

The Potential of Social Network Analysis for Research on the Cultural Sector

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The Potential of Social Network Analysis for Research on the Cultural Sector

Introduction

In this paper we lay out the promise and advantages of using social network analysis in the study of cultural arts organizations. We have two goals. First, we want to broaden use of social network analysis by applying it to cultural arts organizations, an area that has seldom been studied with network analysis (Prell and Skvoretz 2008). Second, we want to increase our knowledge of the impact of cultural arts organizations on their communities.

As part of showing the potential of social network analysis in the study of cultural arts organizations we discuss three social network analyses we have undertaken: Ashé Cultural Arts Center (Ashé) in New Orleans; Movimiento de Arte y Cultura Latino (MACLA) in San Jose; and the Massachusetts Museum of Contemporary Art (MASS MoCA) in North Adams, Massachusetts. The social networks we describe range from very simple to quite detailed. Each analysis was crafted to answer questions specific to that organization, its setting, and its challenges. The analyses share the goal of increasing our understanding of the impact of cultural arts organizations on their local communities.

What is network analysis?

Every individual (and every organization) has links to others. Individuals are linked to some people by virtue of kinship. Individuals are linked to other people through their place of work. There may or may not be overlap between these two networks. Other common places where individuals are linked to one another are schools, places of religious worship, and places where individuals volunteer. While we all belong to social networks, the analysis of these networks requires the researcher to articulate which of the many potential networks is being studied and then to collect appropriate data on the network. Social scientists can formalize social networks, collect data on them, map them, and use the characteristics of social networks in further analyses.

All networks have in common the fact that they are made up of a set of nodes (dots) and links (lines) that connect the nodes. In order to successfully complete a network analysis the researcher needs to know, ideally at the outset, who the actors are being studied – whether individuals or organizations – and what the actions or relationships are that connect the actors to one another. That is, the researcher needs to know what the nodes and lines will represent in the network analysis.

Network analysis is one of a set of tools available to study and articulate social structure and the relationships among actors – whether these actors are individuals, groups, or countries. We choose a particular research tool, like social network analysis, because we think it will further our understanding of the social world. Network analysis has been used in the social sciences to study many questions, including the impact of kinship relations on individuals (Kana'iaupuni et al. 2005) and societies (Padgett and Ansell 1993); the political influence of academics (Griffiths 2010); the role of social networks in the transmission of job information (Calvo-Armengol and Jackson 2007; Reingold 1999; van der Klaauw and van Ours 2003); and the increasing importance of networks for criminal and terrorist activities (Arquilla and Ronfeldt 2001).

As with other social science research tools, there is a basic template for network analysis, and there exists specialized computer software programs for calculating network statistics and visualizing networks. The same way that a regression analysis can be run successfully in a variety of programs, a network analysis can be completed using one of a range of software programs. We use UCINET (Borgatti et al. 1999), Pajek (Batagelj and Mrvar 1996) and NetMiner (Cyram 2005) for our analyses. There are useful guides for using the software (De Nooy, Mrvar and Batagelj 2005); for technical aspects of networks (Wasserman and Faust 2006); and for general introductions to social networks (Degenne and Forse 2004; Scott 2009). Once the network programs have determined the linkages among individuals or groups, it is possible to calculate a broad array of statistics describing the network. We use ArcMap (Esri 2006) to map the network geographically.

In what follows we present social networks for Ashé Cultural Arts Center, MACLA, and MASS MoCA. Each network was created with the purpose of addressing a question or issue specific to that organization. Ashé wished to document its role as a space provider that brought groups and individuals together after Hurricane Katrina. MACLA wanted to document their leadership and collaboration in community initiatives extending beyond Latino issues and arts activities. MASS MoCA wanted a community social network to understand and document, among other things, linkages between its town of North Adams and neighboring Williamstown. One of the strengths of network analysis is that it is flexible in terms of the kinds of questions that can be addressed, and the analysis can be responsive to the context within which the organization operates.

Case Study 1: Ashé Cultural Arts Center

In 2003 Ashé Cultural Arts Center was a small program, located in central city New Orleans. Its goal was to bring social and economic development to the Oretha C Haley Boulevard corridor in central city New Orleans through theater, art exhibits, workshops, and community meetings. Ashé has always emphasized the importance of space, and its ability to offer space for multiple purposes within the neighborhood, as reflected in the following statement in a 2003 funding request:

Ashé Cultural Arts Center “serves as the facilitating force in a space where diverse circles can connect, expand and open up to each other. Ashé is where the creative and environmental influence of a place creates possibility and opportunity for personal, community and social change.” (Ashé Cultural Arts Center 2003:2).

Figure 1 is a photograph of the building in which Ashé is located today. It owns its space as a commercial condominium unit, and shares the building with two other commercial units and 30 residential condominium units.

When Hurricane Katrina hit in August 2005, the future became uncertain for New Orleans, its arts organizations, and Ashé. By the time of Katrina, Ashé was experienced as a community facilitator and accepted as a community space, but it also relied heavily on Foundation grants, the need (and hence competition) for which skyrocketed as a result of Katrina. In October 2006, for instance, the Getty Foundation awarded a grant to Ashé and six other New Orleans arts organizations to investigate information- and cost-sharing initiatives “to help them cope with the city’s much-changed cultural landscape in the aftermath of Hurricane Katrina” (Kennedy 2006).

Figure 1
Ashé Cultural Arts Center, New Orleans



Photo: Ashé Cultural Arts Center. Source:
http://www.gchp.net/projects/gchp_presentation.pdf

In its announcement of the awards, the Getty Foundation acknowledged that some cultural arts organizations would not remain viable in the New Orleans' post-Katrina environment. Ashé not only survived, but it grew significantly during the period 2005 to 2008. One piece of its survival was the fact that it continued to evolve as a space that brought together community, political, and religious leaders to discuss both immediate post-Katrina needs and the future of New Orleans.

The upheaval caused by Hurricane Katrina made it impossible for Ashé to dedicate resources to any form of data collection. By 2009, however, it was possible to obtain some limited data. One dataset was a spreadsheet of groups that had reserved meeting space at Ashé during 2008.¹ We limited our attention to outside groups (events that were not part of Ashé's programming). We did not include the family celebrations held at Ashé during the year, such as funerals, weddings, or birthday parties. We also excluded groups without specific geographic locations, such as bands with a web site for contact, but no band address.

We were left with 38 distinct groups that requested meeting space at Ashé during 2008. The nature of the data is such that each of the 38 groups is connected to Ashé by virtue of their use of

¹ In researching the events, it was evident that some events were cosponsored by several or even numerous groups. Groups that cosponsor an event are, in reality, linking to each other as well as to Ashé in a social network. Information on co-sponsorship was not consistently available, however, and it was not possible to create this type of more complex network map. The data we had consisted of the name of the primary organization associated with an event.

the space, but they are not connected to each other in the dataset. As such, the data are limited in terms of the type of analysis that can be done. We focus on the original question of space. The map presented in *Figure 2* shows Ashé's foundation in its neighborhood and its role as a space for groups with an interest in New Orleans.

Figure 2
Local Organizations Requesting to Use Ashé's Meeting Space, 2008

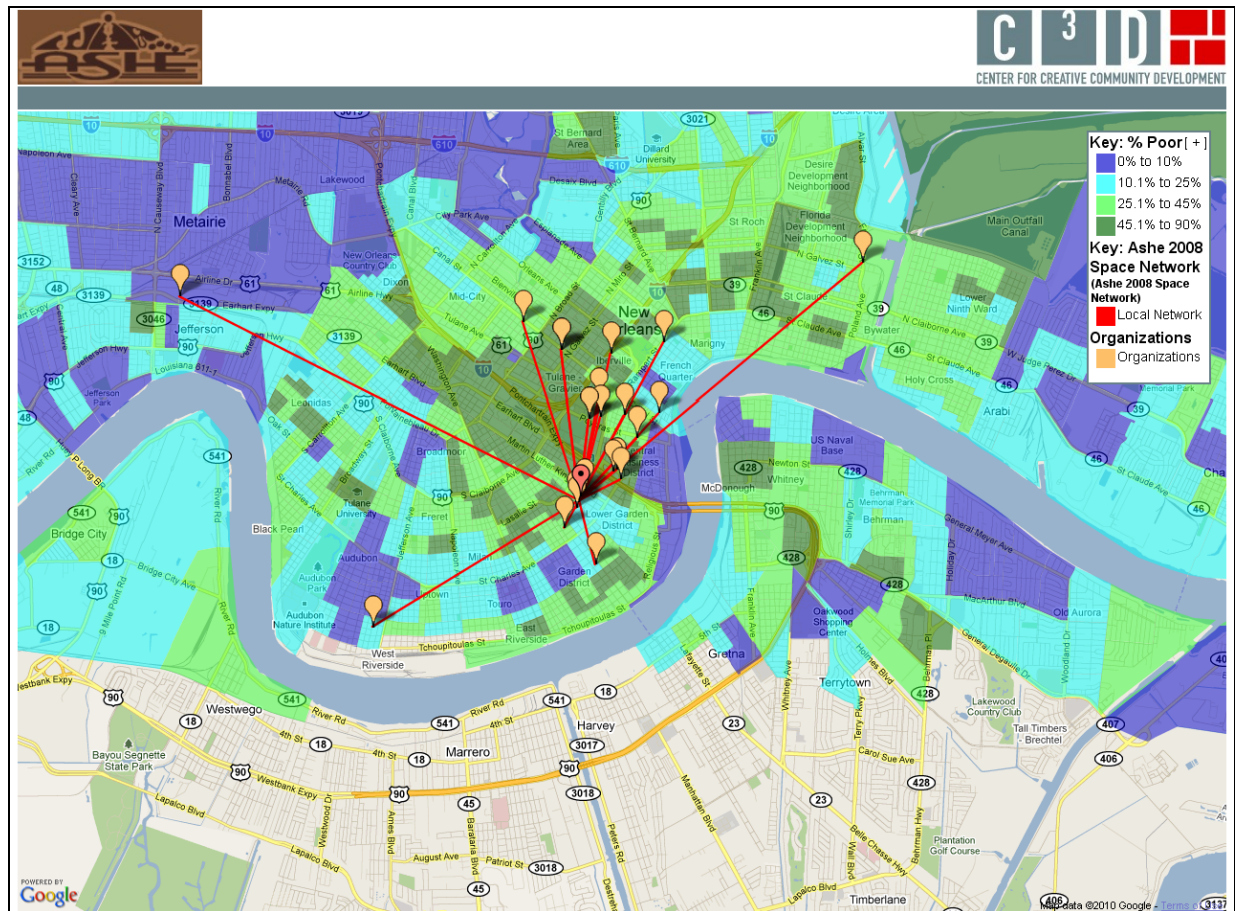


Figure 2 is a geographic presentation of Ashé's network of local organizations that requested to use its space in 2008. *Figure 2* presents Ashé's local network placed over a Census block map of the neighborhood showing poverty levels. Groups requesting to use Ashé's space in 2008 are located in neighborhoods of all wealth levels. Ashé is situated on Oretha C Haley Boulevard and is marked on the map with the dark orange bubble. The dark purple areas are the wealthiest neighborhoods, with fewer than 10% of residents living in poverty. One such neighborhood is Metairie, to the northwest of Ashé. The teal-colored neighborhood to the east of Ashé has poverty rates of 10 to 25%, while the lime-green area to the west of Ashé has poverty rates of 25 to 45%. As you proceed north on Oretha C Haley Boulevard, toward the Central Business District and the Superdome, poverty rates range between 45 and 90%.

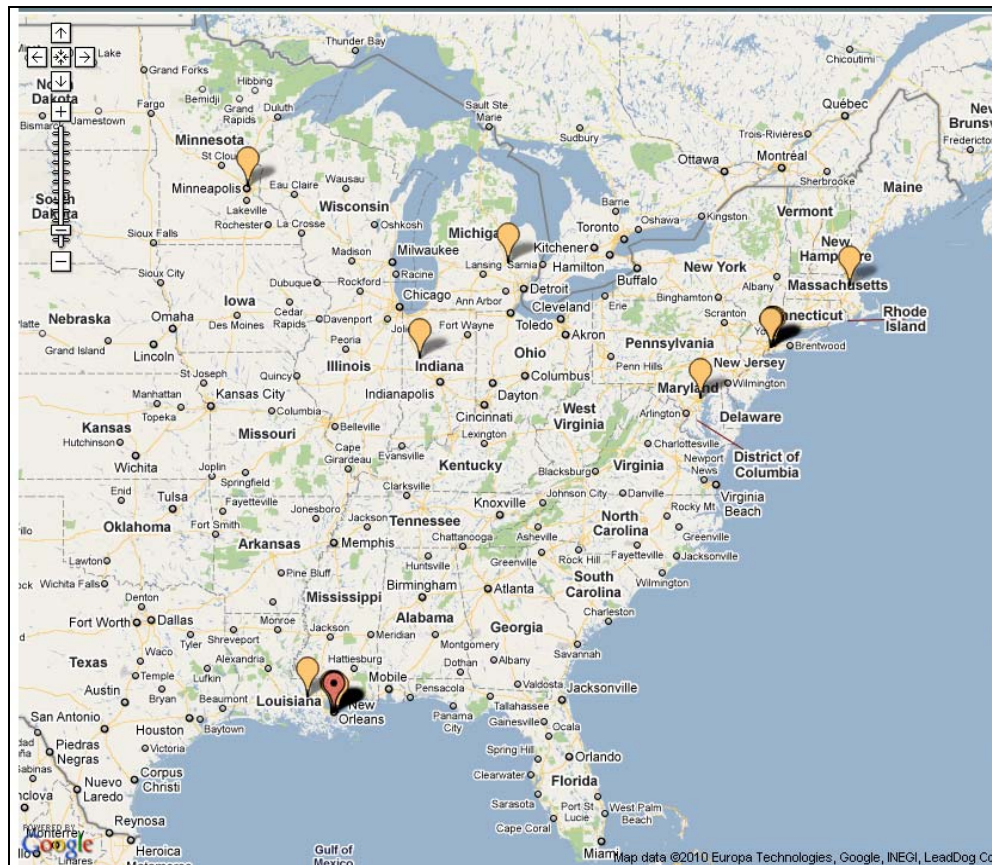
Local organizations' requests for use of Ashé's space typically fell into one of two categories – students/youth; and human rights/displaced persons. One example of a local organization

requesting to use space is Advocates for Environmental Human Rights. In January 2008 Advocates for Environmental Human Rights, which is located northeast of Ashé near Lafayette Square, held a workshop at Ashé titled, “A framework for durable solutions: Human rights, displacement & disaster recovery.” This workshop, facilitated by a local organization, brought together residents of the community with United Nations representative Walter Kalin to discuss issues and options of pressing importance to the community – internally displaced persons.

In addition to local organizations’ requests to utilize Ashé’s space, national organizations also requested use of space. These requests typically fell into one of three categories : to hold a press conference or an opening or closing meeting of a much larger conference; as a private meeting space for Foundations assessing needs in the area; or to hold a small workshop or conference of relevance to the region. National requests for meeting space at Ashé, presented in *Figure 3*, add an important piece to our understanding of the role of Ashé in both the local and the national discussion of rebuilding New Orleans.

Figure 3 is a map of organizations’ requesting use of Ashé’s space in 2008, zoomed out to include requests from outside Louisiana. These requests all came from organizations located on the East coast and in the Midwest.

Figure 3
National Requests to Use Ashé’s Space, 2008



One example of a request by a group from outside Louisiana to use Ashé's space is the request from the Japan Society to reserve space in April 2008. Although many cities, including New Orleans, have chapters of the Japan Society, this request was from the national organization in New York City. The Japan Society held an international-level public forum as part of its exchange program, "Learning from Disaster: Miyakejima and New Orleans." Eight Japanese responders to the 2000 eruption of the Miyakejima volcano and eight American responders to Hurricane Katrina in 2005 were brought together to share their experiences and to contribute to improving response to future disasters.² A photo from the forum is presented in *Figure 4*. In addition to participants in New Orleans, individuals off-site also participated via a link at Meiji University in Tokyo, making it an international forum at several levels.

Figure 4
Learning from Disaster Forum, New Orleans



Japan Society forum, site visit, April 2008. Source: http://www.japansociety.org/event_detail?eid=2f9dd3bc

After the destruction wrought by Hurricane Katrina, New Orleans was in a vulnerable position, as were many of its core institutions, from hospitals to schools to cultural arts organizations. There was a serious concern that local people and local organizations could be shut out of the conversation on the current needs and future directions of the city.

Ashé responded to one immediate need by providing public space in which these discussions could take place. At the same time, it faced the same challenges as the city as a whole. The circumstances that made documentation all the more important for making their case to outside funding agencies were the same circumstances that made data collection impossible. They simply didn't have the resources. Our example has shown how network analysis can be used to organize and present the simplest data to document the groups using Ashé's space and the type of public discussions taking place in New Orleans as it sought to define its future.

² A brief overview of the program can be found at http://www.japansociety.org/event_detail?eid=2f9dd3bc, last retrieved on 9/29/2010.

Case Study 2: MACLA

Movimiento de Arte y Cultura Latino Americana (MACLA), founded in 1989, is a contemporary arts space in San Jose. MACLA is located at the intersection of S 1st Street and E William Street, just a few blocks southwest of San Jose State University and not far from downtown. While the entire area is relatively compact, the area to the east of MACLA, along E William and E Reed Streets has its own unique character compared to nearby residential areas. As MACLA states, the ten blocks that make up the William/Reed corridor consist of a mixed-use “conglomerate of apartments, mom-and-pop businesses, and empty lots” (MACLA 2003:2). *Figure 5* is a photograph of the building in which MACLA is located.

Figure 5
MACLA, San Jose



Like many cultural arts organizations, MACLA was engaged in a variety of community initiatives. It was concerned, however, about the lack of community coherence in the William/Reed corridor and the need for shared community dialogue about issues of local importance to the corridor. Internally, the small businesses and individuals who inhabited the ten-block area saw it simply as their location, not their neighborhood. Externally, city officials saw it as part of nearby South University, which was a well-defined neighborhood. Most of San Jose did not seem to see it at all.

Along with continuing its involvement in ongoing initiatives, MACLA wanted to develop new initiatives aimed at developing a sense of shared identity to the William/Reed corridor, resulting in improved economic cooperation and improved local articulation of concerns and problem-solving capacities. In order to develop the resources for a William/Reed corridor business district, it was necessary to broaden the perception of MACLA as an interest-based organization with interests only in the Latino and cultural arts arenas.

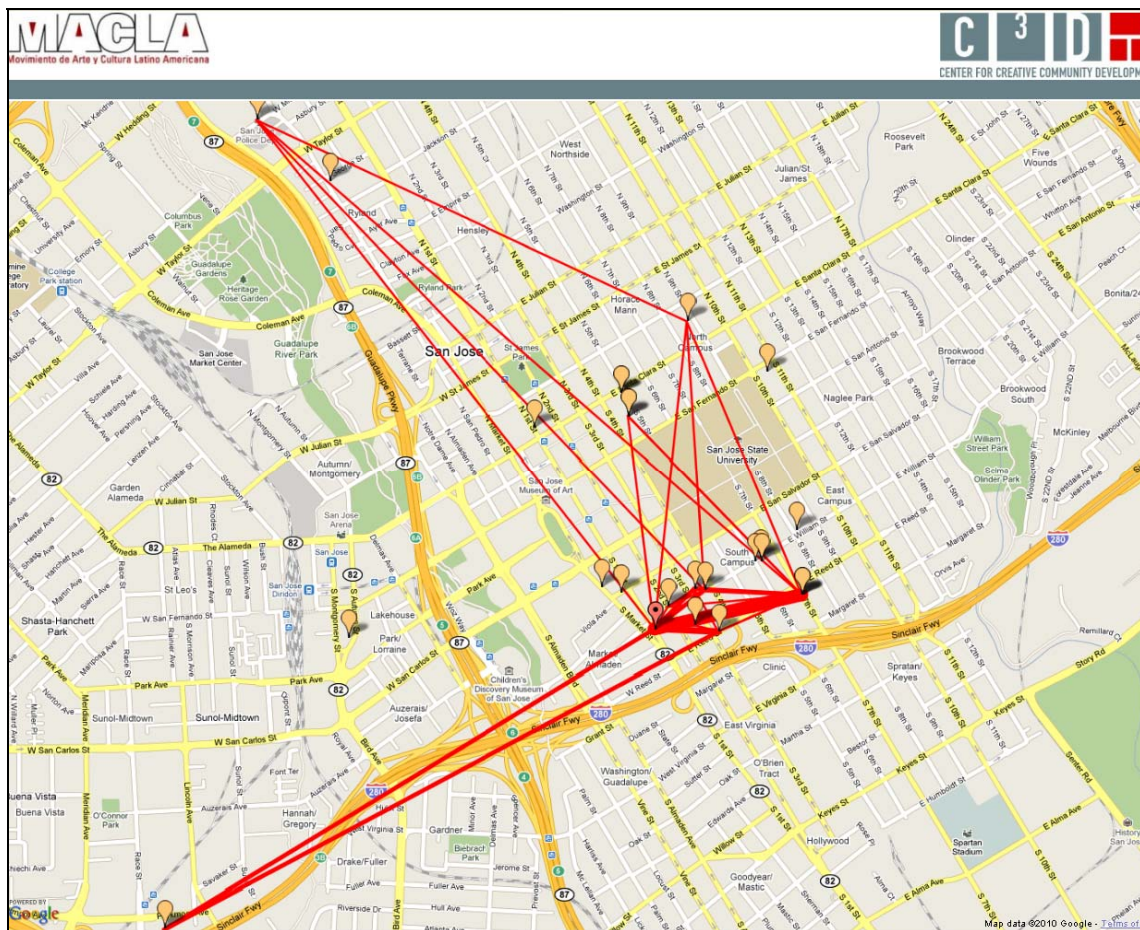
MACLA faced several practical issues in developing its William/Reed corridor initiatives. One issue involved case-making both along the corridor and to city government that the corridor was a distinct socioeconomic area, and that both the area and the city would benefit from developing

it as such. The other issue centered on whether MACLA had the capacity to initiate the types of programs that would provide an inclusive identity to the William/Reed corridor.

As part of creating a social network map for MACLA, we were provided a list of community events and initiatives in which MACLA participated in 2007. The data included where the event occurred; the organization that initiated the event; the purpose or goal of the event; and a list of all the community organizations that participated in the event. After looking at the data and talking with MACLA we coded each event as belonging to one of three possible types of initiatives: community engagement; economic development; and neighborhood identification.

Community engagement initiatives included those that brought people together to work toward a common good. Sometimes the event had a very concrete outcome such as neighborhood beautification. Sometimes the outcome was less visible, such as the community talks that brought residents together to discuss local concerns while also building capacity to visualize solutions locally rather than rely solely on city government or other outside entities. *Figure 6* shows the network for those events that were coded as part of community engagement initiatives.

Figure 6
MACLA Community Engagement Network



The community engagement network presented in *Figure 6* shows that while there is significant involvement with organizations close to MACLA, there is also a geographic spread of organizations with which MACLA participated in community engagement events.

In terms of the network map itself, thicker lines mean a greater number of links between two organizations. If an organization participated in one initiative with MACLA during the period the line will be relatively thin. If the organization participated in four initiatives with MACLA the line will be thicker. It is also the case that in MACLA's community engagement network some of the lines make triangles. An advantage of having data on all participants in an event is that we can map the links among participants in addition to their links to MACLA. If MACLA participates at an event with the Police Department and the San Jose Downtown Association, these three organizations will be linked in a triangle-shaped figure. The Police Department and the San Jose Downtown Association are linked to each other as well as to MACLA by virtue of participating in the event.

There are statistical measures that can be used to calculate characteristics of networks. One such measure is the density of a network. Density is the proportion of all possible links among organizations in the network that *can* exist that actually *do* exist. The density of MACLA's community engagement network is 0.462. If every organization in the community engagement network was connected to each other, the density of the network would equal 1. The density score of 0.462 means that 46% of the possible links in the network exist.

It may be easier to understand the concept of density in MACLA's community engagement network if we look at the network without the geographical component. *Figure 7* is the non-geographic map of MACLA's community engagement network.

Figure 7
Non-geographic Map of MACLA's Community Engagement Network

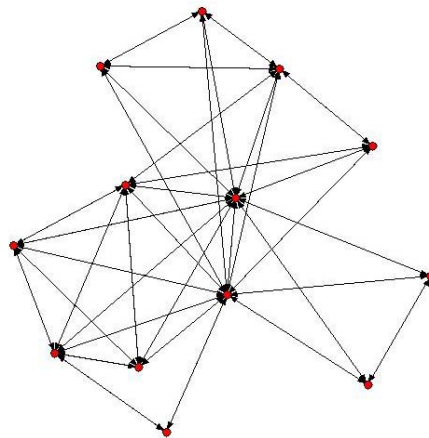


Figure 7 shows that the community engagement network is well interconnected. Three clusters of organizations – to the left, above, and to the right – are highly linked among themselves and to MACLA in the center.

Economic development initiatives were oriented to bringing businesses together for the common goal of strengthening the economic health of the William/Reed corridor. The initiatives included street banners for the corridor that would hang from street lamps and provide a coherent identity to the corridor. Another economic development initiative was the creation of a William/Reed corridor business directory that would provide visibility to the businesses located along the corridor. *Figure 8* presents the network created by MACLA's participation in events with the goal of economic development.

Figure 8
MACLA Economic Development Network

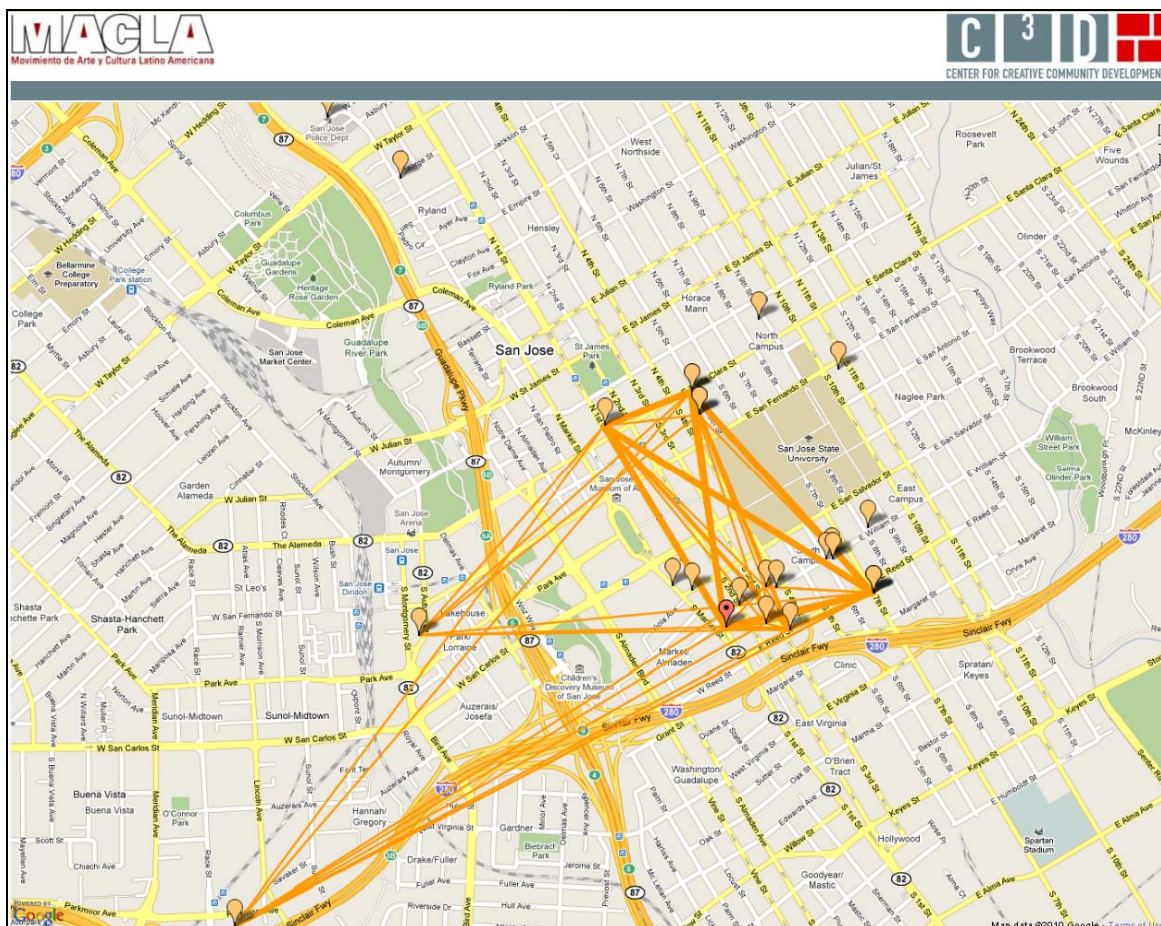


Figure 8 differs from *Figure 6* in several ways. First, the thickest lines are not those directly around MACLA but those somewhat further away, making a parallelogram on the map. A thicker line connecting two organizations means they participated in more initiatives together, and in this sense the link between them is stronger. It is also the case that more of the organizations in the economic development network link to organizations to the west of the William/Reed corridor, with none linking further to the north outside of the core network.

The density of MACLA's economic development network is 0.848. This means that 85% of all possible connections between organizations in the network exist. The geographical presentation

of the network in *Figure 8* makes it difficult to see just how interconnected the organizations are in the economic development network. *Figure 9* is the non-geographic map of MACLA's economic development network.

Figure 9
Non-geographic Map of MACLA's Economic Development Network

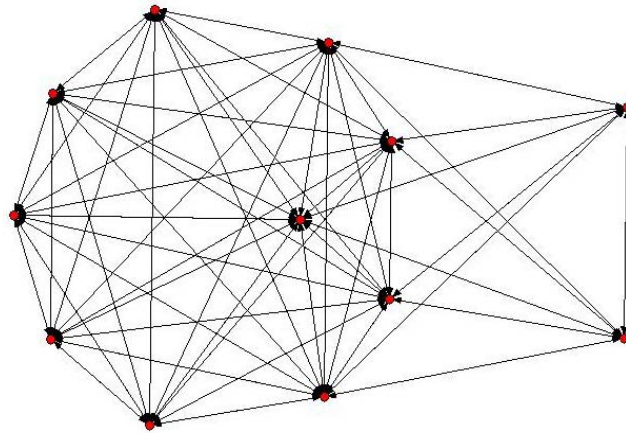


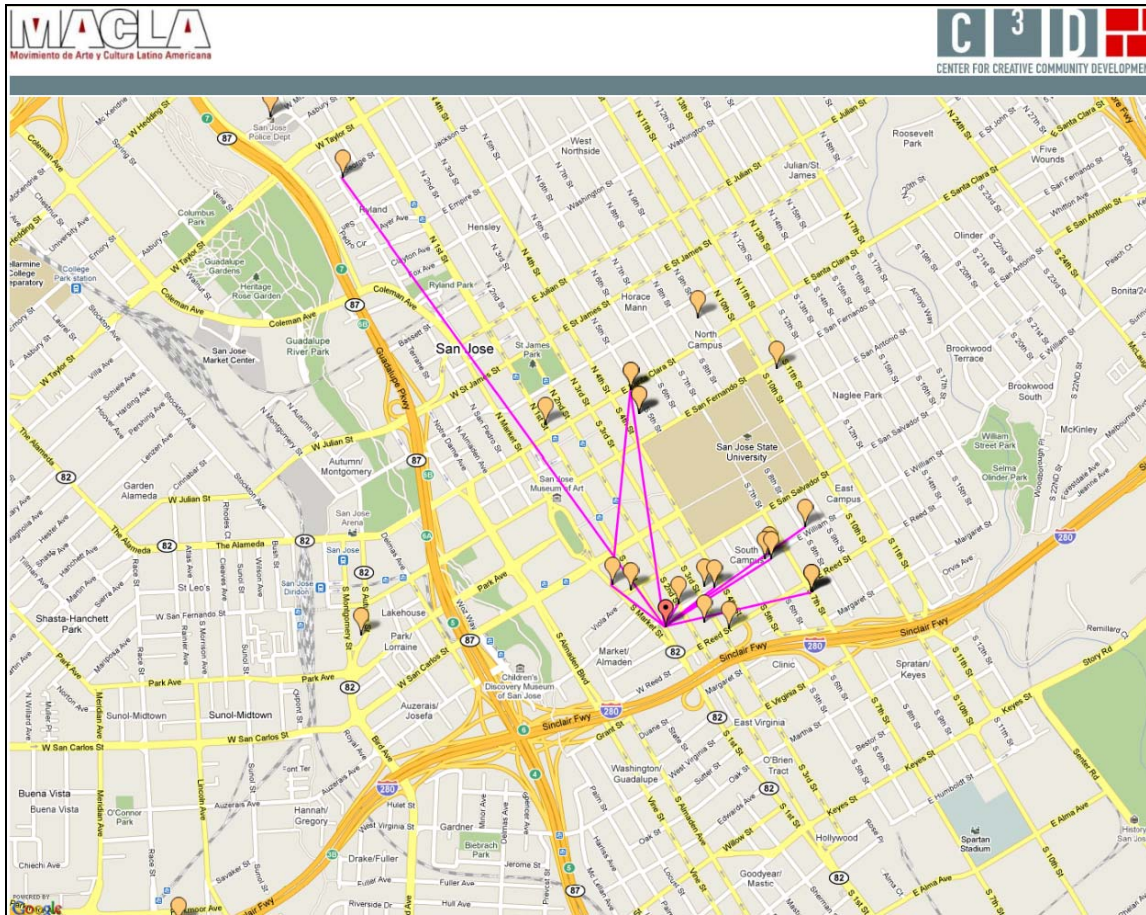
Figure 9 makes it clear just how interconnected the organizations are in MACLA's economic development network. Only the two organizations to the far right in *Figure 9* have fewer links than the others, and even they are connected to each other and 5 other organizations.

The highly interconnected aspect of MACLA's economic development network is not surprising for at least two reasons. One is that one of the initiatives – the creation of a William/Reed corridor business directory – was a central initiative of MACLA during this period. Much of their energy in the community was focused on bringing businesses together to increase visibility of businesses in the corridor. The other reason that *Figure 8* may show significant involvement of organizations outside of the William/Reed corridor is as an indication of an existing economic development network within San Jose.

Neighborhood identification initiatives involved cooperating with small family owned businesses in the corridor on facade repair and improvement. Torn awnings were repaired and broken storefront windows replaced. *Figure 10* presents MACLA's neighborhood identification network.

The neighborhood identification network has quite a different shape than MACLA's other two networks. It looks more like Ashé's network in that, with one exception, each organization is linked to MACLA but not to each other. This general shape is what we call a star network.

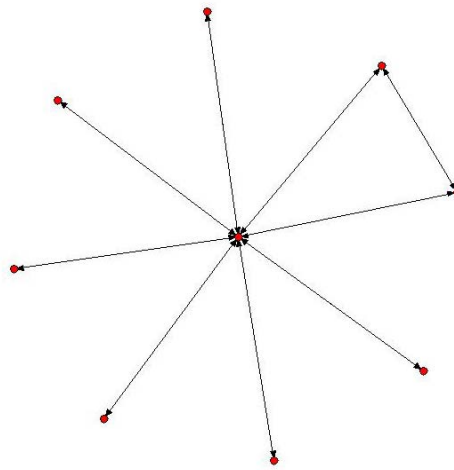
Figure 10
MACLA Neighborhood Identification Network



The neighborhood identification network makes an important point about network analysis. It is not necessarily the case that more is better. In this instance MACLA's neighborhood identification network is simple and loosely connected because it was documented at the start of the initiative. MACLA's goal is to help build cooperation among William/Reed corridor businesses and soften the feeling of isolation or competition. In this first period, that meant MACLA reaching out unilaterally to each of the businesses with offers of help. It is not often that we have the opportunity to map a network at its start. The goal is for this network to develop over time into a more complex network with businesses offering mutual aid on projects.

The density measure for the neighborhood identification network is 0.25. *Figure 11* is the non-geographic map of the neighborhood identification network. The star-like nature of the network is quite clear in *Figure 11*. MACLA is located in the center of the network, and each organization links to it. There was one event that involved two other organizations that can be seen in the triangle part of the network.

Figure 11
Non-geographic Map of MACLA's Neighborhood Identification Network



We coded the data from MACLA as belonging to one of three sets of initiatives in which they were active in 2007. We have seen interesting differences in the networks MACLA has built with the different initiatives. The economic development initiative reflects the densest network, probably because of existing economic networks in San Jose that could be activated. The neighborhood identification network is the sparsest because it was captured at the very beginning of a new initiative.

It is also possible to study MACLA's total network as a whole. Doing so documents MACLA's partners throughout the community on a variety of initiatives throughout the year. *Figure 12* presents MACLA's total network. The density of MACLA's total network is 0.371. This means that 37% of all possible links between organizations exist. We have placed the network over a Census map of median property value by Census block-group. This allows us to see that not only do the organizations in MACLA's network spread geographically over the city of San Jose, but they are also in different kinds of neighborhoods. From this map we see that while the William/Reed corridor is in an area of low property values, MACLA also has access to organizations in wealthier areas of the city; this means access to additional resources, information, and human capital.

We provide the non-geographic map of MACLA's total network in *Figure 13* for the sake of symmetry with its sub-networks. As we close our example of MACLA's network, however, we would like to focus on the geographic maps and the practical value they had for MACLA. Remember that one of MACLA's serious obstacles in creating the William/Reed corridor was demonstrating it had the capacity to be an inclusive community leader. The network maps presented here demonstrated that they were involved in initiatives on a number of fronts – community, economic and neighborhood; that they had a wide variety of partners; that their partnerships spanned socio-economic boundaries in San Jose; and that their partnerships extended beyond Latino and arts-oriented initiatives.

Figure 12
All MACLA Initiatives

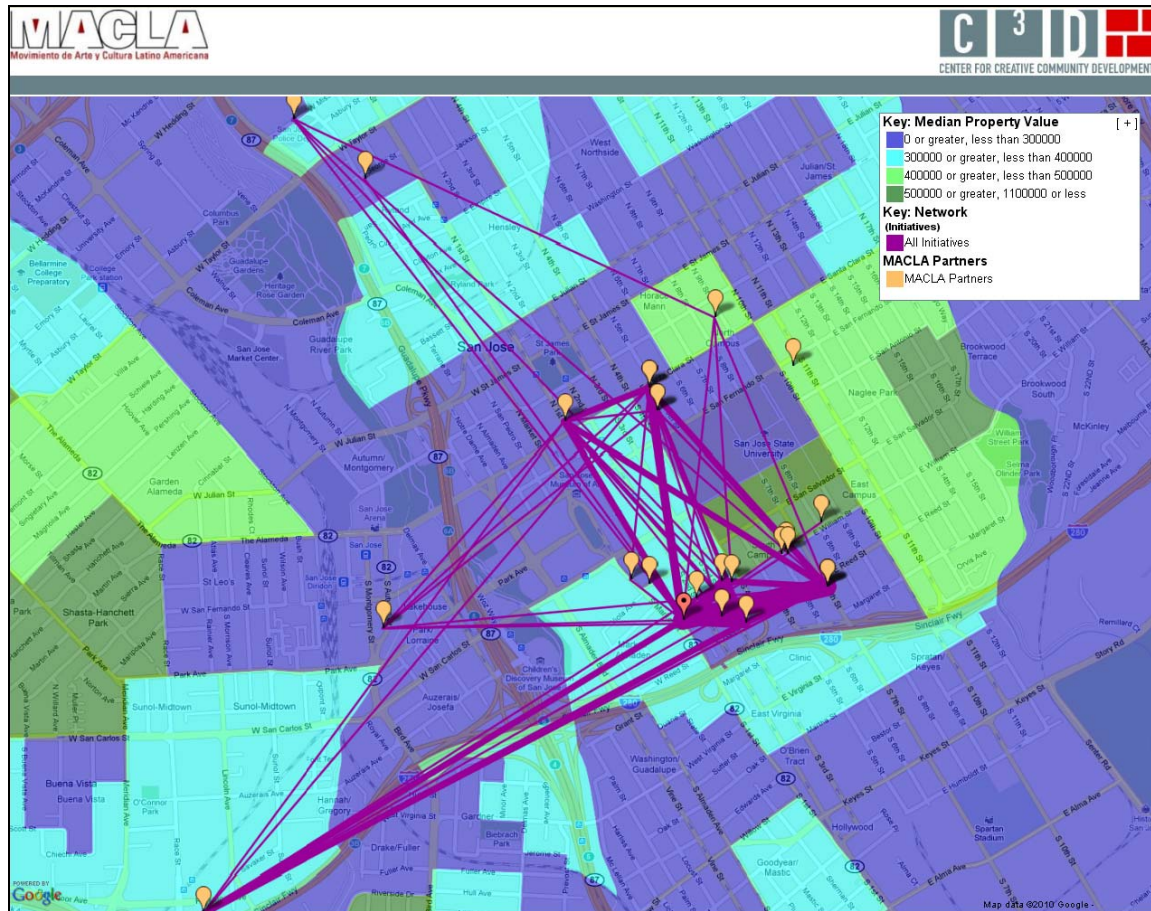
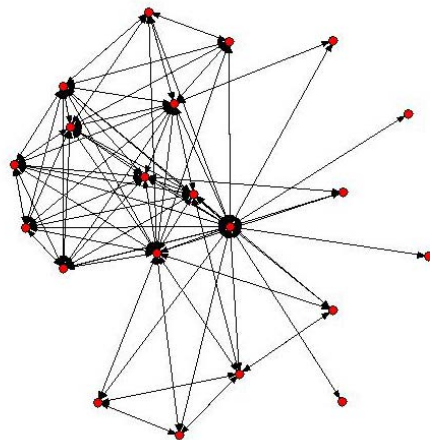


Figure 13 presents the non-geographic map of all of MACLA's initiatives.

Figure 13
Non-geographic Map of All MACLA Initiatives



In the case of MACLA, mapping its social network was useful and had positive consequences. It allowed others in the city to see MACLA in a new light, and opened new opportunities for partnership and leadership in the William/Reed corridor.

Case Study 3: MASS MoCA

In May 1999 the Massachusetts Museum for Contemporary Art (MASS MoCA) opened in North Adams, Massachusetts. Its opening brought to fruition a plan first proposed in 1986, when Sprague Electric closed its gates, ending two centuries of manufacturing on the site, first as cloth mills and then electronics manufacturing.

The mission of MASS MoCA was to become a contemporary museum of national and international repute. Local and state officials hoped, in addition, that it would serve as an economic and social engine for North Adams, a city in northwestern Massachusetts that fell on hard times with the exit of manufacturing from the region. *Figure 14* is a photo of the building in which MASS MoCA is located.

Figure 14
MASS MoCA, North Adams, Massachusetts



At the time it opened, it was not clear that MASS MoCA would succeed (Zukin 1995). The concept of culture as a potential economic engine was still controversial. By 2006 the museum was well-established, and its economic impact on the region had been documented (Sheppard et al 2006.). There was a question, however, as to whether MASS MoCA had made a social impact on the community, and if so, how that could be demonstrated. We chose here to examine the relationships between North Adams and the neighboring town of Williamstown.

We collected data during 2006 and 2007 for as many organizations in North Adams and neighboring Williamstown for which data were available. We sought out publicly available lists of individuals who volunteered, sat on the board, or were employed at each organization. Much

of the data were gathered from the organization's web site or annual reports. Yellow page ads were used to identify professionals in practice, such as physicians, lawyers, and accountants. Theater playbills frequently acknowledge staff, board members, and volunteers. In order for an individual to be associated with an organization, the link had to be more than financial – more than a donation to the organization. We wanted to capture the ways in which organizations in the community were linked with one another through face to face interactions. In this case we chose to focus on employees, volunteers, and board members.

It is important to note that the North Adams network is methodologically quite different from both the Ashé and MACLA networks discussed above. In the case of Ashé we examined organizations that asked to use Ashé's space. In the case of MACLA we analyzed information on initiatives with which MACLA was involved. In both of these examples the relationships being studied were very much driven by the organization and its goals. In the case of MASS MoCA, however, we collected data on the entire community of North Adams and Williamstown, not just MASS MoCA. Instead of focusing on organizational initiatives, such as MASS MoCA's commitment to bring every school child in the area to MASS MoCA at least once annually, we collected data on decisions of individuals throughout the community as to where to work, volunteer, or sit on boards of directors.

Our analysis of North Adams and Williamstown is based on 64 organizations and 4,369 individuals³ associated with those organizations as employees, volunteers, or board members. Each organization in the data set was coded based on the general sector of the economy to which it belonged.

One advantage of collecting data for the entire community is that it is possible to pull out the primary network⁴ of any single organization in the community for study and comparison with the larger network. *Figure 15* shows the total network map for the communities of North Adams and Williamstown. *Figure 16* provides the primary network map for MASS MoCA. The primary network map shows every relationship that involves MASS MoCA in terms of an individual being employed, volunteering, or sitting on the board of MASS MoCA and any other organization in the community. In this way, MASS MoCA's primary network is unique to it, as would any other organization's primary network be.

Figure 15 presents the community network map. North Adams is the town to the east and Williamstown is to the west. The network is mapped over Census data showing the percent poor by block-group. It is unfortunate that we do not have network data for the community from the late 1980s or early 1990s for comparison. It is impossible to overstate the invisible barrier that developed between North Adams and Williamstown after sources of employment disappeared in North Adams with the closing of Sprague Electric, the closing of General Electric's large-power transformer plant, and the disappearance of the remnants of the textile industry (Oehler, Sheppard and Benjamin 2006).

³ The 2000 Census identifies 11,399 individuals age 18 and older in North Adams and 7,131 individuals age 18 and older in Williamstown, for a total of 18,530. The 4,369 individuals in our dataset correspond to approximately 25% of the adult population of the towns.

⁴ We use the term primary network to refer to the network built around a focal organization. The technical term in the network literature is ego-centered network or personal net (Wasserman and Faust, 2006:42).

The unemployment rate in North Adams ran from 25 to 30%, the highest in Massachusetts. High school dropout rates in North Adams were more than five times the state average (Oehler, Sheppard and Benjamin 2006; Boston Globe 1992). The New York Times reported that a developer suggested that the best use for North Adams was to flood it for waterfront property for Williamstown (Kifner 2000). Even assuming this was a rhetorical comment, it captures the despondent state of affairs in North Adams and the large socio-economic gap that had developed between North Adams and Williamstown. A New York Times travel article on traversing Route 2 (the Mohawk Trail) from Boston to the west advised that the traveler turn around before reaching “the post-industrial decay that litters North Adams” (Oehler, Sheppard and Benjamin 2006; Graff 1995).

Figure 15
Total Community Network: North Adams and Williamstown

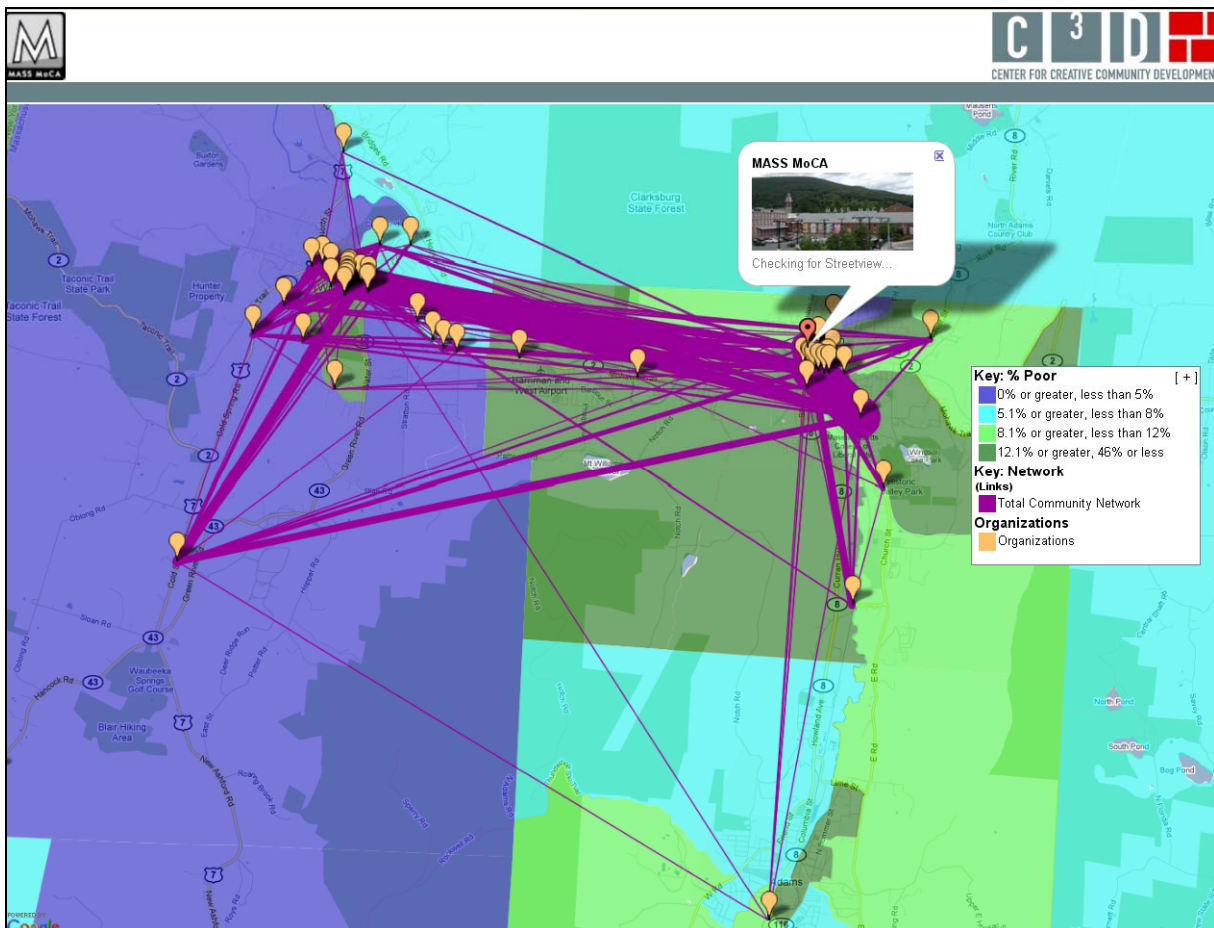
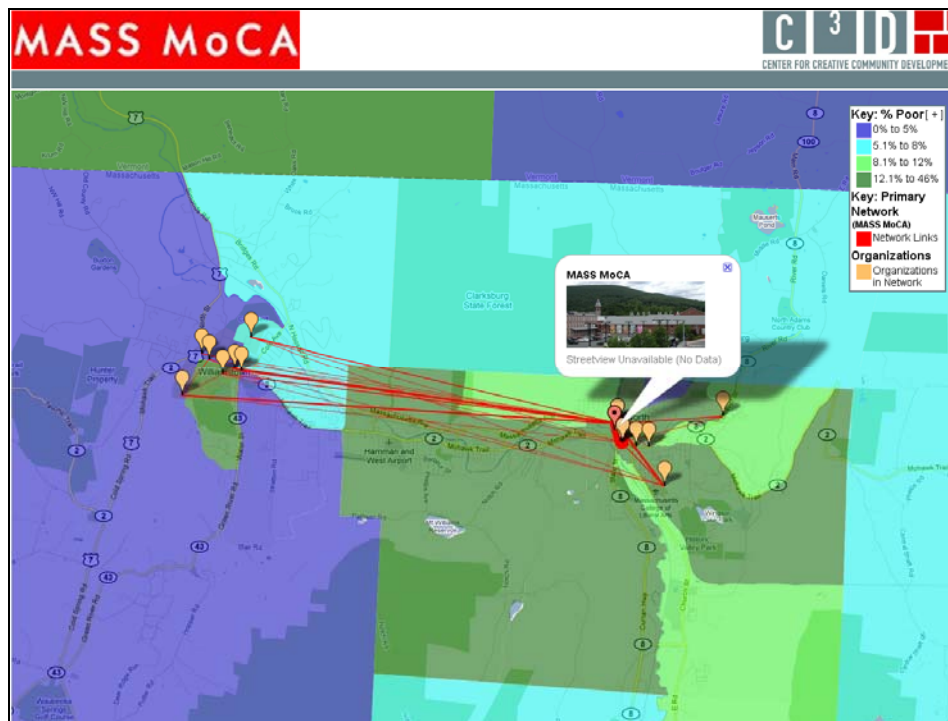


Figure 16
MASS MoCA's Primary Network



Poverty in North Adams historically has been higher than poverty in Williamstown, and remains so today. The community network map in *Figure 15* is striking in the extent to which linkages currently exist between the two towns. Each connecting line on the map represents a link between organizations made by an individual who is employed, volunteers, or is on the board of the two connected organizations. If an individual works at the bank and sits on the board of the Community Chest, then those two organizations are connected by a line representing that individual's participation. The thickness of the line represents the number of individuals linking the two organizations.

Figure 16 presents MASS MoCA's primary network. MASS MoCA's primary network includes fewer organizations than the community network, as would be expected since it is a subset of the community network. Yet what is striking is the extent to which it looks like a subset of the community network – MASS MoCA has linking ties to Williamstown as well as in its local community of North Adams.

While the maps can be visually striking, a question arises as to whether it is possible to demonstrate the linkages between North Adams and Williamstown in a more formal way. It would also be of interest to be able to more precisely compare the relationship of the two towns in the MASS MoCA primary network with the relationship of the two towns in the community network.

It is possible to address these questions by taking a simple network measurement – density – and following its extension in the literature to the more nuanced E-I Index. In order to do so, we must

spend a moment discussing density. One benefit of having network data for the entire community is that it allows for greater use of the statistical measures developed specifically for the study of networks.⁵ One such measure is density. Density is the percentage of all possible links in a network that actually exist. By all possible links we mean the number of links that would exist if every organization was linked to every other organization in the network. The density of the North Adams/Williamstown community network is 0.125. This means 12.5% of all possible links that *could* exist among the 64 organizations actually *do* exist.

There is no magic number for density that would allow us to say a network is effective or not (Burt 1995). Individuals and organizations face limited time and resources. They make decisions about how to allocate their time and resources based on an estimation of the mix of activities that will best match their interests and goals. Rather than attempting to link with all the other groups in the community, an individual or organization may decide to link to one or two organizations within each *type* of organization – education, culture, and business groups, for example.

MASS MoCA's primary network consists of 18 organizations – MASS MoCA and 17 organizations linked to it. Small networks tend to have higher density than large networks, so it is expected that the density of MASS MoCA's primary network will be higher than the density of the community network (Cross and Parker 2004:159). It is easier for eighteen organizations to be fully connected than sixty-four. It is also the case that the very nature of a primary network is such that every organization in it is linked to MASS MoCA – that is how we define a primary network. This structure would tend to increase the density calculation for the primary network (Scott 2009:73).

To correct for the fact that all organizations in the primary network connect to MASS MoCA by definition, we disregard the links to MASS MoCA in calculating the density of its primary network. We use only on the links among the other 17 organizations in the primary network. Calculating the density of MASS MoCA's primary network in this manner we find that it is 0.522. This means that over half of all possible connections between organizations that could exist actually do exist. This is higher than we expected and four times higher than the density of the larger community network. MASS MoCA's primary network is a highly interconnected one.

We can learn something about a network by its density measure, but it is difficult to draw conclusions with confidence using density alone. A suggestion to make density a more useful measure “is to divide people into subgroups – by, for example, function or location – and calculate network density figures within and between subgroups” (Cross and Parker 2004:159). These within and between subgroup measures of density are calculated using the E-I Index, where E is the number of external links, or links between organizations in different categories, and I is the number of internal links, or links between organizations in the same category. The index is calculated as $(E-I)/(E+I)$ and ranges from -1 when all links are internal to 1 when all links are external (Krackhardt and Stern 1988).

⁵ One network measure is centrality, which calculates how central each organization is in the network. See Oehler, Sheppard, Benjamin and Dworkin 2007 for an earlier analysis of the North Adams community network that includes measures of centrality.

We can use the E-I Index to measure the amount of cross-town links in the community network shown in *Figure 15* and MASS MoCA's primary network shown in *Figure 16*. We coded the organizations in each of these two networks based on their location in either North Adams or Williamstown.⁶ We then calculated whether organizations in North Adams linked predominantly to other organizations in North Adams, and whether organizations in Williamstown linked predominantly to organizations in Williamstown.

The E-I Index measures the extent of contact between the two towns and whether the pattern of linkages differs for the community network and MASS MoCA's primary network. *Table 1* provides the results of the E-I Index, first calculated from MASS MoCA's primary network and then calculated from the community network.

Table 1
Tendency of Groups to Link Outside of their Town

Town	# of Groups in MASS MoCA's Primary Network	E-I Index Primary Network	# of Groups in Community Network	E-I Index Community Network
North Adams	11	-0.070	34	0.041
Williamstown	7	0.320	29	0.042

Looking at *Table 1* we see that of the 18 organizations in MASS MoCA's primary network 11 are located in North Adams and 7 are based in Williamstown. The E-I Index for those organizations based in North Adams is -0.070. An index of 0 would mean that North Adams organizations in MASS MoCA's primary network are as likely to link externally to Williamstown as they are to link internally in North Adams. The actual index score of -0.070 is very close to this pattern.

The pattern for organizations in MASS MoCA's primary network that are based in Williamstown is different. These organizations have an index score of 0.320. An index of 1 would mean that Williamstown organizations in the primary network have all of their links in North Adams. The actual index score of 0.320 indicates that Williamstown-based organizations in MASS MoCA's primary network link to both North Adams and Williamstown, with more of their links going to North Adams.

Looking at the right-hand side of *Table 1*, we see that of the 64 groups in the community network, 34 are located in North Adams and 29 are based in Williamstown. Remembering that an E-I Index of 0.00 indicates the same number of external links as internal links, we see that groups located in North Adams have just slightly more links to Williamstown than they do to groups in North Adams. It is extremely interesting that groups located in Williamstown follow the exact same pattern – they have just slightly more links to North Adams than they do to groups in Williamstown.

⁶ One organization in the dataset is a charter school based in the neighboring town of Adams, serving families of both North Adams and Williamstown. The charter school is not included in this analysis.

How does the E-I Index enhance our interpretation of *Figures 15 and 16*? We now can say with confidence that organizations in North Adams and Williamstown are as likely to link to organizations in the neighboring community as they are to link in their own. The exception is Williamstown-based organizations in MASS MoCA's primary network, which are actually more likely to link to North Adams organizations. The invisible barrier between the two towns that existed in the late 1980s/early 1990s is gone.

Conclusions and Future Directions

The future of network analysis of cultural arts organizations is filled with exciting prospects. Research agendas in the field could include comparative examination of a community network and cultural arts organizations within it; analyzing the impact of micro (individual) and macro (community) networks on individual life outcomes such as happiness; and documenting the evolution of a network during a time of stress. In terms of data available to us, these three prospects could take the following concrete forms:

1. The community network data we have collected for North Adams and Williamstown has great potential for further analysis. We can study the community network further, and we have the ability to study the primary networks of each of the 64 organizations included in the community network. In addition to having coded each organization in terms of the town in which it is located, we have also coded the organizations based on their economic sector, such as culture, education, and business. We can address questions about whether cultural arts organizations link only among themselves, or the extent to which they link to other sectors. We can also explore other distinctions such as whether the organization is nonprofit, for-profit, or governmental. The community network data would allow us to empirically address some of the most frequent misunderstandings about cultural arts organizations, including that they connect only to each other for mutual benefit.
2. We have begun network analysis on another dataset that covers three live-work artist spaces. In the survey that generated this data, artists were asked questions that covered three areas: individuals within the building with whom they were linked; organizations within the city with which they linked; and their satisfaction with their live-work space. Successful analysis of these data would allow us to estimate the impact of an individual's social network and the network of the building as a whole on individual satisfaction. This would be very important for demonstrating that spaces like artist live-work spaces and the connections that are made within them have a real effect on individuals.
3. We have 2007 data on the primary network of a museum in a large urban area. The opportunity exists to repeat the method used to collect 2011 data for the same museum. This would give us two points in time to study changes in the network during an extremely important period – the recent/current recession. We have additional data on the general environment of nonprofits in the city during this period, as well as general economic data for the city. This project would allow us to greatly enhance our understanding of the evolution and devolution of nonprofits during times of economic crisis.

In this paper we provided an overview of social network analysis. We presented three examples, ranging in complexity, of how social network analysis can fruitfully be applied to the study of

cultural arts organizations. As a result of our ongoing work on cultural arts organizations we have reached the following conclusions concerning the use of social network analysis:

1. Social network analysis includes a rich range of statistical tools that can be used to formally document cultural arts organizations' involvement in their community. It is a welcome additional methodology for demonstrating the social impact of cultural arts organizations. It supplements contextual histories of cultural arts organizations, and allows for specific hypotheses to be tested in a scientifically acceptable way.
2. Rich data allow for rich analyses. The more complete the data are, the more questions that can be examined. The more that data collection has been thought out in advance, the more likely the cultural arts organization and the researcher can return to the data time and again to address new questions that arise.
3. At the same time, it is important to stress that even the simplest data can be useful in documenting the goals of the organization and its progress toward those goals. Networks mapped geographically can be important tools for articulating the role of the cultural arts organization in its community.
4. Networks created at the beginning of an initiative can play a vital role in documenting change that occurs in the community as a result of the initiative. Measurement of a network over time can document and articulate the community impact of the initiative. It is unfortunate that the vast majority of evaluation of initiatives occur at the end of their funding cycle, thus missing the opportunity to trace changes in the community over time.

We have presented evidence that social network analysis can increase our knowledge of cultural arts organizations and their impact on their communities. We presented results from three social network analyses we have undertaken: Ashé Cultural Arts Center in New Orleans; MACLA in San Jose; and MASS MoCA in North Adams, Massachusetts. Through discussion of these case studies we have shown the range of data that can be used in network analysis and the way in which formal network measures can be utilized. We focused on geographic presentation of network maps as a particularly useful format.

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