of the sectoral affiliation, small organisations are more numerous. For example, 51 percent of nonprofit arts and culture organisations have annual budgets of less than $50,000 and more than three-quarters have annual budgets of less than $500,000 (Sustain Arts, 2014). Further, nearly two-thirds of for-profit organisations have annual budgets of less than $500,000 (Sustain Arts, 2014). Smallest among other nonprofits are the

humanities and music organisations. Unsurprisingly, large organisations also have better survival rates as compared to small organisations (Sustain Arts, 2014).

In terms of their funding profile, following the recession of early 1990, cultural organisations have become increasingly self-reliant (Sustain Arts, 2014). Most of the foundation giving in the area supports the oldest and largest organisations, and there are also inequities in supporting cultural organisations in communities of color (Sustain Arts, 2014). Public funding for the arts, although not insignificant, is very small as compared to private support and earned income. Per the Sustain Arts' report (2014), state funding has seen an especially sharp decline in the period of 1993-2012. Additionally, areas of Metropolitan Detroit have a history of passing local tax millage for supporting the arts. However, while some organisations such as the DIA are able to derive public finding via the millage, other cultural organisations in the same area are excluded from the millage.

When it comes to public access to the arts, several major arts organisations, such as the DIA and the Detroit Symphony Orchestra (DSO), have made significant strides in improving their community outreach. For example, the DIA has placed samples of art work in Metropolitan parks as part of its InsideOut project. Likewise, the DSO has recently started a neighborhood concert series that bring music from Detroit to suburbs. However, in most cases, these outreach efforts focus on more affluent parts of Metropolitan Detroit. Following the COVID-19 pandemic, several institutions, including the DSO and MOT, have also launched online performances. However, access to those events depends on technological capacity, and many geographic areas in Metropolitan Detroit suffer from the lack of technology and unreliable internet. Furthermore, a recently released report by the Knight Foundation has identified significant problems when it comes to ensuring access to the arts and culture for Metropolitan Detroit non-white populations

(Scott et al., 2020). Additionally, CEOs of two of Detroit's major art museums – DIA and the Museum of Contemporary Art Detroit – have recently been accused of racial discrimination and toxic workplace culture (Bousquette, 2020; Hooper, 2020). While it is clear that individual organisations are trying to improve access and be more inclusive to various population groups, substantial problems remain, which makes research on access to the arts very timely and important.

Cultural Geography and Equity of Access Literature

The growing urban studies literature continues to provide evidence of the important roles that arts and culture organisations play in local communities, justifying the development of more localized, place-specific, approaches to cultural policy (Gilmore, 2013; Grodach, 2016; Evans, 2016; Hooper-Greenhill, Phillips, Woodham, 2009; Markusen, 2014; Redaelli, 2013; Scott, 2006; Stern & Seifert, 2010, 2012; Strom, 1999; 2002). Notwithstanding some research indicating that arts organisations are associated with gentrification (Foster et al., 2016; Grodach et al., 2018; Lloyd, 2002; Scott, 2006), cultural organisations also perform a variety of positive intrinsic and instrumental roles in urban areas (Moldavanova & Wright, 2020; Markusen, 2014; Strom, 2002). Cultural institutions are viewed as not just the objects in urban development agendas, but as actors that deliberately choose to engage in revitalization and place-making activities as part of their mission (Strom, 2002). Yet, the ability of cultural institutions to engage in the useful development agendas often depends on urban geography and organisational locations (Paül i Agustí, 2014).

In recent years, there have been several notable studies exploring the locational patterns of cultural industries (Brooke et al., 2010; Evans, 2016; Foster et al., 2016; Grodach, 2016; Grodach et al., 2014; Houston & Ong, 2013; Stern & Seifert, 2010; Redaelli, 2013; Rushton, 2005). These studies focus on mapping cultural sector locations against other community characteristics, such as population profile, the concentration of other industries, population and housing growth, and

availability of donors (Evans & Foord, 2008; Redaelli, 2013). Cultural mapping studies have also attempted to predict the vitality of the cultural sector depending on the properties of the local environment (Grodach, 2016), as well as investigate the relationship between organisational locations and various policy outcomes, such as public support for the arts funding (Rushton, 2005). However, cultural mapping literature lacks studies investigating equity of access to cultural amenities by diverse populations. Furthermore, few studies address how different kinds of arts and culture activities interact with various dimensions of diversity (Foster et al, 2018).

In parallel, there has also been increasing scholarly and policy interest in the questions of population access to cultural resources (Brook et al., 2010; Delrieu & Gibson, 2017; Evans, 2014; Houston & Ong, 2013; Stern & Seifert, 2010; Widdop & Cutts, 2012). Such interest resonates with the growing urgency of the community outreach efforts by cultural organisations themselves, who see these initiatives as imperative for their continuing sustainability and long-term legitimacy, particularly in the U.S. context where public finding for the arts remains scarce (Grams & Farrell, 2008; Moldavanova, 2016). Unlike their European counterparts, non-commercial arts and culture organisations in the U.S. are disproportionally dependent on private philanthropy and earned income for their immediate survival as well as long-term sustainability. Moreover, cultural organisations often experience pressures from their external stakeholders who expect them to be more inclusive in their outreach efforts as a condition for their broader organisational legitimacy.

Despite notable successes by governments and philanthropic communities as well as organisations themselves in ensuring broader population access to these organisations (Grams & Farrell, 2008), the question of equity of access to cultural amenities and the problem of inequities in the distribution of cultural services remain important concerns (Brook, Boyle, & Flowerdew, 2010; Evans, 2014, 2016; Hooper-Greenhill et al., 2009; Houston & Ong, 2013; Markusen, 2014;

Scott, 2006; Widdop & Cutts, 2012). Particularly, the ability of cultural organisations to achieve greater inclusiveness and audience diversity is dependent upon the access structure of the institution and the features of the environment where cultural organisations exist. However, there is a dearth of studies researching accessibility of cultural resources to historically under-represented populations, such as ethnic minorities and low-income populations (Brook, 2016; Evans, 2016; Leguina & Miles, 2017; Markusen, 2014; Widdop & Cutts, 2012).

The notion of access itself remains a contested concept in the literature (Brook et al, 2010; Brook, 2016; Evans, 2016; Houston & Ong, 2013; Widdop & Cutts, 2012), including the plurality of views regarding factors that influence public access to cultural resources. One case in point are somewhat surprising findings regarding the role of affordability in explaining cultural consumption, which show that affordability explains the frequency of attendance rather than an intent to attend (Keaney, 2008). Others also show that such factors as facilities attractiveness, distance from a facility, availability of time and transportation, cultural norms and other neighborhood-level effects, matter for participation in the arts and culture (Brooke, 2016; Delrieu & Gibson, 2017; Evans, 2016; Houston & Ong, 2013; Widdop & Cutts, 2012).

Aside from these commonly acknowledged predictors of access, there is also evidence that socio-demographic factors play a role in explaining arts demand. Notably, education is a generally robust predictor of arts consumption (Brook et al., 2010; Brook, 2016; Widdop & Cutts, 2012). Several studies also show that ethnicity, age, and socio-economic status matter, although not as consistently as education (Brook et al., 2010; Brook, 2016; Houston & Ong, 2013; Leguina & Miles, 2017). Additionally, there are also market-based factors that influence access, such as competition between nonprofit cultural organisations and entertainment industry (sports, commercial industries, online entertainment, etc.). Overall, when examined from a consumer

behavior point of view, access is a multi-faceted concept that factors in multiple barriers to participation at both individual and community levels, which range from geographical to socio-cultural factors (Brook, 2011; Delrieu & Gibson, 2017; Evans, 2016; Hooper-Greenhill et al., 2009; Houston & Ong, 2013; Widdop & Cutts, 2012).

Fewer studies, however, consider the geographical factors of accessibility in relation to particular communities and their cultural infrastructure (Delrieu & Gibson, 2017). One example is the study by Brook and colleagues (2010) that compares data from a large dataset of performing arts ticket buyers in London with the population characteristics of small geographical areas in which they reside. Further, in her 2016 study of the spatial distribution of museums and galleries in London, Brook designs an innovative accessibility index that allows comparing visitor attraction measures with attendance survey data, demonstrating that spatial accessibility matters for attendance and that both geographical and institutional effects shape "opportunity structures" for attendance (Brook, 2016, p. 31). The study by Delrieu and Gibson (2017) goes beyond proximity by investigating the quality of transport infrastructure and the quality and quantity of social and cultural spaces as factors of cultural participation in England.

In the U.S. context, an example of a geographical approach to analyzing cultural assets is work by Stern and Seifert (2010, 2012) who examined the spatial distribution of cultural assets in Philadelphia. Their Cultural Assets index (2010, 2012) includes participation rates as well as inventory of the various diverse elements of local cultural infrastructure, including arts businesses, nonprofits, artists and informal sector, as well as arts participants. Stern and Seifert's index of access is based on an aggregate number of institutions, and they are able to trace change in that number overtime (1997-2010), showing geographical areas of 'gain' and 'loss' when it comes to cultural assets in Philadelphia. However, their approach to the index construction does not factor

in geographical (distance) or infrastructure-related (transportation networks, access to cars) factors. Stern and Seifert (2012) also examine the socio-demographic profile of local communities, focusing on housing insecurity and health problems among other issues, which allows them to subsequently describe community profiles in the areas with 'gains' and 'losses' in cultural assets.

What these previous studies made clear, is that spatial access is an important concept and valid predictor of cultural participation, even when accounting for various socio-demographic factors (Brooke, 2016; Delrieu & Gibson, 2017; Houston & Ong, 2013; Widdop & Cutts, 2012). Yet, there is a dearth of studies focusing on spatial factors of access, particularly in the U.S. context (Houston & Ong, 2013; Stern & Seifert, 2010, 2012). Additionally, scholars have typically mapped 'cultural industries' as a whole, including both traditional forms of culture and more commercial industries (media firms, telecommunications, consulting firms). This non-differentiated approach to cultural mapping does not account for substantial differences in the challenges of access that more traditional institutions face as compared to their commercial counterparts. Scholars also tend to use either physical locations of individual organisations or a generalized locational quotient for the sector/sub-sector (a measure that derives from comparing specific locations to national averages) for mapping the cultural sector (Foster et al., 2016; Grodach et al., 2014). These approaches do not account for the presence of other factors that may be equally important for describing the geography of access, such as the physical or transportation infrastructure that supports or obstructs access. Our study seeks to fill some of these gaps by considering geographical factors and analyzing the distribution of and access to several types of cultural resources in Detroit, particularly focusing on the under-represented groups, such as ethnic minorities and low-income populations.

Research Design

This study explores geographical and demographic differences in access to public and nonprofit cultural organisations located in urbanized counties of Metropolitan Detroit by introducing a novel way of conceptualizing and measuring access to cultural amenities. The study neither attempts to establish nor test causal relationships between access structure and social, political, and economic variables that may define it, nor does it offer specific prescriptions on how to solve the cultural assets distribution problem. The study focuses on collecting and interpreting primarily geographical data, and we do not analyze cultural participation rates. The study, however, offers some insights to both scholars and policy-makers about the geographical factors of access to cultural amenities. Importantly, the study offers a new methodology that can be used in future studies beyond Metropolitan Detroit.

Data

This study focuses on 335 public and nonprofit cultural organisations located in the four counties of Metropolitan Detroit - Wayne, Oakland, Macomb, and Washtenaw. The choice of the geographic area along the county lines is motivated by the importance of administrative boundaries in the urban planning literature, including when it comes to creative place-making (Redaelli, 2013). This specific geographic area was chosen based on the proximity and relatedness of the arts and culture ecosystem, existing transportation networks that connect these four counties, as well as shared history and socio-economic conditions that exist in this part of the metropolitan area (Moldavanova & Akbulut-Gok, 2020; Sustain Arts, 2014). Moreover, while there is more than one way of defining Metropolitan Detroit, we chose to conduct the study in the four-county area consistent with the arts census project conducted in 2014 by Sustain Arts[3], which also focuses on the four-county area.

Organisations included in the study comprise five sub-sectors common for this area: 28 visual arts organisations (e.g. Museum of Contemporary Art Detroit, Cranbrook Art Museum); 15 science organisations, including zoos and aquariums (e.g. Belle Isle Aquarium, Michigan Science Center); 87 music and performing arts organisations (e.g. Detroit Symphony Orchestra, Grosse Pointe Theatre); 70 historical organisations (e.g. Detroit Historical Society, Berkley Historical Museum, Arab American National Museum, Henry Ford Museum), and 135 libraries. Only organisations that had a clearly identifiable geographic location were included in the study. It is important to acknowledge that arts and culture sites in this study include organisations of various sizes, ages, and types. Some of those organisations are major institutions with far reaching overall access capabilities, while others are neighborhood-based organisations. This approach appropriately reflects the diversity of public and nonprofit cultural organisations, but it does not account for capacity-related differences in being able to provide access, which is an important question exceeding the scope of the present study.

We included organisations that are either incorporated nonprofits or public cultural organisations, such as public libraries and municipal historical museums. These organisations are distinguished from their commercial counterparts by socially-driven missions, which was verified by the researchers. The focus here is on the 'public serving' side of the cultural market, which resembles the approach of arts and culture network organisations in Detroit, such as CultureSource. The study excluded commercial arts businesses, such as iconic Fox and Fisher Theaters or jazz venues such as Cliff Bells and Baker's Keyboard Lounge. These commercial businesses are integral to the overall arts and culture eco-system, but they are governed and funded differently as compared to the nonprofit and public organisations. Therefore, the questions of access are framed differently for such organisations. We also excluded narrowly positioned member-serving

organisations (e.g. church choir), arts businesses, individual artists, advocacy organisations and professional alliances, fundraising organisations, and seasonal events.

Our choice to focus on long-standing public and nonprofit cultural organisations is explained by their distinctiveness due to their physical embeddedness within their local communities, which often means inability to relocate as easily as many commercial organisations can. They also face legitimacy pressures bestowed upon them by governmental and philanthropy organisations that are not present in the market sector. We also limit the number of sub-fields to five common ones and do not include informal arts and culture activities, which are nevertheless known to foster more equitable cultural participation (Leguina & Miles, 2017; Stern & Seifert, 2010). While our approach is not without limitations, it allows focusing on public and nonprofit organisations that represent what could be termed as 'warehouses' of cultural activity and that serve as the basis for overall cultural infrastructure in a given place and around which many other formal and informal cultural activities emerge.

The list of organisations was derived from multiple data sources, including the membership database of CultureSource and Sustain Arts, arts advocacy organisations, GuideStar nonprofit database, and open source material (such as municipal government web sites, visitdetroit.com, etc.). While the search process may have missed some organisations, the list included in this study comes close to the population of public and nonprofit cultural organisations from the five sub-fields located in the four counties of Metropolitan Detroit.

Analytical strategy

This article relies on the GIS-modelling approach to investigate spatial distribution of and geography of access to 335 public and nonprofit organisations from five sub-fields located in Metropolitan Detroit. First, we use traditional methods to assess differences in the density of

institutional locations across the region. Second, looking beyond density, we implement an index of access that considers three types of access factors: geographic proximity, availability of transportation, and institutional admission policy. Through the lens of this index, we assess spatial patterns of access across the region. Third, we use census data to assess differences in demographic characteristics of residents in areas with high access to cultural institutions compared to those with low access to cultural institutions. In particular, the analysis focuses on populations that are traditionally considered as under-represented among arts' audiences, such as racial minorities and populations with low socio-economic status, low income, or low education.

The findings section of the article first interprets the results from the density analysis, and then the results from access analysis. The interpretation discusses the concentration of and access to the various cultural amenities. The final part of the findings section utilizes census data matched with various access levels to all cultural organisations and sub-fields of cultural amenities. These data are represented in the consolidated table for all organisations as well as separate tables for each of the five sub-fields, to enable the comparison[4]. Data in the tables are organized under three substantive categories: employment and income; socio-economic status, and demographic data. Comparing maps and tables for different cultural sub-fields enables us to illustrate qualitative differences among them which are discussed in the findings section.

<div align="center">**Data Analysis and Findings**</div>

Traditional Density Analysis Approach

Data Analysis. First, as a proxy for access, density analysis was performed in ArcGIS. Physical addresses for each of the 335 public and nonprofit cultural organisations were geocoded into a geographic information system, where each organisation was identified by its sub-group. We then performed spatial analysis to determine density of cultural organisations.

A kernel density map (also called a heat map) is traditionally used to visualize density, in which the color of each cell of the map is symbolized based on the number of features that are within a fixed search radius from the center of that cell. We chose the 1.92-mile search radius for kernel density mapping based on Silverman's Rule-of-thumb bandwidth estimation formula, which is a widely used best practice to avoid the "ring around the points" phenomenon that often occurs with sparse datasets, and which is resistant to spatial outliers. Considering shortcomings of a straight-line Euclidean distance, we used a modified density analysis approach that incorporated the existing street network (Adams et al., 2010; Sparks et al., 2011; Witten et al., 2003).

The selected search distance was used to create a 'service area' for each organisation's location based on the surrounding street network. Overlapping service areas were then symbolized to illustrate the number of organisations within the specified travel distance for each area of the map. The resulting maps show areas with different densities of organisations (see Figs. 2-7). Locations with a heavy density of facilities - districts - are shown in darker color, and locations with a low density of facilities – deserts - have no color.

Findings

The density map of the entire cultural sector (Fig. 1) shows Wayne, Oakland, and Washtenaw counties have greater concentration of organisations as compared to Macomb County. There are two distinct cultural districts in the region. The first was Woodward Corridor including the parts of both the City of Detroit and nearby suburbs. The second was the City of Ann Arbor. A less distinct cultural district is located in Royal Oak/Bloomfield Hills area (modern-day centers of wealth in Metropolitan Detroit). However, there are also areas within each county that have low concentration of cultural institutions. Additionally, the northern one-third of Macomb County and

the western one-third of Washtenaw County are rural and farming areas, which explains the lack of cultural institutions in these areas.

[Figure 1 about here]

The cultural sector in Metropolitan Detroit follows three locational patterns: 1) historical (areas with high concentration tend to be located in areas of initial population settlement); 2) population size and the presence of governing bodies (areas with high concentrations tend to be located in areas of county seat locations), and 3) centers of community wealth. Newer facilities, in particular, appeared to have selected locations with access to potential donors, creating mini-districts in recent suburbs such as Bloomfield Hills (established 1932), Rochester Hills (established 1984) and Northville (established 1955). Cultural organisations also tend to be clustered in the areas surrounding major public universities—University of Michigan in Ann Arbor and Wayne State University in Detroit.

The density maps for the sub-fields of arts and culture (Figs. 2-6) show that cultural districts for performing and visual arts organisations (Figs. 4 and 6) are observed in areas of historical settlement, modern day population centers, and areas with high concentration of wealth. Performing arts organisations (Fig. 4) are more widely distributed in Metropolitan Detroit as compared to visual arts (Fig. 6), and in addition to the three noted above cultural districts, they also have an identifiable district in Plymouth/Northville. Locations of visual arts organisations (Fig. 6) are sparser, and most of the metropolitan area, with the exception of the three cultural districts, could be considered as an area of low concentration of visual arts organisations.

[Figures 4 and 6 about here]

Historical organisations and libraries are widely distributed across urban and rural locations (Figs. 2 and 3). Historical organisations are less numerous and have three clearly identifiable

cultural districts – Detroit, Royal Oak, and West Bloomfield (Fig. 2). The largest deserts for historical organisations are located in rural areas of Macomb County and Washtenaw County. Libraries are more evenly distributed throughout the metropolitan area, with lower concentrations of libraries in rural Washtenaw County. Among all types of organisations, libraries have the largest number of districts (Fig. 3).

[Figures 2 and 3 about here]

Science organisations are the least concentrated in the area. The largest science district is located in Ann Arbor, and the second largest is in Detroit (Fig. 5). Both of these districts are characterized by the presence of large research universities – University of Michigan in Ann Arbor and Wayne State University in Detroit. There are also substantial areas of Metropolitan Detroit with no science institutions.

[Figure 5 about here]

Access Index Approach

Data Analysis. The access index presented in this article builds upon community resource accessibility models employed in a variety of other community settings, such as education, health, and food (Adams et al., 2010; Bertrand et al., 2008; Pearce et al., 2006), as well as previous cultural mapping studies (Brook et al., 2010; Brook, 2016; Houston & Ong, 2013; Stern & Seifert, 2010).

Previous studies used various components for designing their access indexes, such as travel time, distance, access to transportation or availability of a given resource (Brook et al., 2010; Brook, 2016; Houston & Ong, 2013). An index has been typically calculated as either a sum or a weighted sum of its components (Brook, 2016; Sparks et al., 2011; Witten et al., 2003). Previous studies have also relied on various means of transportation for approximating public access to a

community resource, such as walking, driving, and/or reliance on public transportation (Adams et al., 2010; Brook et al., 2010; Houston & Ong, 2013; Sparks et al., 2011; Witten et al., 2003).

The index of access presented in this article builds on the previous literature and considers six factors that either constrain or enable access to cultural institutions: institutional admission policy (factor 1 below), geographical distance (factors 2-4), and the availability of transportation (factors 5-6):

(1) Institution with free admission policy within walking distance (at least one institution of a kind within 0.5 miles from the population-weighted center of a tract).

(2) Walking distance (at least one institution of a kind within 0.5 miles from the population weighted center of a tract).

(3) Biking distance (at least one institution of a kind within 5 miles from the population weighted center of a tract).

(4) Driving distance (at least one institution of a kind within 30 miles from the population weighted center of a tract).

(5) Connected by transit service (a bus route runs within 0.5 miles walking distance from the population weighted center of a tract, and the route also runs within 0.5 miles walking distance of a cultural institution).

(6) At least 90 percent of residents have access to a private vehicle.

In selecting specific elements for this index, we focused on practical factors that can broadly limit an organisation's positioning to serve residents in their surrounding community. The geographical parameters dominate in the index construction due to our substantive focus on urban geography and location. Additionally, while in many other urban areas it would make sense to

factor in more diverse modes of transportation beyond bus routes (e.g. subway, light rail, Amtrak), Metropolitan Detroit has distinctively limited public transportation options, and people with no access to cars rely on bus networks for public transit. On the other hand, to partially account for economic barriers to access, which reflect socio-economic inequalities in this geographic area, the index considers institutional admission. Our approach to combining three diverse parameters of access represents a qualitative approach to the index construction, which is not uncommon in the literature (Brook et al., 2010; Stern & Seifert, 2010). We also did not apply weights to any of the six access parameters, which is something that could be done in future studies once the relative importance of the various factors is established. While this approach is not without limitations, it enables substantive comparisons between geographic areas with different levels of access.

Census tracts served as the unit of analysis, analogous to neighborhood boundaries. For each tract, we calculated aggregated access index scores for the entire cultural sector and each of the five sub-fields. A census tract received a point for meeting each of the above criteria, with a maximum score of six. Similar to the density analysis described above, we chose to rely on the street network approach to measuring distance. The outcome of this approach is six access groups (access scores 1, 2, 3, 4, 5, 6) that are collections of census tracts with similar levels of access. Our approach was based on computing access scores for census tracts for all cultural organisations as well as each of the groupings (science, visual arts, history, performing arts, and libraries) separately. In this approach, a score of 6 is the maximum score suggesting great access to cultural sites, while zero is the lowest possible score suggesting no access. In substantive terms, people living in areas with high access scores have the most access to cultural institutions, and people living in areas with low access scores have low access to such institutions.

Findings. The access index analysis resulted in six access zones for each cultural sub-field, except for the performing arts and science organisations that only had five access zones and no zone with the highest access (6). On the other end of the access continuum are the libraries that have all six access zones. There are no census tracts with access of zero in any of the sub-fields of arts and culture organisations.

Access index maps for the entire cultural sector and the five sub-sectors reveal a more nuanced picture of the cultural resources accessibility in Metropolitan Detroit (Figs. 7-12). Overall, access is more broadly distributed than the traditional density analysis, which could be attributed to the influence of particular access index components (such as access to, and availability of, transportation). Some cultural districts (darker areas on the maps in Figs. 7-12) shown in the access index maps are located in the areas of wealth concentration; however, there are also high access areas that are not linked to wealth concentration. High access zones only partially follow patterns that were identified via the traditional density analysis.

The access map for all cultural institutions (Fig. 7) reveals that substantial portions of the Metropolitan Detroit territory have average access to cultural amenities (indexes 3 and 4). There are also more census tracts that have high access (indexes 5 and 6) as compared to low access (indexes 1 and 2). While most cultural districts as defined by the 6-point index (Fig. 7) remain the same as in the traditional density analysis, the City of Detroit itself and parts of the Woodward corridor have average access index scores (index 3) though these areas have a high density of cultural institutions.

[Figure 7 about here]

There are notable access differences across the sub-fields of arts and culture (Figs. 8-12). For instance, science organisations and visual arts (Figs. 11 and 12) appear to be the least

accessible--more than half of the Metropolitan Detroit territory covered with low access zones (indexes 1 and 2). Moreover, no tracts achieve the maximum index score (index 6) for performing arts institutions and science institutions sub-sectors (Figs. 11 and 12). This is explained by the fact that no institutions of these types offer free admission (admission prices typically range from $3 to $250). Access to the performing arts (Fig. 10) is more widely distributed than science institutions. Unsurprisingly, cultural districts for the performing arts are geographically aligned with the centers of population wealth.

[Figures 10, 11, 12 about here]

Access to libraries is particularly broad (Fig. 9). Being the largest cultural sub-sector, libraries shape the overall access map, ensuring wider population access to cultural amenities. Historical organisations (Fig. 8) are second most accessible to the Metropolitan Detroit population; sizable portions of the area are located in the medium access zones (index 3 and 4). It is also notable that cultural districts for historical organisations, similar to the performing arts, are located in the centers of wealth.

[Figures 8 and 9 about here]

Demographic Disparities in Access Levels

Data Analysis. After calculating access index scores for each census tract in the region, we explored variations in the characteristics of Census tracts with different levels of access. The characteristics of tracts were derived from the U.S. Census Bureau 2011-2015 American Community Survey data and included three groups of measures: 1) employment and income, 2) socio-economic status, and 3) demographic data (Tables 1-6).

Findings. Based on the analysis of the aggregated access table for the entire cultural sector (Table 1), the majority of Metropolitan Detroit population has a moderate access (zones 3

and 4) to cultural amenities. However, there is also some evidence of a fragmented access structure, where certain population groups have greater access to the arts. In particular, for all arts and culture organisations, the highest access zone (index 6) has fewer ethnic minorities, fewer people with less than a Bachelor's degree, and higher household income.

[Table 1 about here]

Moreover, across all sub-fields of arts and culture with the exception of libraries, access deficiencies are observed for the communities that have higher percentage of minority populations (Tables 2-6) and higher percentage of less educated people, which resonates with findings from previous studies (Brook et al, 2010; Brook, 2016; Foster et al. 2018; Houston & Ong, 2013; Widdop & Cutts, 2012). When it comes to libraries, which are typically publicly-funded institutions, access distribution is more even (Table 3), indicating that libraries are more accessible as compared to the other sub-fields.

Other, less consistent access deficiencies include: areas with higher proportion of low-income population (for history, science, and performing arts), lower proportion in labor force and higher unemployment (for history and performing arts), higher percent receiving food stamps and in poverty (for history), higher percent receiving Social Security (for libraries, history, performing arts, and science), higher proportion of people with disabilities (for history and science). Therefore, the results of our descriptive analysis indicate that historically under-represented populations – racial and ethnic minorities and economically-disadvantaged populations – may remain at a greater disadvantage in terms of access to several cultural sub-fields. Correspondingly, strategies to engage new audiences may be less successful for public and nonprofit cultural organisations in these fields.

[Tables 2-6 about here]

Historical organisations and performing arts (Tables 2 and 4), in particular, have the type of access structure that could be described as elitist, where access decreases for historically under-represented populations and increases for the more advantaged ones across multiple socio-demographic measures. Even for libraries, which are overall more widely distributed, highest access (index 6) is observed in areas with the highest income and lowest percent of ethnic minorities (Table 3). At the same time, highest access to visual arts is observed for tracts with the highest income and socio-economic status (lowest unemployment, percent in poverty and receiving food stamps), lowest percent minority, lowest percent with less education, lowest percent with disability, and highest median age (Table 6). Once again, these observations point out a possible elitist access structure that follows education and higher social status, and in which more affluent populations also have greater access to the arts. Education, in particular, appears to be a consistent factor for both reducing and enhancing access to most types of cultural amenities, with the exception of libraries, where levels of education are similar across all access zones.

Despite the fact that our analysis here is observational, it nevertheless allows identifying and discussing uneven geographical distribution of the cultural amenities as well as the fragmented access structure that exists in this particular metropolitan area. The overall implication of this finding is that who has access to what type of amenities varies, and there could be multiple areas for improving the access structure.

Discussion

This article has introduced and applied to a particular geographic setting a comprehensive, multi-component, index of access that measures access to cultural amenities as a community resource for diverse populations. Relying upon 335 public and nonprofit cultural organisations, the article used GIS-modelling approaches to investigate spatial distribution of cultural

organisations in Metropolitan Detroit. U.S. Census Bureau 2011-2015 American Community Survey data were further used to analyze possible inequities in the distribution of cultural resources, as well as access that diverse populations have to such organisations. Our analysis revealed that access to cultural organisations is unevenly distributed across the region, and historically under-represented population groups disproportionately live in areas with relatively low access levels to many of the cultural amenities. These differences are especially pronounced when it comes to race and education. For example, as we discovered, the highest access zone has fewer ethnic minorities and fewer people with less than a Bachelor's degree. These two groups also consistently stand out as lacking access to all cultural sub-fields with the exception of libraries.

One limitation of the current study is that it relies on qualitative assumptions to constructing the index of access, and future studies would benefit from performing sensitivity analyses, including weighting various factors differently, to determine the relative significance of its various components. Second, the index of access includes six components focusing primarily on geographical proximity and access to public transportation. However, other variables that were not investigated here may be important for understanding access structure, including more nuanced measures of transportation infrastructure and quality of street design (Evans, 2014) that may impede or facilitate access for particular population groups (Evans, 2016). Our index also did not factor in the quality of cultural offerings or the diversity of programming, as well as differences among cultural institutions themselves, which in itself is important for access (Brook, 2016; Evans, 2016; Delrieu & Gibson, 2017; Houston & Ong, 2013). Another limitation of this study is that is focused on a subset of cultural institutions (public and nonprofit organisations) and did not include other actors of importance to the broader arts and culture urban eco-system, such as commercial organisations and independent artists (Stern & Seifert, 2010). Notwithstanding these limitations,

however, the index of access and the framework introduced in this article open room for future investigations.

Further research is needed to investigate the various types of factors and their influence on fostering more inclusive access to the arts. It would also be beneficial to research the relationship between place and engagement, and the role of direct arts activity in promoting public participation (Evans, 2016). Future studies would also benefit from exploring access structure that includes both commercial and noncommercial cultural organisations, as well as informal sector, which collectively form what Stern and Seifert (2010) term "natural" cultural districts. It would also be beneficial to examine access structure separately for commercial arts businesses. Furthermore, our study examined the geography of access and we did not analyze participation rates or other ways to approximate individual preferences; however, analyzing such preferences is a valuable research goal (Markusen, 2014) that has important implications for understanding the cultural market.

Conclusion

This article contributes to the growing body of urban studies literature that recognizes the important roles that arts and culture organisations play in urban development efforts (Gilmore, 2013; Grodach, 2016; Evans, 2016; Hooper-Greenhill et al., 2009; Markusen, 2014; Redaelli, 2013; Stern & Seifert, 2010; Strom, 1999; 2002), particularly focusing on the pressing questions of the equity of distribution of and access to public and nonprofit cultural amenities. The post-COVID world has heightened understanding of existing social, economic, and political inequities in local communities, making it more urgent than ever for all public serving organisations to pay attention to these dynamics. Furthermore, as we are finding ourselves in the midst of a new economic recession, those inequalities exacerbating. In its modest way, by focusing on public and

nonprofit cultural organisations, this article contributes to furthering the question of equity of access to cultural amenities as a shared community resource.

This study set out to shed more light on the geographical and demographic differences in access to cultural amenities in Metropolitan Detroit, as well as to investigate whether residents in different locations within this metropolitan area have the same or different opportunities to access the various cultural amenities. As such, this research presents a pioneering effort in exploring geographical differences in access to public and nonprofit cultural organisations by various population groups. Although the study is observational, and does not attempt to answer causal questions about the access structure, it offers a new methodology that can be adopted in future studies. Importantly, the study reveals inequities that exist in the distribution of cultural amenities in Metropolitan Detroit, raising both intellectual and policy questions about causality and better access. Answering these questions as the next step in future research is particularly important because having access to cultural institutions often means better economic and social climate, more opportunities for youth and more engaged citizens (Markusen, 2014; Moldavanova, 2016; Moldavanova & Wright, 2020; Redaelli, 2013; Strom, 1999; 2002; Toepler & Wyszomirski 2012).

To date, this is one of few studies focusing on the U.S. metropolitan context, where questions of equitable access to arts and culture amenities are especially pronounced due to fragmentation and distinct historical context (Houston & Ong, 2013; Rushton, 2005; Stern & Seifert, 2010). Many problems that we see in Detroit are not unique to this metropolitan area, and this investigation serves as a useful framework for future studies in other geographic areas. Furthermore, of particular value is this study's focus on local geography and comparing physical access structure with the sociodemographic profile of specific communities (potential attendees),

which is different from previous studies that relied on actual attendance and membership records and participation surveys (Brook et al, 2010; Houston & Ong, 2013; Leguina & Miles, 2017).

Another distinct contribution of this article is its focus on traditional (public and nonprofit) cultural organisations from the conventional sub-fields (visual arts, performing arts, historical organisations, science organisations, and libraries), as opposed to mapping cultural industries that include arts businesses or 'new' arts (e.g. media). Organisations that we focused on play critical roles in local cultural eco-systems, as they represent the 'warehouses' of cultural activity, and they also represent a 'public-serving' side of the cultural market. Additionally, while previous studies rarely focused on comparing multiple sub-fields of cultural activity, primarily focusing on one or two sub-fields (Brook et al., 2010; Brook, 2016; Delrieu & Gibson, 2017; Houston & Ong, 2013), our study allows comparing the distribution of and access to different types of cultural amenities.

Aside from its methodological contribution, this study has important policy implications for improving equity of access to cultural amenities. There are several possible ways of improving access structure in Metropolitan Detroit. First, institutions could increase public outreach to geographic areas with lower access levels. Less accessible cultural organisations might also consider collaborations with the libraries (Delrieu & Gibson, 2017) that are both widely distributed in the metropolitan area and offer free access. A possible policy intervention might also include better public transportation networks and/or subsidized transportation options. It would be especially beneficial to subsidize access to busses and other forms of transportation for young people and seniors, to enable their access to more distant or more diverse cultural amenities than they could currently access on their own. For the first group, engagement in cultural activities could have positive psychological and even health effects, and for the second group, early

engagement in the arts could foster their engagement later in life and provide opportunities for networking and professional development.

Additionally, studies conducted in European context found the highest levels of attendance among educated white people in areas with good access to culture, but they also found that access increases the probability of attendance for educated minority respondents (Brook, 2016). This could mean that creating opportunity structures is important for enabling more equitable cultural participation. Moreover, as has been rightly acknowledged in the previous literature, access barriers include both geographical and socio-cultural factors (Brook, 2016; Delrieu & Gibson, 2017; Hooper-Greenhill et al., 2009; Houston & Ong, 2013; Widdop & Cutts, 2012). Therefore, policy tools to boost access to cultural resources should involve multi-faceted interventions and utilize the entire range of diverse public and private organisations comprising local cultural eco-systems. Finally, in the post-COVID world, it is important that cultural institutions and those supporting them consider how they can expand their geographic reach and improve access via technology-based tools, thus providing more equitable access and overcoming the existing geographical barriers.

Endnotes

1. The term 'culture' can be defined in a variety of ways, ranging from a broad conceptualization of culture as human values and beliefs systems, as well as more narrowly construed as institutions and organisations of the cultural sector (Williams, 1983). This article focuses on the organisational level of culture, to include formal organisations within the domain of arts, culture, and humanities.

2. Multiple terms with overlapping meaning have been used to describe the cultural sector, such as creative or cultural industries, creative vitality, the creative class, and other related

concepts Brooks & Kushner, 2001; Grodach, Currid-Halkett, Foster, & Murdoch, 2014;

Markusen, 2014; Moldavanova. et al., 2018; Reese et al., 2010). This study, however,

focuses specifically on public and nonprofit formal arts and culture organisations that have

clearly identifiable geographic locations.

3. The results of the Sustain Arts 2014 cultural census, as well as information about their

   geographic focus and methodology, are archived here:

   https://wordpress.foundationcenter.org/sustainarts/wp-

   content/uploads/sites/4/2014/12/Key-Learnings-SE-Michigan.pdf

4. As pointed out by one of the reviewers, libraries as public institutions are more numerous

   and more widely distributed geographically as compared to other organisational types,

   which is evident from their maps. That is why we 'profile' each of the cultural sub-fields

   separately, so these differences are more pronounced and we can see the nuances when it

   comes to various socio-demographic parameters. The finding about libraries also has

   important policy implications, namely, that other organisations interested in improving

   access may consider collaborating with libraries on their outreach and programming.

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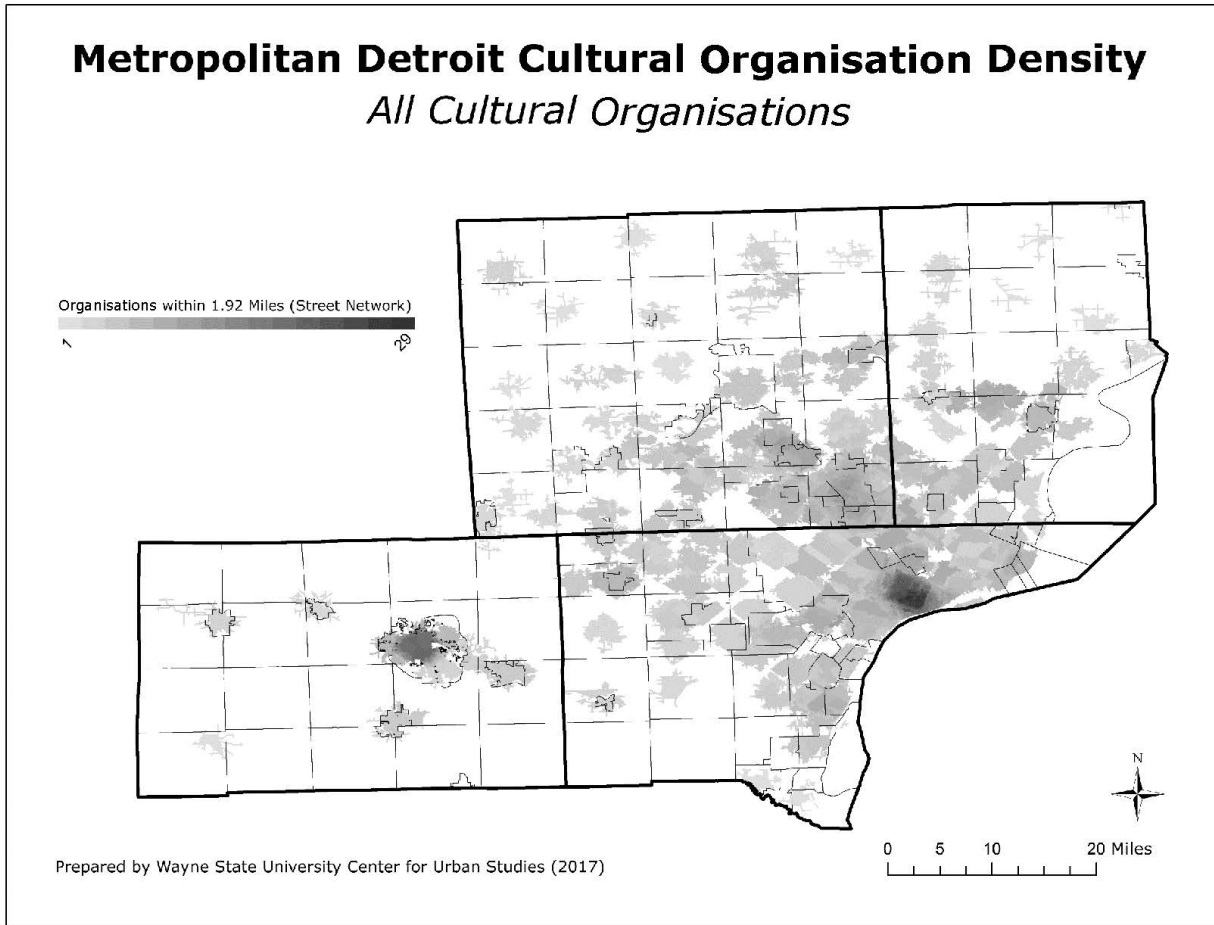Evans, G. (2016). Participation and provision in arts & culture–bridging the divide. *Cultural Trends*, *25*(1), 2-20.

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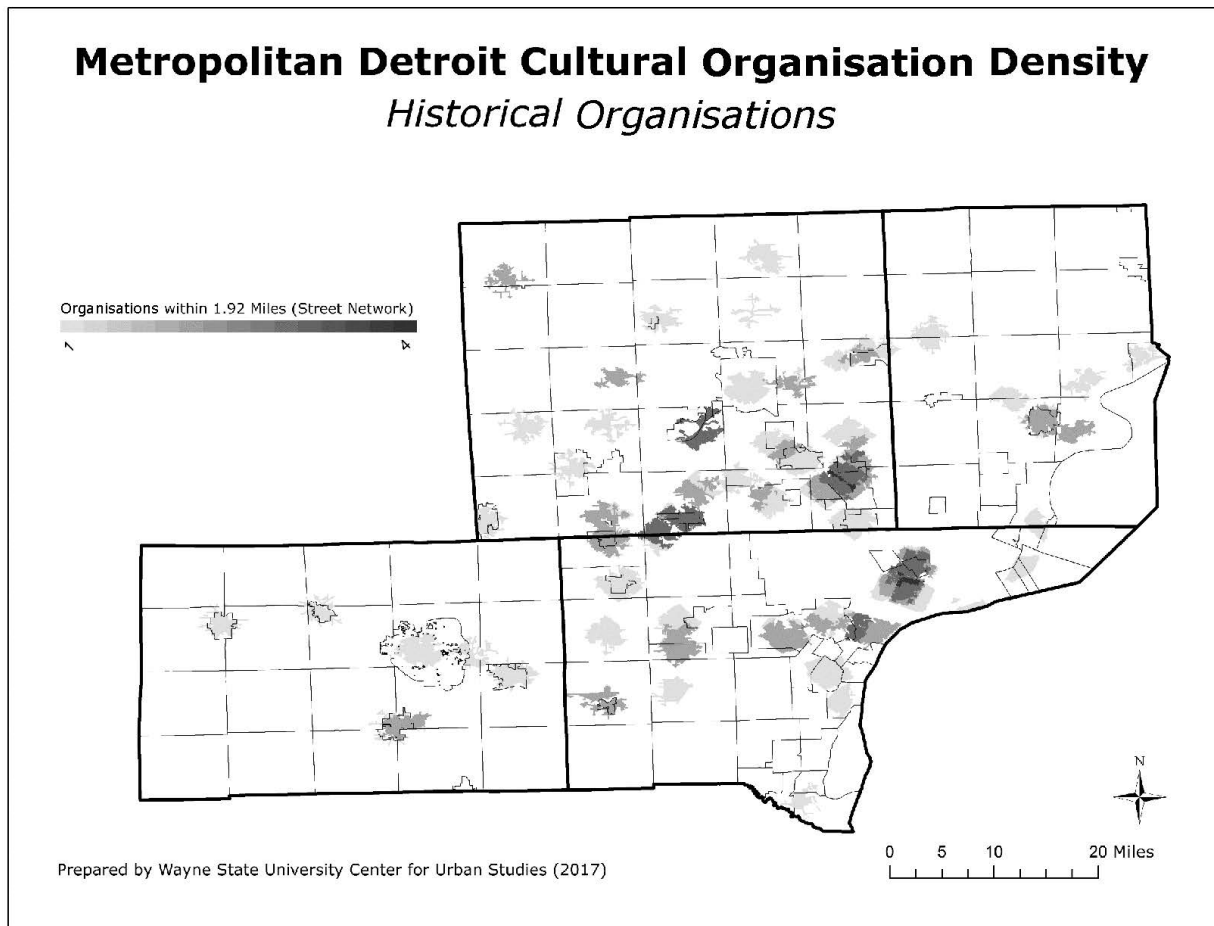
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Figure 1. Metropolitan Detroit Density Map for All Cultural Organisations

Metropolitan Detroit Cultural Organisation Density
All Cultural Organisations

Organisations within 1.92 Miles (Street Network)

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles

Figure 2. Metropolitan Detroit Density Map for Historical Organisations

Figure 3. Metropolitan Detroit Density Map for Libraries
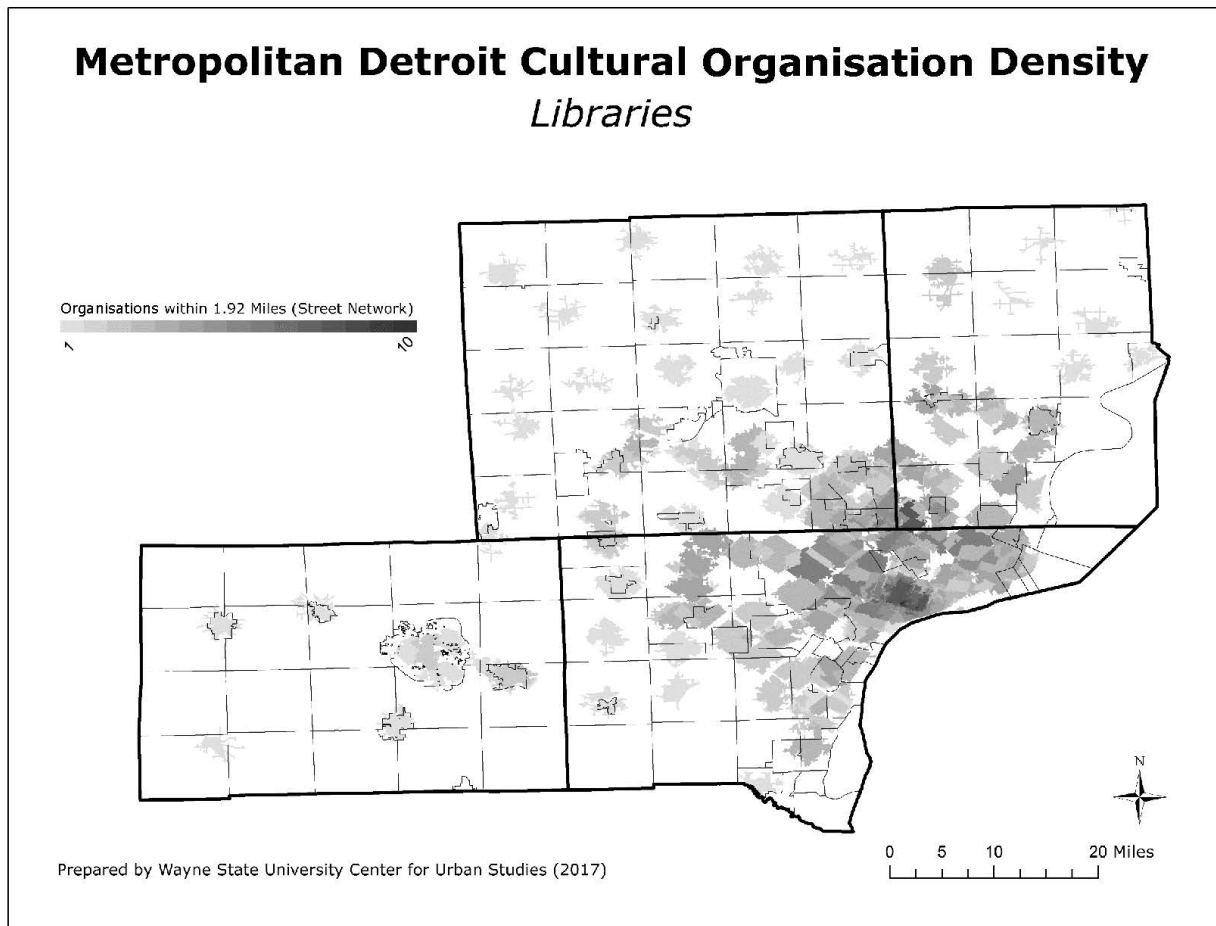
Figure 4. Metropolitan Detroit Density Map for Performing Arts and Music Organisations

Metropolitan Detroit Cultural Organisation Density
Performing Arts and Music Organisations

Organisations within 1.92 Miles (Street Network)

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles
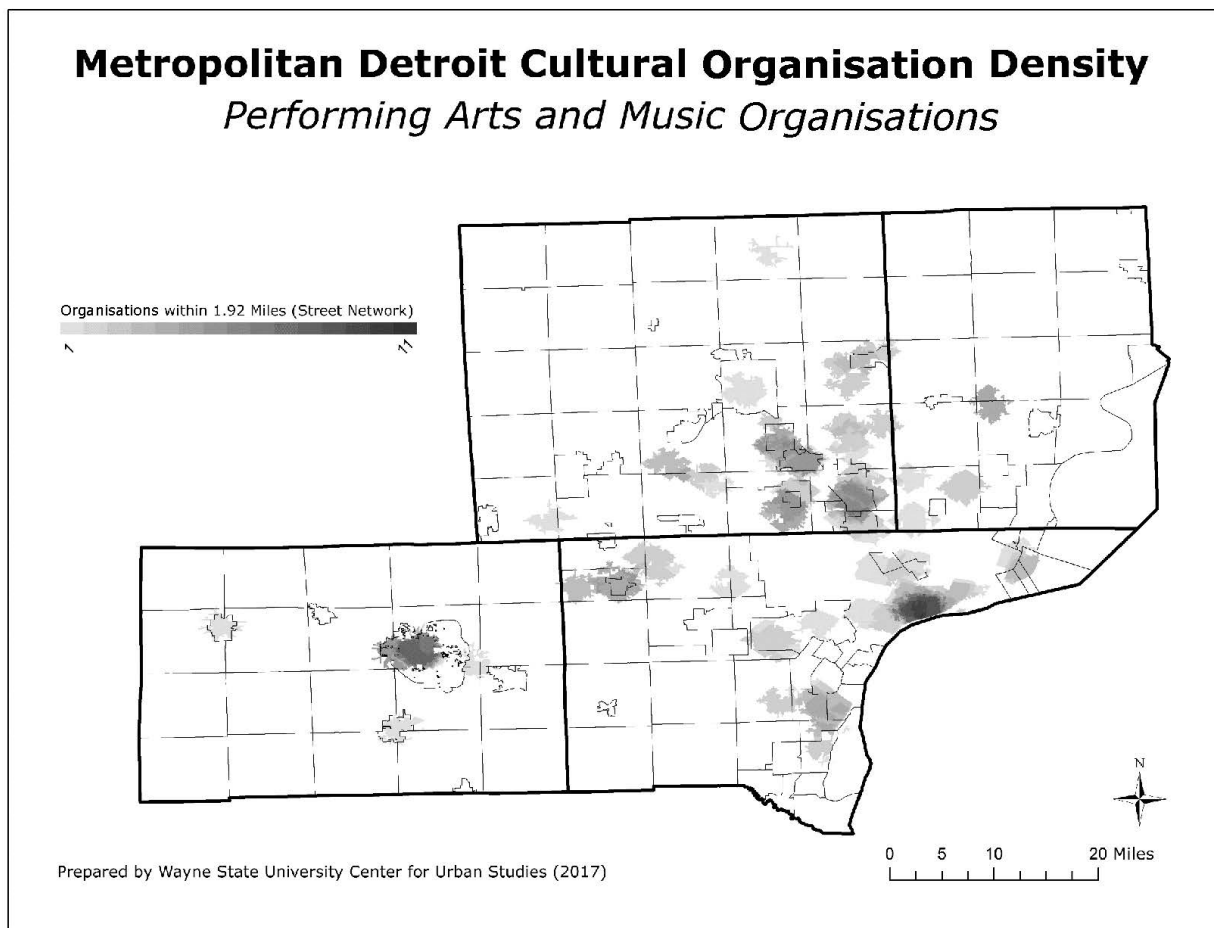
Figure 5. Metropolitan Detroit Density Map for Science Organisations

Metropolitan Detroit Cultural Organisation Density
Science Organisations

Organisations within 1.92 Miles (Street Network)

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles

Figure 6. Metropolitan Detroit Density Map for Visual Arts Organiations
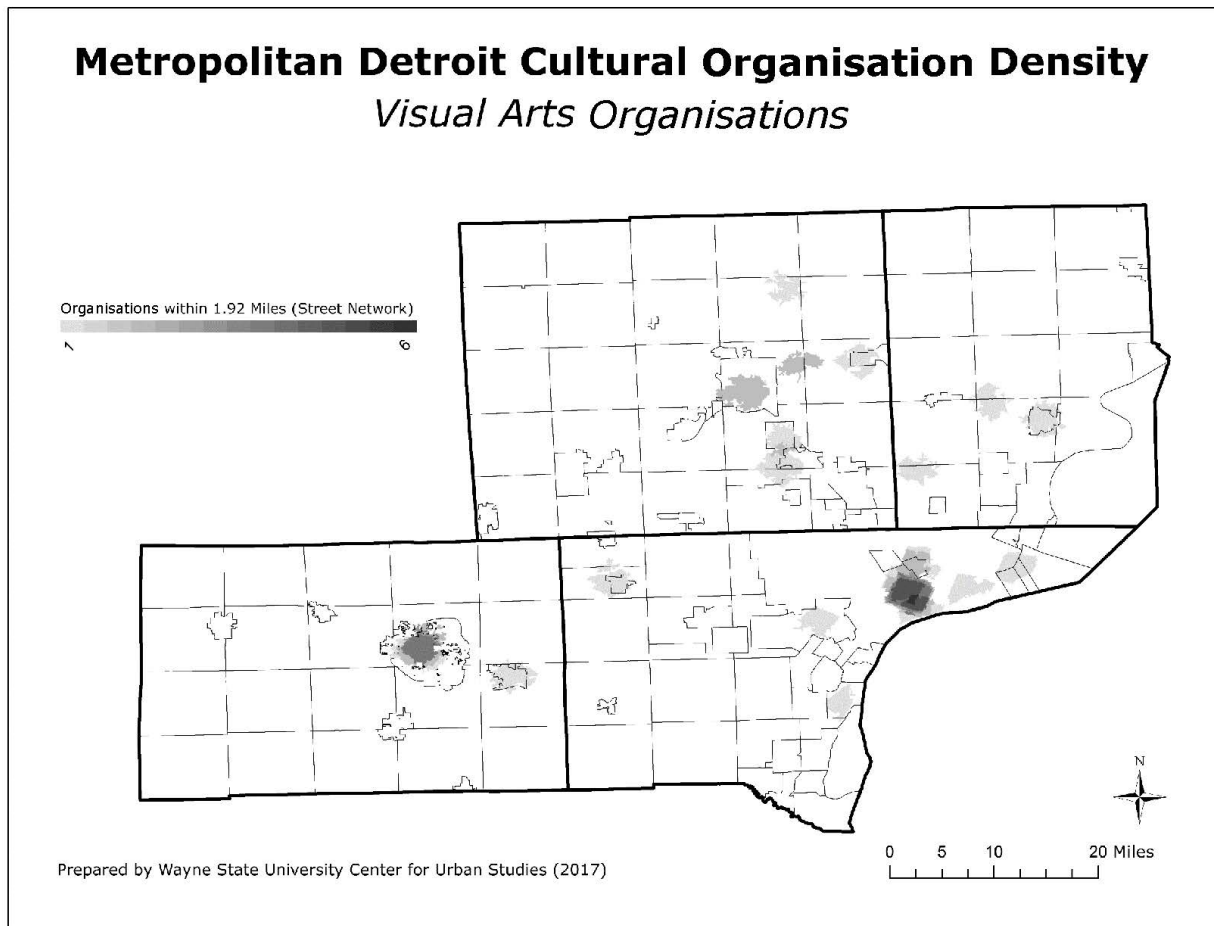
Figure 7. Metropolitan Detroit Access Index Map for All Cultural Organisations
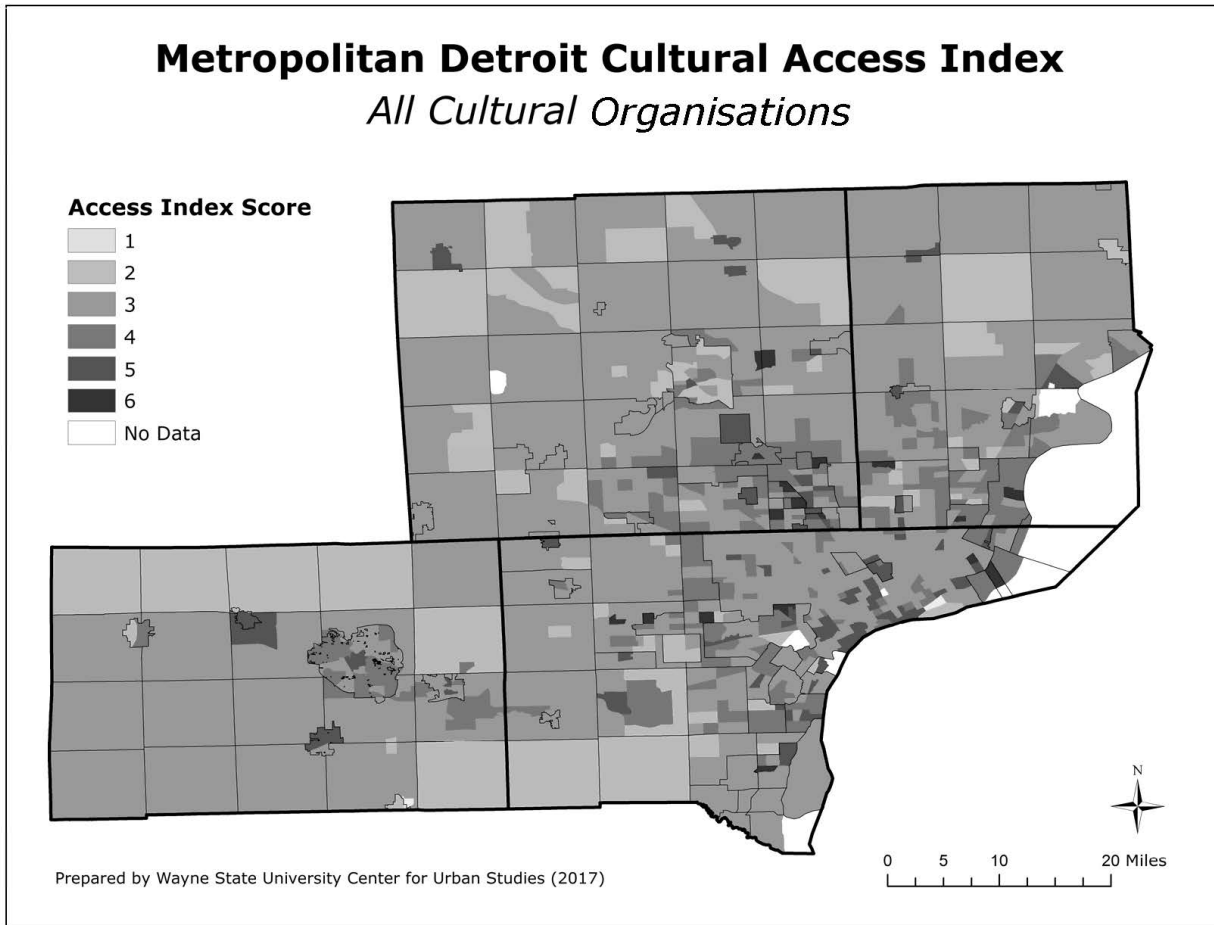
Figure 8. Metropolitan Detroit Access Index Map for Historical Organisations

Metropolitan Detroit Cultural Access Index
Historical Organisations

Access Index Score
1
2
3
4
5
6
No Data

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles
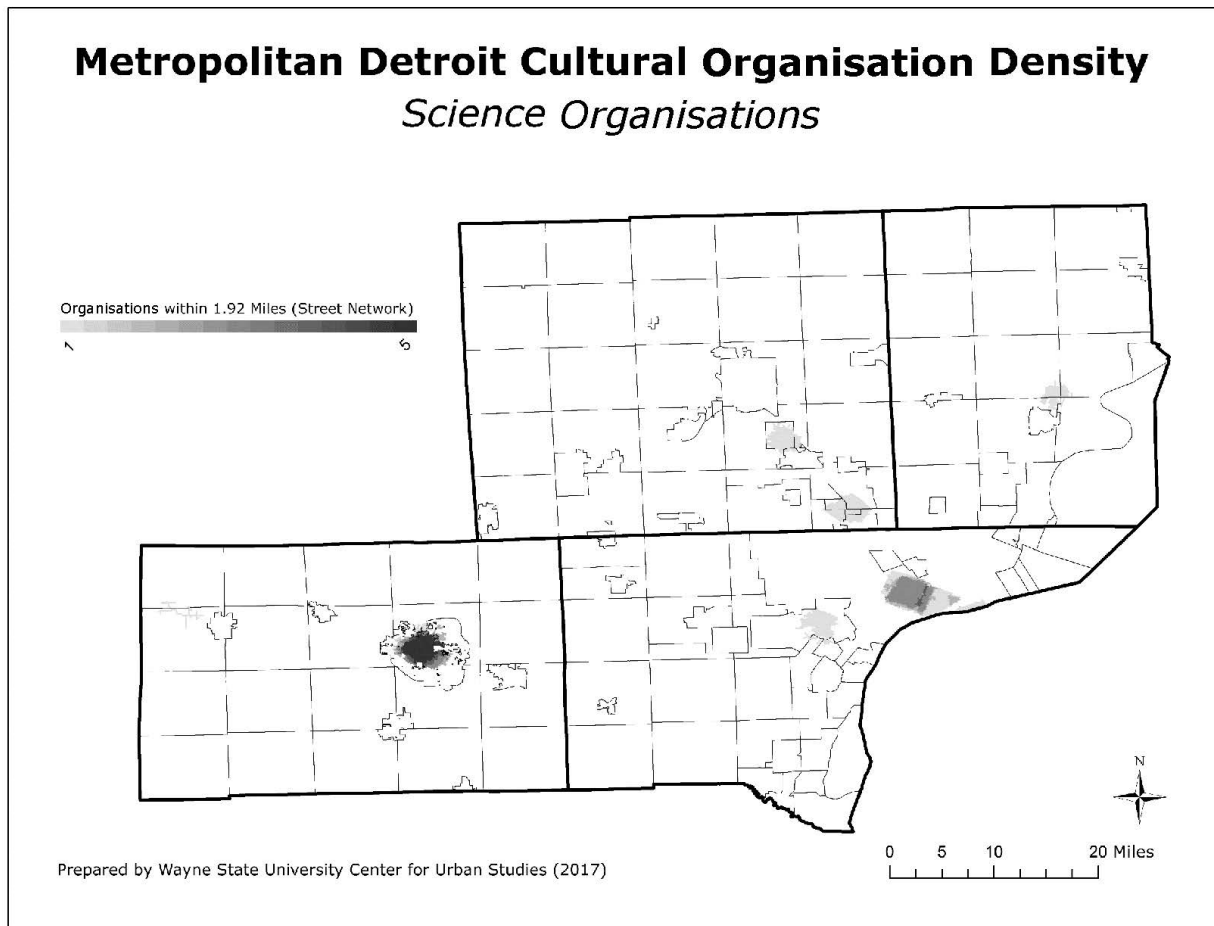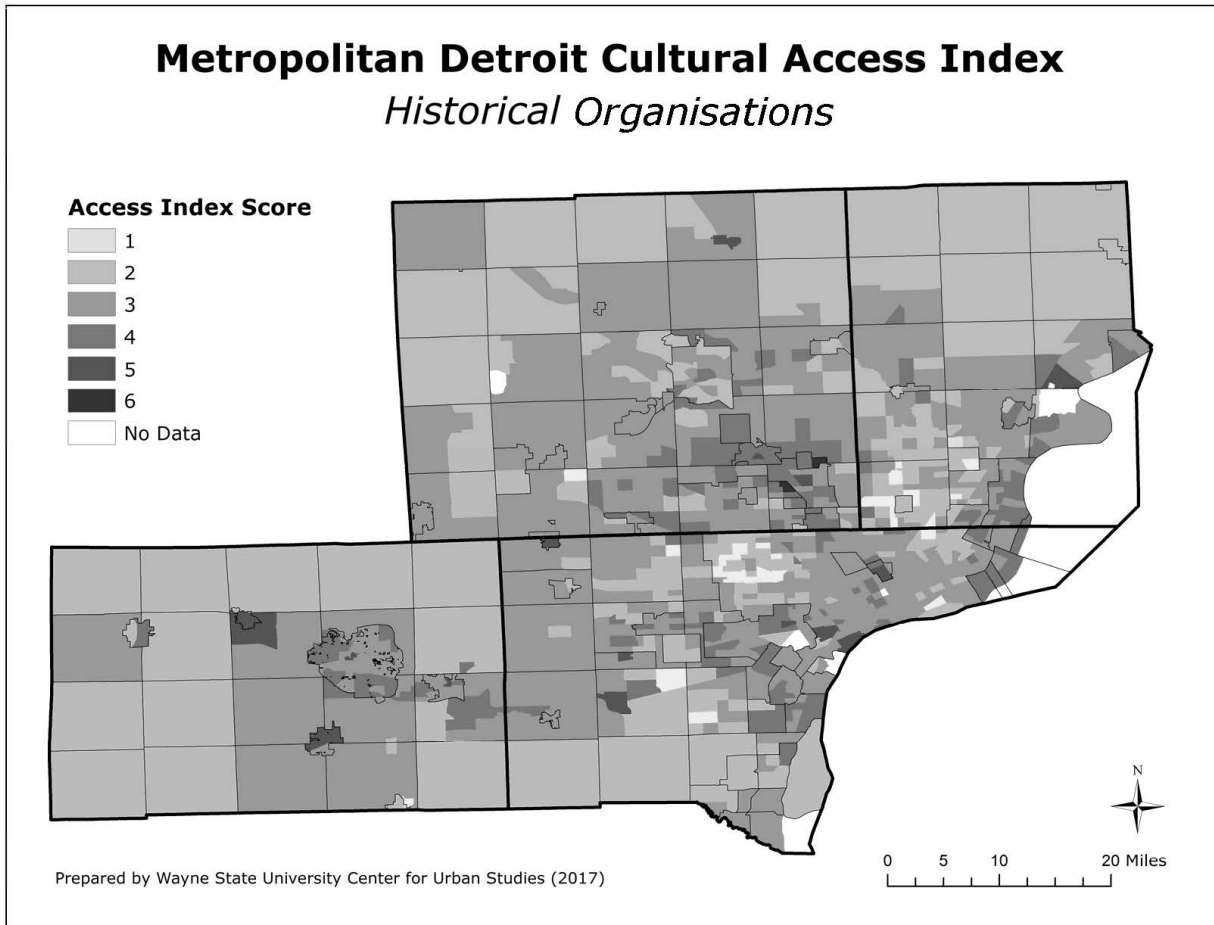
Figure 9. Metropolitan Detroit Access Index Map for Libraries
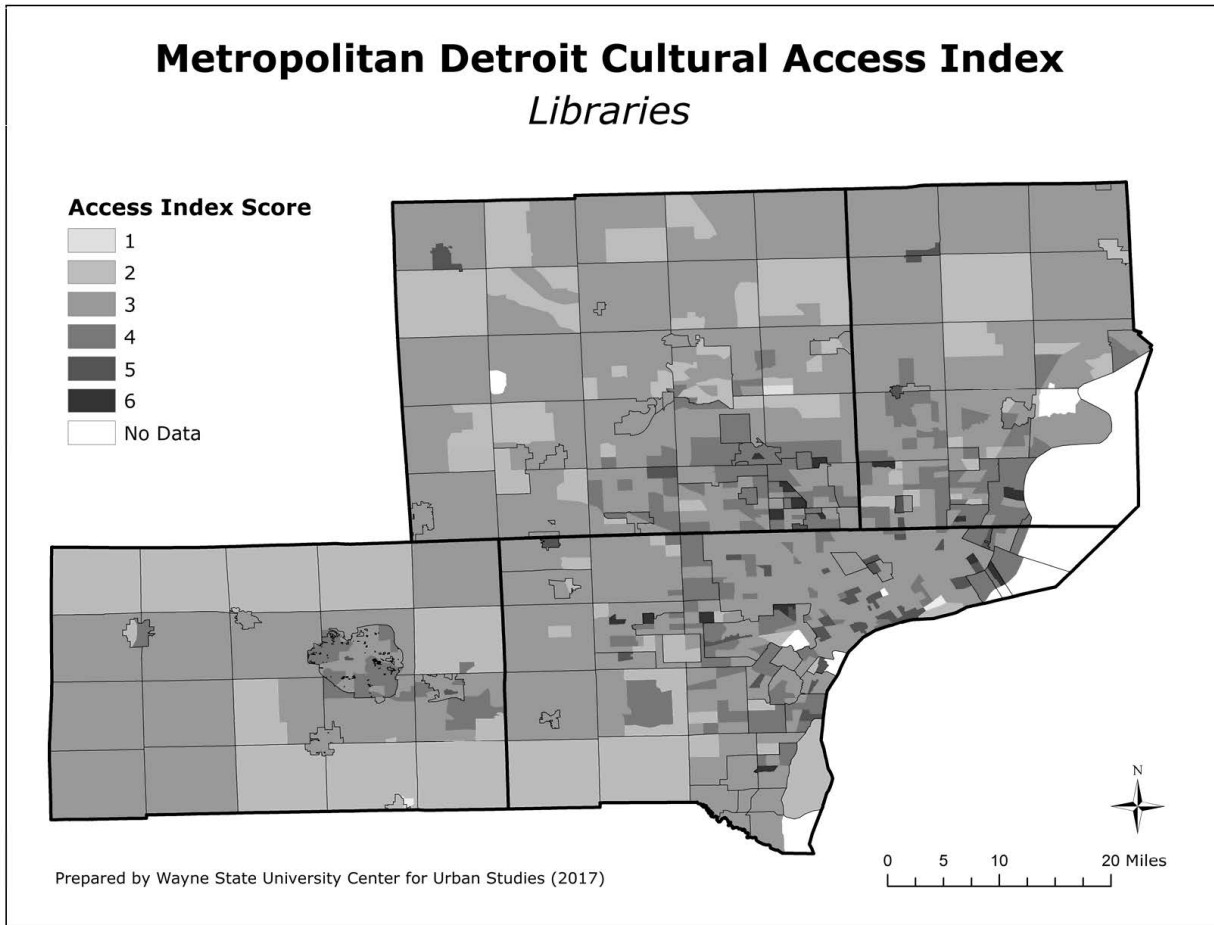
Figure 10. Metropolitan Detroit Access Index Map for Performing Arts and Music Organisations

Metropolitan Detroit Cultural Access Index
Performing Arts and Music Organisations

Access Index Score
1
2
3
4
5
6
No Data

Prepared by Wayne State University Center for Urban Studies (2017)

0 5 10 20 Miles
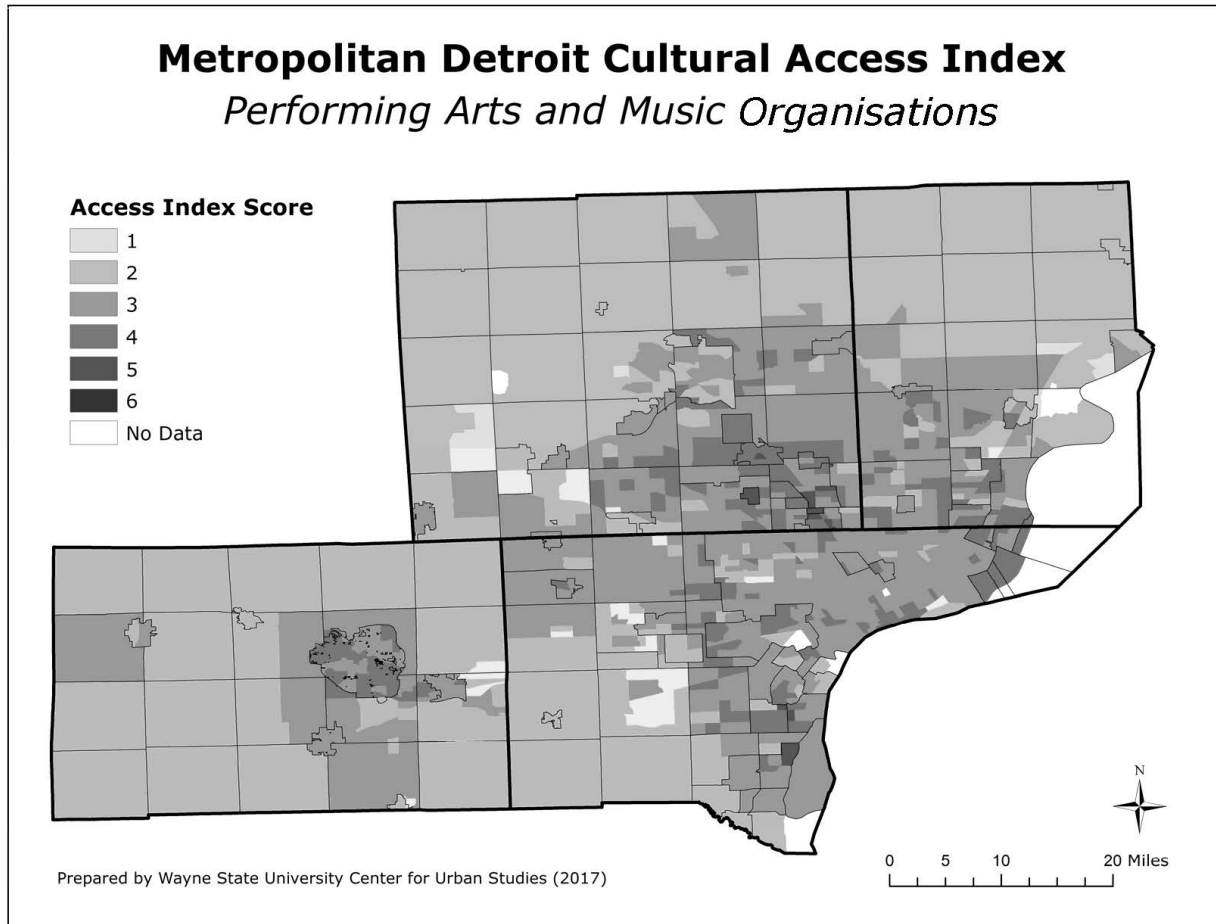
Figure 11. Metropolitan Detroit Access Index Map for Science Organisations

Metropolitan Detroit Cultural Access Index
Science Organisations

Access Index Score
1
2
3
4
5
6
No Data

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles
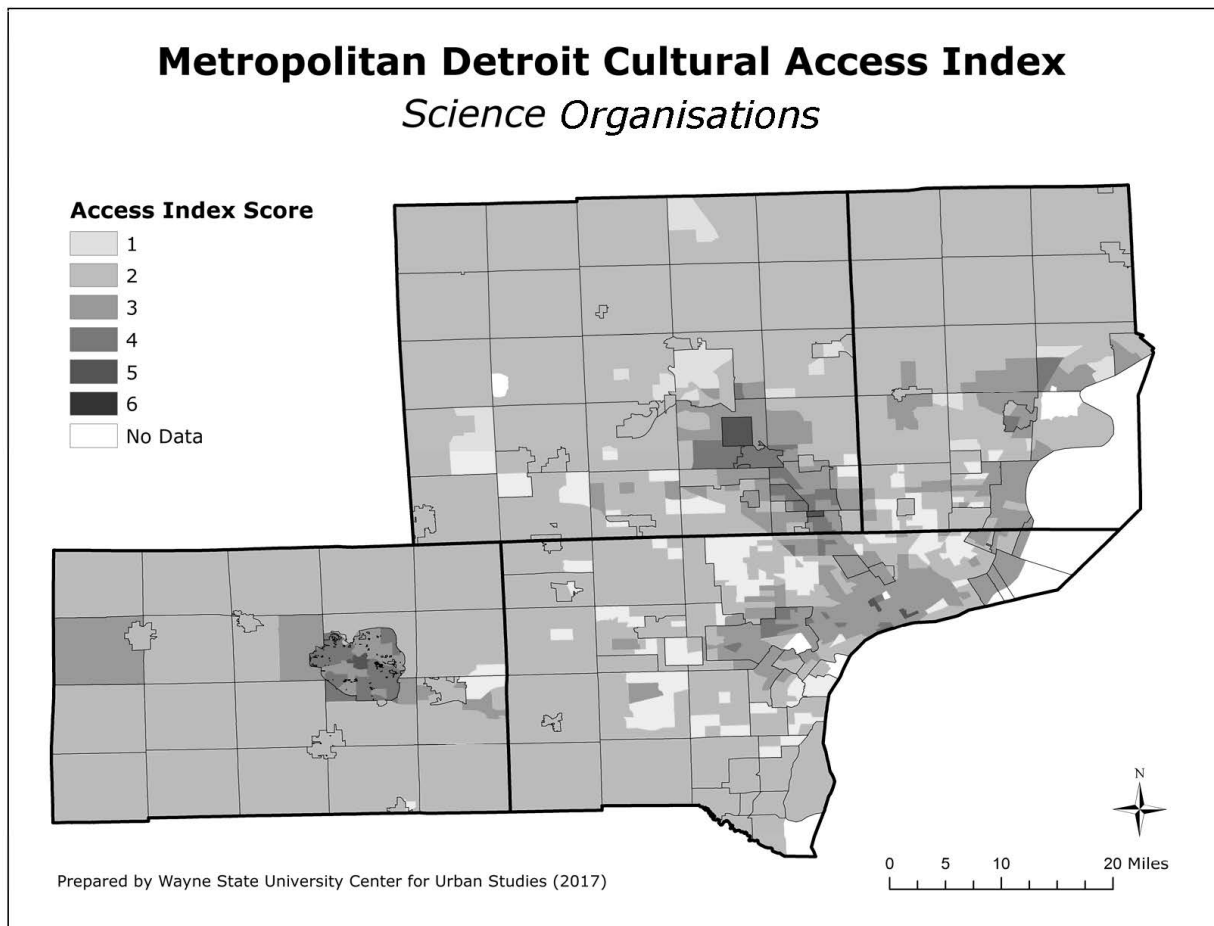
Figure 12. Metropolitan Detroit Access Index Map for Visual Arts Organisations

Metropolitan Detroit Cultural Access Index
Visual Arts Organisations

Access Index Score
1
2
3
4
5
6
No Data

Prepared by Wayne State University Center for Urban Studies (2017)

0   5   10   20 Miles
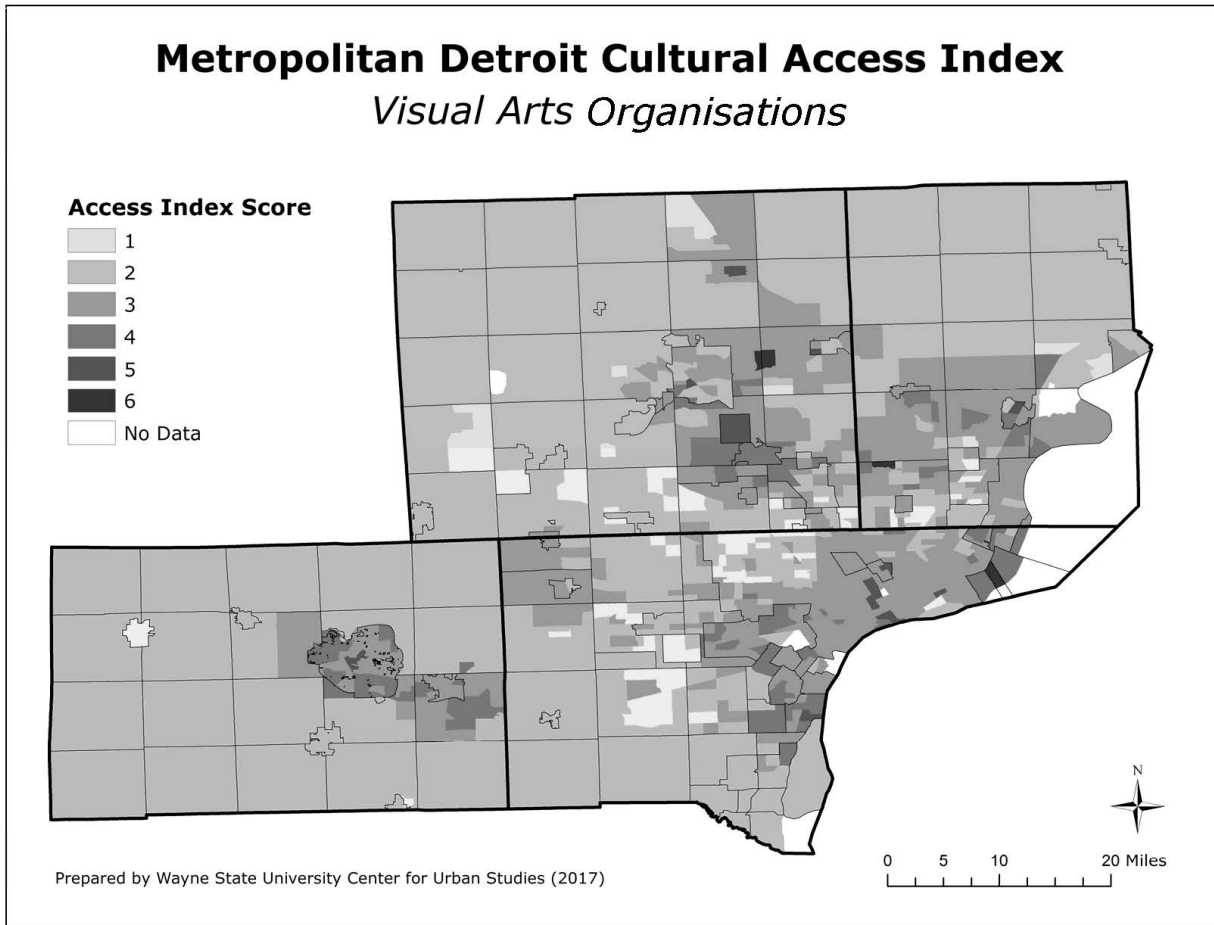
Table 1. Table with Access Index and Socio-Demographic Variables for All Cultural Organisations

Variable	Access Index Score - All Cultural Organisations						Total
	1	2	3	4	5	6	Four Counties
Number of tracts	2	87	785	279	85	20	1,258
Population	4,896	333,163	2,662,403	897,616	256,491	62,684	4,217,253
Employment and income							
% in Labor Force[a]	36.0%	61.7%	62.5%	64.7%	57.4%	62.4%	62.6%
Unemployment Rate[a]	6.8%	10.5%	11.0%	9.2%	13.4%	9.5%	10.7%
Mean Household Income	40,504	70,843	74,193	74,538	57,461	81,067	73,045
Social and economic status							
% in Poverty	19.7%	15.3%	17.4%	14.3%	31.2%	15.0%	17.3%
% of Households with SNAP/Food Stamps	27.5%	16.6%	18.0%	14.3%	25.5%	13.2%	17.5%
% of Households with Social Security	44.9%	33.8%	31.5%	30.5%	27.9%	31.8%	31.3%
% Less than Bachelor's Degree[b]	73.4%	75.0%	71.1%	68.8%	75.2%	69.4%	71.2%
Demographic data							
Median of Median Age	50	42	40	40	37	42	40
% Minority	82.2%	28.4%	36.9%	30.6%	43.1%	23.7%	35.1%
% Hispanic	5.5%	3.8%	4.0%	3.7%	9.8%	2.6%	4.3%
% With Disability	37.1%	15.1%	13.5%	13.3%	14.4%	13.6%	13.6%

Note.[a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey

Table 2. Table with Access Index and Socio-Demographic Variables for Historical Organisations

Variable	Access Index Score - Historical Organisations						Total
	1	2	3	4	5	6	Four Counties
Number of tracts	34	289	711	202	20	2	1,258
Population	90,767	992,149	2,397,449	657,215	73,630	6,043	4,217,253
Employment and income							
% in Labor Force[a]	54.2%	61.4%	62.8%	65.0%	60.0%	74.9%	62.6%
Unemployment Rate[a]	18.2%	12.3%	10.3%	8.7%	10.2%	3.6%	10.7%
Mean Household Income	47,018	65,223	75,724	79,267	64,982	89,756	73,045
Social and economic status							
% in Poverty	27.5%	18.2%	17.1%	14.4%	28.9%	2.8%	17.3%
% of Households with SNAP/Food Stamps	31.1%	20.0%	17.0%	13.3%	21.7%	4.4%	17.5%
% of Households with Social Security	37.5%	33.3%	30.9%	29.2%	26.5%	26.9%	31.3%
% Less than Bachelor's Degree[b]	85.9%	77.8%	69.7%	64.5%	71.9%	58.4%	71.2%
Demographic data							
Median of Median Age	36	40	40	40	36	42	40
% Minority	64.4%	37.0%	35.1%	28.7%	30.8%	5.2%	35.1%
% Hispanic	2.1%	3.1%	4.5%	4.2%	16.0%	2.4%	4.3%
% With Disability	19.2%	15.4%	13.1%	12.5%	13.0%	10.9%	13.6%

Note.[a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey

Table 3. Table with Access Index and Socio-Demographic Variables for Libraries

Variable	Access Index Score - Libraries						Total
	1	2	3	4	5	6	Four Counties
Number of tracts	3	108	807	273	49	18	1,258
Population	8,195	419,131	2,723,566	873,094	134,243	59,024	4,217,253
Employment and income							
% in Labor Force[a]	44.9%	62.5%	62.3%	64.9%	55.3%	62.7%	62.6%
Unemployment Rate[a]	6.0%	9.6%	11.1%	9.0%	17.5%	9.4%	10.7%
Mean Household Income	65,098	78,519	72,352	76,250	46,415	80,218	73,045
Social and economic status							
% in Poverty	13.0%	13.3%	18.3%	13.8%	34.1%	15.1%	17.3%
% of Households with SNAP/Food Stamps	18.6%	14.5%	18.5%	13.6%	33.4%	13.6%	17.5%
% of Households with Social Security	41.0%	33.3%	31.2%	30.3%	31.5%	31.8%	31.3%
% Less than Bachelor's Degree[b]	66.8%	70.8%	71.7%	68.2%	81.0%	69.2%	71.2%
Demographic data							
Median of Median Age	45	42	40	40	36	42	40
% Minority	57.6%	25.8%	37.3%	29.6%	57.9%	23.7%	35.1%
% Hispanic	5.1%	3.7%	4.1%	3.7%	13.7%	2.6%	4.3%
% With Disability	25.1%	13.9%	13.6%	13.2%	17.1%	13.9%	13.6%

Note.[a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey

Table 4. Table with Access Index and Socio-Demographic Variables for Performing Arts and Music Organisations

| Variable | Access Index Score - Performing Arts and Music Organisations | | | | | | Total |
	1	2	3	4	5	6	Four Counties
Number of tracts	27	287	701	232	11	0	1,258
Population	93,656	1,106,543	2,250,285	736,786	29,983	-	4,217,253
Employment and income							
% in Labor Force[a]	62.5%	64.9%	61.0%	63.7%	72.7%	-	62.6%
Unemployment Rate[a]	11.0%	8.9%	12.1%	9.3%	5.9%	-	10.7%
Mean Household Income	56,384	79,006	69,048	77,817	92,762	-	73,045
Social and economic status							
% in Poverty	19.7%	12.3%	20.4%	15.5%	7.0%	-	17.3%
% of Households with SNAP/Food Stamps	21.1%	13.6%	20.4%	14.1%	7.1%	-	17.5%
% of Households with Social Security	32.3%	30.5%	32.1%	30.0%	25.1%	-	31.3%
% Less than Bachelor's Degree[b]	76.9%	71.9%	72.5%	66.3%	52.5%	-	71.2%
Demographic data							
Median of Median Age	38	40	40	40	44	-	40
% Minority	41.0%	24.4%	41.5%	31.5%	17.2%	-	35.1%
% Hispanic	4.5%	3.4%	4.6%	4.6%	2.7%	-	4.3%
% With Disability	16.9%	12.5%	14.4%	12.8%	11.7%	-	13.6%

Note.[a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey

Table 5. Table with Access Index and Socio-Demographic Variables for Science Organisations

Variable	Access Index Score - Science Organisations						Total Four Counties
	1	2	3	4	5	6	
Number of tracts	170	708	306	64	10	0	1,258
Population	523,841	2,549,816	897,123	213,414	33,059	-	4,217,253
Employment and income							
% in Labor Force[a]	58.6%	64.0%	60.4%	67.6%	47.8%	-	62.6%
Unemployment Rate[a]	17.3%	9.2%	12.2%	7.0%	10.7%	-	10.7%
Mean Household Income	48,863	78,844	65,592	97,061	74,342	-	73,045
Social and economic status							
% in Poverty	27.9%	13.2%	23.2%	14.2%	39.8%	-	17.3%
% of Households with SNAP/Food Stamps	29.8%	13.9%	21.7%	10.3%	16.3%	-	17.5%
% of Households with Social Security	34.2%	31.5%	30.5%	25.9%	21.3%	-	31.3%
% Less than Bachelor's Degree[b]	83.5%	70.5%	71.5%	48.2%	67.5%	-	71.2%
Demographic data							
Median of Median Age	37	41	39	37	26	-	40
% Minority	59.4%	27.7%	44.3%	24.2%	39.8%	-	35.1%
% Hispanic	5.1%	3.3%	6.6%	4.5%	3.3%	-	4.3%
% With Disability	18.6%	12.6%	14.7%	10.3%	7.8%	-	13.6%

Note.[a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey

Table 6. Table with Access Index and Socio-Demographic Variables for Visual Arts Organisations

Variable	Access Index Score - Visual Arts Organisations						Total
	1	2	3	4	5	6	Four Counties
Number of tracts	81	503	534	116	20	4	1,258
Population	254,843	1,847,112	1,657,532	391,756	55,788	10,222	4,217,253
Employment and income							
% in Labor Force[a]	58.5%	64.2%	61.2%	64.9%	52.1%	62.5%	62.6%
Unemployment Rate[a]	14.5%	9.4%	12.2%	8.2%	13.6%	7.8%	10.7%
Mean Household Income	53,226	79,188	67,001	85,062	57,644	114,180	73,045
Social and economic status							
% in Poverty	24.1%	12.9%	21.7%	13.8%	37.7%	7.1%	17.3%
% of Households with SNAP/Food Stamps	26.3%	13.9%	21.1%	12.1%	23.3%	5.0%	17.5%
% of Households with Social Security	35.2%	31.2%	31.4%	29.4%	22.9%	30.8%	31.3%
% Less than Bachelor's Degree[b]	79.3%	70.0%	73.2%	62.7%	73.7%	59.9%	71.2%
Demographic data							
Median of Median Age	39	40	39	40	33	43	40
% Minority	55.0%	29.0%	41.2%	24.6%	42.2%	15.4%	35.1%
% Hispanic	2.1%	3.0%	5.9%	4.9%	3.6%	4.3%	4.3%
% With Disability	18.8%	12.7%	14.4%	11.9%	12.1%	10.4%	13.6%

Note. [a] Persons 16 years or older; [b] Persons 18 years or older
Source: U.S. Census Bureau, 2011-2015 American Community Survey