Local arts organizations and structural network analysis - A case study of a North German town

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Abstract

The purpose of this article is the analysis of the multifold significance of a local network of arts organizations, i.e., the clarification of the art networks' strengths and weaknesses (e.g., brokers, structural holes). Social network analysis has become an important pillar of social research, yet to be fully acknowledged in cultural economics. In the past, network analysis has been predominantly used by economics for analyzing corporate networks and strategic alliances. This case study has gone beyond this confined scope by empirically examining a local network of the fine and popular arts, plus cultural policy, cultural administration and other cultural support agencies. Surveying and interpreting specific network indicators (e.g., in- and out-degree, constraints, closeness centrality, betweenness centrality, clustering coefficient) uncover the social and political potentials and limits of this cultural network. The data have been gathered in a two-step manner. First, we conducted in-depth interviews with ten experts and brokers for the arts in a North German city and created ten egocentric networks, applying contents analysis of the transcribed interviews. Second, we constructed one extensive aggregate network out of these ten egocentric networks which then has been again reflected by our local experts. Extensive statistical analysis of the final network yielded knowledge about the structure and the strengths and weaknesses of this local network.

Keywords

Social network analysis, arts organization, open systems, mixed methods, egocentric networks

1 Introduction, literature review, network concepts

The analysis of the organization of arts and culture is an analysis of the ability and intensity to connect people and institutions of the arts, and it is an analysis of the consequences of this ability and intensity. In the broader sense of connectedness connectivity is the amount of and the intensity of relations to other actors in a defined topological space. In the narrow sense of graph theory (Diestel 2010) connectivity is the minimum number of elements (nodes or links) which need to be removed to disconnect remaining nodes from each other. Many recent theoretical and analytical approaches to arts organizations or to the arts field[1] evoke the concept of networks as pivotal for the existence and thriving of these organizations.

The American scholar of organization W. Richard Scott describes the social and cultural dependency of organizations from their surroundings as 'open natural systems', and posits that no organization can survive without adjusting to the rules and regulations of its organizational environment, especially to the uni- or multilateral dependency on resources and their unbalanced distribution, e.g., of money, information, values and norms. Scott (2003) sees a shift in organizational analysis from the past 'organization set model', where the environment is just one ancillary factor that might influence the operations of an organization, to the contemporary 'interorganizational field model' where the center of analytical attention is the structure of relations – the network – of the organizations of a specific environment (ibid., 158).

[1] In German, the plural form "arts organizations" is "Kulturbetriebe", a plural mostly used for business-run arts organizations (cf., e.g., Frey/ Pommerehne 1993). The singular form of "arts field", in German, is "Kulturbetrieb", i.e., the specific conglomerate of interconnected cultural operations, cf. Zembylas 2004.

Scott (ibid., 162) distinguishes these environments as (1) 'interorganizational fields' (i.e., a group of actors that are held together by powerful agents or 'brokers', cf. Aldrich 1979, Warren 1967), (2) 'interorganizational networks' (i.e., groups of actors that have a considerable number of interactions, cf. Benson 1975), (3) industrial systems (i.e., group of actors that 'flow-filter' products and ideas from the creators via the distributors to the consumers, cf. Hirsch 1972), (4) 'societal sectors' (i.e., groups of actors that together exercise the same or similar functions in or for society, cf. Scott und Meyer 1983), and (5) 'organizational fields' (i.e., groups of actors that in a similar manner or lifestyle produce similar ideas, products or services, cf. DiMaggio/Powell 1983). These explanations of organizations are directly related to the application of network analysis.

Network analysis uncovers and distinguishes actors (nodes or vertices) and relations (links or contacts) among these actors.[2] The number and importance of actors and the intensity and direction of relations is measured and put into proportion to the number of possible relations in the system (i.e., density). The number of directed relations is observed, assuming that a one-way relationship also indicates power or powerlessness. A high connectivity of an actor who monopolizes relationships or communications indicates his or her power status as 'broker' or 'cut-point'. The 'centrality' of an actor is based on the number of alternative paths to other actors (i.e., indirect relations that need one or more contacts in between). The 'clustering' of an actor is the small number of direct relations he or she has to other actors that indicate the particularity of a subgroup, and the closeness of an actor is based on the path or geodesic distance to all other actors, where the measure is the number of actors (or nodes) that have to be contacted when communicating with even remote actors of the network. However, I will come back to the intricacies of these measures later.

The literature on networks as a valuable method and theoretical approach for understanding structures and processes of society is voluminous (e.g., Castells 1999, 2007, Burt 1995, Granovetter 1973, 1983, Wellman 1988, Scott 2005, White 1992), some of it also in German (Jansen 1999, Pappi 1987, Weyer 2000). In addition, several powerful software programs calculating structural networks have been compiled; one of them, Pajek, has been used for this analysis (de Nooy/Mrvar/Batagelji 2011). The application of explaining and analyzing real world[3] arts organization networks is not as comprehensive, although there are a few substantial contributions to the understanding of arts organizations by networks (e.g., Albertsen/Diken 2004, Anheier/Gerhards 1991, Gerhards 1997, DiMaggio 1987, Kenyon 1996, Whitt 1987, 1991, Thurn 1983, Friedrichs 1998).

As a starting point for explaining the significance of a local network for the organization of arts and culture in a middle-sized North German town of about 70,000, I will outline the explorations of Friedrichs (1998) who explained the artistic importance of the city of Cologne between the 1950s and the 1970s by looking at the network of the artistically active people and institutions in these years[4]. This past high reputation of Cologne as a hub for the arts and for creative industries depended on the social networks of artists, arts-related institutions (e.g. galleries, the Studio for Electronic Music, the art society etc.), arts-supporting patrons and corporations, and especially a municipal administration that

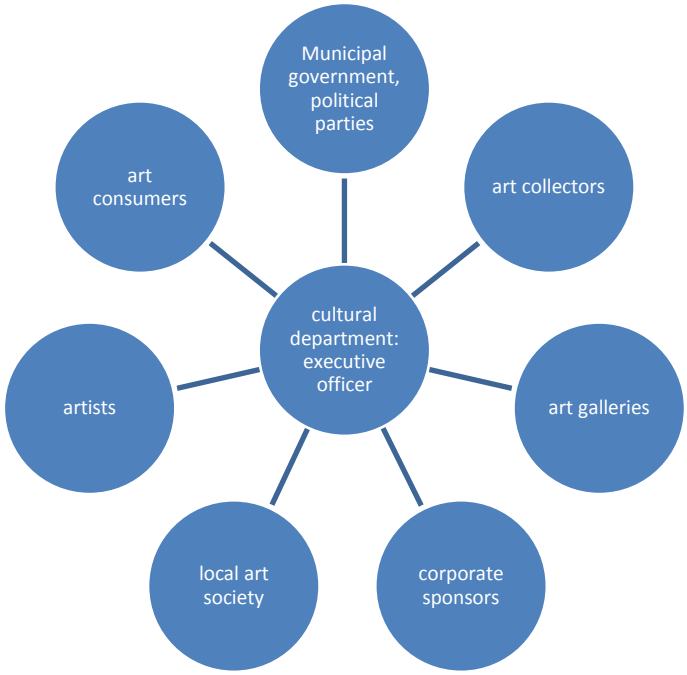
[2] "Not the individual but its relationships to others and its embeddedness? in a structure is interesting." (Jansen 2006: 18, translation from German by author)

[3] Here, I am not writing about so-called 'social networks' or 'social media' such as Facebook, Twitter etc.

[4] In this case it does not matter whether the actors are people or institutions; solely the relations among the actors are important. „Network analysis …is first and foremost – without applying a narrow definition of 'theory' here – a possibility to describe relationships und to closely determine positions and relationships of individual persons and elements in a network." (Friedrichs 1998: 146; translation from German by author).

understood itself as serving the local arts by supporting networks among them. At the beginning, this artistic network was not one intertwined system but a loose cooperation of sub-networks, or 'social circles', as Kadushin (1976) dubbed them in the tradition of Simmel (1908: 305-344). The cooperation or indirect interaction of these social circles was possible because of an overriding interest of all sub-networks in the support of the (local) arts. This superior interest was, however, fragile because it was only based on partial interests of the participating social circles. They participated in the wider network only because of their particular strategic interests. In the example of Cologne, the complete local network of the arts was thus not really visible and did not act as an official entity in the political and social events of these years. The success of the Cologne arts network was based on the effort of only a few mighty persons and institutions that were capable to link the existing sub-networks or social circles. These brokers allowed the creation of a complete local network that could act as one entity, and Friedrichs (1998: 148) pinpointed to the past executive officer of the municipal culture department who adopted this role of a broker.[5] In Cologne of the 1950s to the 1970s, the most influential broker was the executive office of the municipal arts department, Kurt Hackenberg, who, between the years of 1956 to 1979, initiated and maintained a plethora of relationships for the benefit of coordinating and incubating artistic creativity in Cologne. After his retirement in 1979, nobody took over his broker role, with the results that the sub-networks lacked a strategy of coordinated efforts to preserve their former artistic strength and reputation, and the complete network vanished.

Fig. 1 Sub-networks and the main broker in the artistic network of Cologne (Friedrichs 1998)



Burt highlights the interests of individuals and their sub-networks, and the subsequent disadvantage for the whole network. Brokers, or 'structural holes', are always chokepoints and thus loci of power. This

[5] Especially Burt (1995) adverted to the powerful position of brokers in a network, although he labels them as 'structural holes', because, if brokers are eliminated from the network, creating 'structural holes', the network might be destroyed and sub-networks are disconnected from each other. According to Burt, power in a network is thus defined by this role and by the 'structural autonomy' that these brokers have. Their power, capital or resource is thus the potential to allow or to prohibit contacts between other actors of the network whose relations depend on him or her as a 'bridge' – one also talks about 'gatekeepers'.

emphasis on individual and sub-network interests might, however, overshoot the mark. Different to Burt, Granovetter (1973, 1983) regards participants in networks not as individualistic egotists but as actors who consider the social consequences and collective interests of the whole network, although the collective interests of the partial networks might still be regarded higher than the interest of the complete network (cf. Wellman 1988: 20, Jansen 2006: 21). For instance, the decline of the Cologne artistic network after 1980 can be derived from the revival of partial interests of individuals and isolated social circles. The tension between individual and collective interests always exists in networks but well-informed and good-willed brokers can govern for the benefit of the network.

The tension of interests among individual actors and sub-networks in the whole network can be described by the unequal distribution of social capital among the network participants. Jansen (2006: 28-32) classifies this power resource into six categories.

1. **Family or clique solidarity**: This solidarity is founded on social inclusion among the members of the clique where a group is tied together by strong ties. A main indicator for the clique is the mutual control and a strong moralist attitude (conventions) among the clique members. Dissenters are sanctioned but as long as you are a member of this closely knit group you can feel trust and security. You might even experiment with your new ideas because you know that if you fail, the group will catch you. This exclusive and strongly clustered network can be found especially in innovative milieus, like in arts cliques or art scenes.[6]
2. **Trust in the universality of norms**: Social capital (within a partial network or clique) can be created and maintained by norms and rules that are based on a universal morality. This value-oriented basis of behavior and attitudes is generally not doubted, and, thus, this culture produces security in decisions and behavior. It also allows creating ties among the members that do not need to be acknowledged by legal or formal contracts.
3. **Information**: Information is a third kind of social capital, and it is more the fuel for weak than strong ties because it is an advantage to gain information fast and through many different channels. (Jansen 2006: 29)
4. **Hierarchization of collectives**: If a network becomes too big it cannot be controlled by, e.g., solidarity, trust, morale or close ties, anymore. Then, a formalized (bureaucratic) structure with fixed hierarchies and strata is created where the higher actors, institutions, strata or partial networks have a higher centrality, prestige, social capital and, thus, more power than lower positioned actors.
5. **Structural autonomy (brokerage)**: The broker has the monopolistic power to connect or disconnect other actors and sub-networks. The degree of structural autonomy is his capability to bridge structural holes. He or she can use this position for the benefit of the network or solely for his own advantage, playing other actors off who are unwilling or unable to cooperate. The probability to abuse this power is especially high if the network consists mostly of a few weak ties without overall acknowledged values such as solidarity or the belief in one unifying purpose.
6. **Power by social influence**: In a hierarchically structured network (cf. above category 4) the actors of higher and more central sub-networks have a larger and more important array of connections than the actors of lower and peripheral sub-networks. It is thus important for actors in the lower ranks to create ties to members of the higher strata to indirectly utilize these contacts for their own individual purposes. (Jansen 2006: 31).

[6] Dorothea Jansen (2006: 31f) stresses that a network with many weak ties is more prone for innovations (that might be important for artistic networks) than a network with strong ties. However, for the realization of innovations a denser network of strong ties is better because it has less structural holes.

The characteristics of networks can be ordered in two categories. On the one hand, networks can create secure environments, trustworthy companions, solidarity, a milieu of innovations and creativity, and an optimal flow of resources among the members. On the other hand, networks can create hierarchies of sub-networks, a distinct allocation of power by monopolizing brokers, egotistical objectives and cliques with partial interests disadvantageous to the whole network.

How, then, is the network of cultural and arts production in a small town in North Germany structured? How is the social capital allocated and who holds what kind of power within this network?

To answer these questions, it is helpful to recapitulate some of the main variables and indicators that specify central concepts of network analysis.

Table 1 Central concepts of network analysis

Central notion, measure	**Alternative notions, explanations**
Relation(ship), connection	Link, line
Actor	Vertex, node
Undirected (equal) relationship	Edge, graph
Directed (unequal) relationship	Arc, digraph
Broker	Cut-points, cut-vertices, structural holes
Path	Relationships via another node
Path distance	Geodesic distance, smallest number of nodes between indirectly linked actors
All-degree	Number of relationships of one actor
In-degree	Number of relationships that are directed towards the actor (i.e., other actors ask for something), popularity
Out-degree	Number of relationships that are directed from the actor (i.e., the actor asks other actors for something)
Degree centrality	Relative number of direct relationships
In-degree centrality	Relative number of direct relationships, that are directed towards the actor
Out-degree centrality	Relative number of direct relationships, that are directed from the actor
Closeness centrality	Measure indicating the path distances to all actors that can be reached by the actor (sum of reached nodes divided by the sum of path distances)
Betweenness centrality	Number of all shortest paths (geodesics) between pairs of other nodes that include this actor, that have to cross the observed actor (ignoring directions)
Hubs-authorities-centrality	Extent to which an actor is linked to other nodes with high eigenvector centrality. The importance of an actor is determined by the importance of its network neighbors. Hubs are senders, connected to important authorities; authorities are receivers, connected with important hubs.
Authority weight	Extent of (measure for) connections to important senders (eigenvector centrality)
Hub weight	Extent of (measure for) connections to important receivers
Input domain, influence domain	Structural prestige, number of percentages of all other actors that are connected by a path to the observed actor
Proximity prestige	Proportion of all actors (except the observed actor) in its input domain divided by the mean distance from all actors in its input domain
Clustering coefficient, transitivity	Measure for the strength of cliques (partial networks), the proportion of all two-paths that are closed
k-cores	Measure for clusters (relatively dense sub-networks), applied for undirected networks. A k-core is a maximal sub-network in which each vertex has a minimum of at least k degrees within the sub-network.

Each network actor can be described by certain characteristics indicating his relations to the network. These are measures of prestige and popularity (degree centrality, closeness centrality, proximity

prestige), of sovereignty and autonomy (betweenness centrality, eigenvector centrality, authority and hub weights), and of cohesion and sub-network affinity (clustering coefficient, k-cores, triads).

The most visible indicator for **prestige and popularity** (social capital) is the number of contacts an actor has in the network (degree, degree centrality, cf. Jansen 2006: 127, 128-131). Individual **sovereignty and autonomy** are measured by brokerage indicators such as betweenness centrality, eigenvector centrality and authority and hub weights that indicate the actor's power (the measure of brokerage).

Networks that are characterized by non- or equally directed connections (with a mutual exchange of resources) are positively legitimated in a non-hierarchical sense; they are examples for **exchange networks**. Positive traits of these networks are the complementarity and additivity of all connections of the network. In general, connections are not monopolized and there are many dense and alternative relationships between the actors; many interconnected triads exist.

On the other hand, networks with many directed connections (and a clear differentiation of hubs (senders) and authorities (receivers)) are examples for **power or influence networks**. Many significant structural holes or brokers are indicators for an unequal distribution of resources (Jansen 2006: 163).

In addition, the existence of **sub-networks** and **cliques** is also evidence for an unequally structured network (Jansen 2006: 164). The cohesion of a network is measured by clustering coefficients and sub-network and clique affiliation. Negative traits of these networks are the competition of actors for directed contacts to a few powerful actors and the lack of alternative connections, e.g. bypassing powerful brokers. The main function of these negative networks is the distribution of (scarce) resources by a few powerful actors without an equal exchange of resources among all connected actors.

2 Research Design, Methodology

The research questions we stated are based on the theoretical basis of network analysis (Burt 1995, Granovetter 1973, Scott 2005), on network studies in the arts sector (Friedrichs 1998, DiMaggio 1987, Whitt 1987, 1991), and on studies about elite and political networks in communities (Pappi 2010, Laumann/Pappi 1973, Laumann/Marsden/Galaskiewicz 1977).

On a descriptive level, we asked

- who the local **actors** are, realizing and offering cultural and artistic products and services,
- how they are **connected** to each other (by equal or unequal relationships, by the significance of and the permanence of these relationships), and
- how the network looks **as a whole** (e.g., dense, scattered, divided).

On an analytical level, we asked for differences and disparities in the explored network. Following the theoretical concepts of structural network analysis, we looked for network actors

- with **high social capital** (indicated by connectedness and central positions within the network, indicating a corresponding prestige),
- with **high influence and power**, obtained by high levels of 'structural autonomy', i.e., by being a broker among other actors who need 'bridges' to communicate among each other,
- with **active network strategies** for improving their own network standing, strategically linking themselves to other actors that are (more) powerful players in the local network (by being able to influence other actors and/or by providing needed resources) ('hubs'),

- with **active network strategies** for attracting other actors as dependents because the former provides resources to other network participants ('authorities').

The data have been gathered between 2007 and 2011. In 2007, in the context of a first research phase, a preliminary and exploratory report of major local arts and cultural players and their network has been compiled (Dziallas et al. 2007). We (1) explored our own and other peers' knowledge of the local arts as residents and local cultural consumers and producers, (2) collected information by contacting the local tourist information, browsing the Internet, and the local newspaper, (3) sent out a first standardized questionnaire to some assumed actors of the predicted network, asking them for the five most important local connections to the arts, and (4) provided the results of this exploratory survey (yielding 70 actors) to one known major actor for the local arts network as a reality check about our findings.

Between 2007 and 2009, local arts institutions in town, county and region have been examined in detail about their networks. In a second stage of research, we conducted longer qualitative interviews, used a semi-structured interview guideline and followed the rules of qualitative empirical research for expert interviews (Gläser/Laudel 2006). In 2007 we interviewed the executive directors of three visual arts institutions[7], in 2008 we interviewed the executive directors of three literature institutions[8], and in 2009 we interviewed the executive directors of three music venues[9].

The interview consisted of five parts about (1) the internal organization of the examined arts institution and the background of the interviewed expert, (2) the scope, structure and dynamics of contacts to other local arts organizations, (3) effects of these contacts and, if applicable, of the participation in the local network, (4) strategies to create, improve and maintain local relationships, and (5) issues about needed or supplied resources, especially financial dependency, and about related topics such as competition for or cooperation in gaining resources.

In 2010 we interviewed important representatives of cultural policy and administration[10], cultural politics,[11] and arts support[12] since, due to the prior studies, we had to acknowledge the significance of municipal politics and administrations outside arts production. The interview guideline for these experts from politics, policy, and support consisted likewise of five parts, (1) the knowledge and acknowledgement of local arts networks, (2) past and present changes, and future developments of

[7] The interviewed experts are from a gallery for contemporary visual art in the city, the director of a local museum, the executives of a gallery and arts venue in the county, and of a land art gallery in the region

[8] The interviewed experts were from a center for literature in the city, a converted farm for book readings and authors-in-residences in the neighboring county, and the foundation seat and former residence of a famous North German author in the region

[9] The interviewed experts were from a church music center in the city, a festival for classical music in the neighboring county, and a network and festival organizer for 'new art music' in the region.

[10] The interviewed experts for administrative and policy issues were the deputy mayor and the head of the cultural division in the city, and the head of the division for cultural heritage and visual arts of the state ministry for culture, and the department chief for culture in the state ministry for culture.

[11] The interviewed experts for cultural politics were the representative of the Green party in the municipal commission for culture, the chairman of and representative of the Social-democratic Party in the municipal commission for culture (who is also the scenario editor of the local theatre), and the state minister for culture (from the German conservative party, CDU).

[12] The interviewed experts for arts support and sponsorship were the director of the local savings institution foundation for the support of the arts, the local executive director of a regional printing press company, and the local head of an insurance company foundation.

these networks,[13] (3) the appraisement of existing members in the local art network, (4) the causes and characteristics of contacts in these networks, (5) the effects of contacts and, probably, the active participation of the interviewed expert in shaping these networks.

All recorded expert interviews have been transcribed. Then, the answers have been searched for and coded by categories that are relevant for the creation of an art network from the perspective of the interviewed expert. Documented categories were the contacts mentioned by the interviewed (including the institutional or personal style of communication, the geographic distance , and the location of the contact), the intensity of the contact (the communication frequency in the last year, the subjective importance of the contact), the direction of the contact (to be, or to respond to, a solicitant) and the general assessment of the described network as important, dense, homogeneous, divided, competitive or collaborative. These data have then been interpreted and converted into a visualization of the expert's network, using the software PAJEK.

In 2011, in the last stage of the data gathering, we returned the preliminary visualizations to the interviewed experts, and asked them to correct, supplement or remove contacts of our visualized interpretation if they were not on a par with the interviewed expert's ideas.[14] We limited this last stage to the ten experts who worked in the examined city,[15] due to limited personal and financial resources. These modified ten expert-networks have then been merged to a total local arts network. At this very last point, and as another precautionary measure, we rendered the almost final visualization of this complete network to the chief editor of the culture section of the local newspaper to let him assess our findings for possible misconceptions or bland errors, or for possible important contacts and actors among the local arts that the ten interviewed experts have overlooked. The necessary changes were only small and relatively insignificant.

3 Findings

The presentation of the findings of this network analysis has two parts. **First**, I will describe the final network, the number and composition of its actors, the number of contacts and their directedness, and a general visualization of the complete local network of arts and culture. **Second**, I will analyze the particularities of the network. Measures of prestige and popularity, sovereignty and autonomy, and the degree of sub-network cohesion will be presented. These measures have been calculated for all actors;

[13] Networks can change (cf. Friedrichs 1998) but if established, they have the tendency to be structurally inert: "Organizations formed during one time period assume specific characteristics that tend to be carried forward; they are imprinted by the forces present at the time of their creation." (Stinchcombe 1965) This structural inertia has many causes, e.g. the employed personal appointed many years ago or tariff regulations that cannot be changed. (Scott 2005: 169) Another reason might be the establishment of an autopoietic power structure that is able to revive itself through the years (Luhmann 1997).

[14] None of the experts insisted on anonymity. The argument was that in this smaller town, "everybody knows anyway everything from everybody." In this paper, however, the institutional affiliation is more important than the real names.

[15] These ten chosen local experts are the heads from the gallery for contemporary visual art, from the local museum, from the center for literature, and from the center for church music, two representatives of the municipal commission for culture (Green party and SPD); the latter is also the scenario editor of the local theatre, furthermore the deputy mayor, also in charge for the arts in town, and the head of the municipal cultural division; finally the heads of the local savings institution foundation for the support of the arts, and of the local insurance company foundation for the support of the arts in the region.

however, the following visualizations of networks will only show well-connected actors, i.e. the actors that have at least four links to other actors.

3.1 Description of the arts network

The whole network consists of 186 actors (or nodes) and 596 links (or contacts). 18 % of all reported relationships are of little, 38% of middle, and 44% of high importance.

Less than half, 44 % of the 186 measured actors are in the local fields of arts production, distribution or consumption. Other actors are members of the sectors 'education' (16%), 'art support' (15%), 'politics' (11%), 'media' (6%), 'churches' (5%), and 'public administration' (4%). However, the proportion of these sectorial actors does not reflect the significance of these sectors (as will be shown by the high significance of the smallest sector, public administration).

Table 2 Frequency of network actors by sector

Sector	Frequency	Percent
Culture	82	44,1
Education	29	15,6
Arts Support	28	15,1
Politics	20	10,8
Media	11	5,9
Churches	9	4,8
Public Administration	7	3,8
Total	186	100,0

Although we asked for actors in the local arts network this does not necessarily mean that the actors come only from the locality. 55% are working and operating within the city limits, but 19% are located in the surrounding county, 14 % in the federal state the town is located in (many from the state capital), 9% from Germany outside the state, and 3% from abroad.

Table 3 Frequency of network actors by geographic location

Location	Frequency	Percent
City	101	54,3
County	35	18,8
State	27	14,5
National	18	9,7
International	5	2,7
Total	186	100,0

The quotient of links and actors is 596/186, i.e., each actor has an average of 3.2 links to other actors (this includes double links, if two actors mention each other as link). However, a clue for the heterogeneity of the network is already the distribution of each actor's connections. Most actors have 1 to 3 links; only a very few actors have a higher number of connections but these few actors have a number of contacts that is considerably higher. The all-degree measure for each of the ten interviewed

actors of the network is higher than 40, followed by another 10 actors that each have more than 10 relationships.[16] The same can be said about the links directed towards an actor (in-degree), and the links directed away from an actor (out-degree).

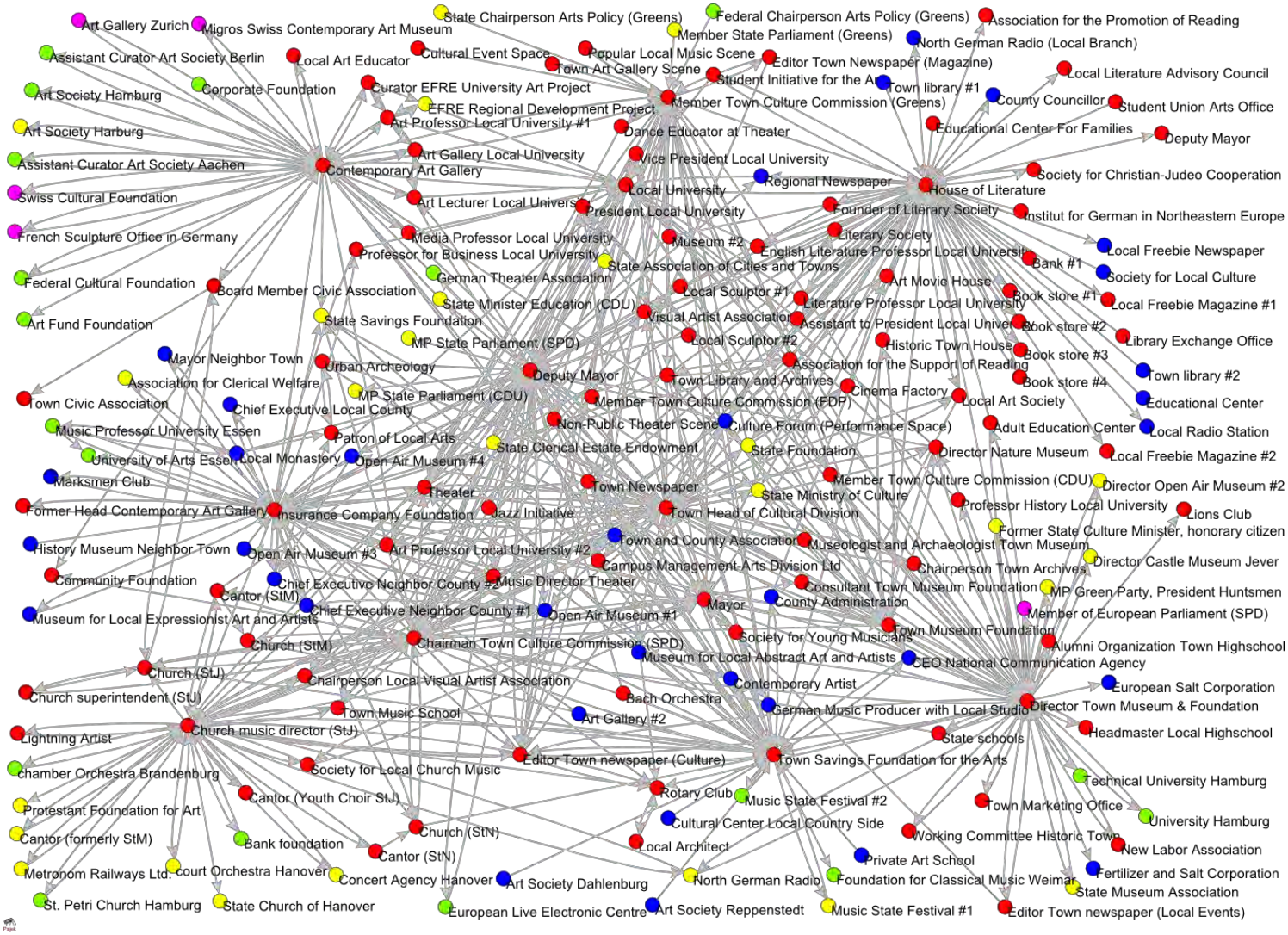
Table 4 Degrees (links) of important actors of the network

	All degree	**Out-Degree**	**In-Degree**
House of Literature	70	34	36
Director Local Museum	68	40	28
Deputy Mayor	59	26	33
Town Head of Culture Division	59	32	28
Insurance Company Foundation	57	25	32
Town Savings Institution Foundation for the Arts	55	15	40
Church music director	52	27	25
Contemporary Art Gallery	48	28	20
Chairman Town Commission of Culture (SPD)	44	20	24
Member Town Commission of Culture (Greens)	43	21	22
Local University	28	8	20
Town Museum Foundation	26	14	12
Mayor	22	11	11
Editor for Culture - Town Newspaper	18	9	9
Theatre	17	8	9
Town Newspaper	13	4	9
Town and County Association	12	6	6
Visual artist association	11	5	6
Culture Forum (Performance Space)	10	7	3
Town Library / Town Archive	9	5	4

This first listing of the uneven distribution of contacts indicates that some players are indeed more powerful than others. This impression is reinstated by the visualization of the complete local network of the arts that follows now. Especially interesting are those actors whose representatives have not been interviewed but show up in this listing, i.e. the local university, the mayor, and the theatre.

[16] This already hints on a problem with the creation of a local network by interviewing a few – admittedly important – players in the local arts and culture network. Egocentrical networks by definition bias the 'ego' who provides the information about networks because s/he are in the center of their own networks and the links are provided mostly from themselves as relating starting points. The dominance of the egocentrality of each individual network has been mitigated by the merging of ten egocentrical networks but it could not be eliminated completely.

Fig. 2 Complete network with all actors (vertices) and relationships (arcs)



Without dwelling too much on the details of this intricate network it becomes already clear that some participants act as gravity points, i.e., as major nodes for the network, e.g., the director of the town museum, the director of the house of literature, the deputy mayor, and the town head of the culture division, to name just a few. The color of the nodes indicates the geographic location, red nodes signaling a location in the city, blue nodes in the county, yellow nodes in the state, green nodes in the rest of Germany, and violet nodes abroad.

3.2 Analysis of the arts network[17]

The analysis of the unevenness and dividedness of the arts network, and the major channels of information and resource has three different perspectives: prestige and popularity, sovereignty and autonomy, cohesion and sub-networks/clique distinction.

[17] This analysis has been conducted by using the network analysis software program PAJEK (cf. http://pajek.imfm.si/doku.php?id=start and http://vlado.fmf.uni-lj.si/pub/networks/pajek/). Many of the here used concepts and measures have been explained in theory and application by de Nooy et al. (2011).

3.2.1 Prestige and popularity

The network concepts 'prestige' and 'popularity' are very close to the sociological concept of 'social capital'. The positioning of an actor in the center of a network (closeness centrality), his or her 'popularity' (degree centrality or relative number of direct relationships), and its 'proximity prestige' (proportion of all network participants connected by a path to the observed actor divided by the mean path distance from all connected actors) are indicators for this 'social capital'. Especially the in-degree centrality is a good indicator for the prestige of an actor with respect to actors that are directly connected; the proximity prestige is a good indicator for the prestige of an actor even among other actors that are also indirectly connected.

Table 5 Indegree centrality of important actors of the network

	Indegree centrality	**Proximity prestige**	**Closeness centrality**[18]
Town Savings Institution Foundation for the Arts	0,2162162	0,4802154	0,479732
House of Literature	0,1945946	0,3934127	0,393409
Deputy Mayor	0,1783784	0,4513062	0,450559
Insurance Company Foundation	0,172973	0,4064474	0,405367
Director Museum and Town Museum Foundation	0,1559459	0,3666863	0,366389
Town Head of Culture Division	0,1513514	0,4605479	0,459881
Church music director	0,1351351	0,3748348	0,374622
Chairman Town Commission of Culture (SPD)	0,1297297	0,4203755	0,419389
Member Town Commission of Culture (Greens)	0,1189189	0,36869	0,367398
Contemporary Art Gallery	0,1081081	0,3495869	0,347306
Local University	0,1081081	0,3569856	0,355642
Mayor	0,0594595	0,4152017	0,415469
Editor for Culture - Town Newspaper	0,0486486	0,394563	0,394573

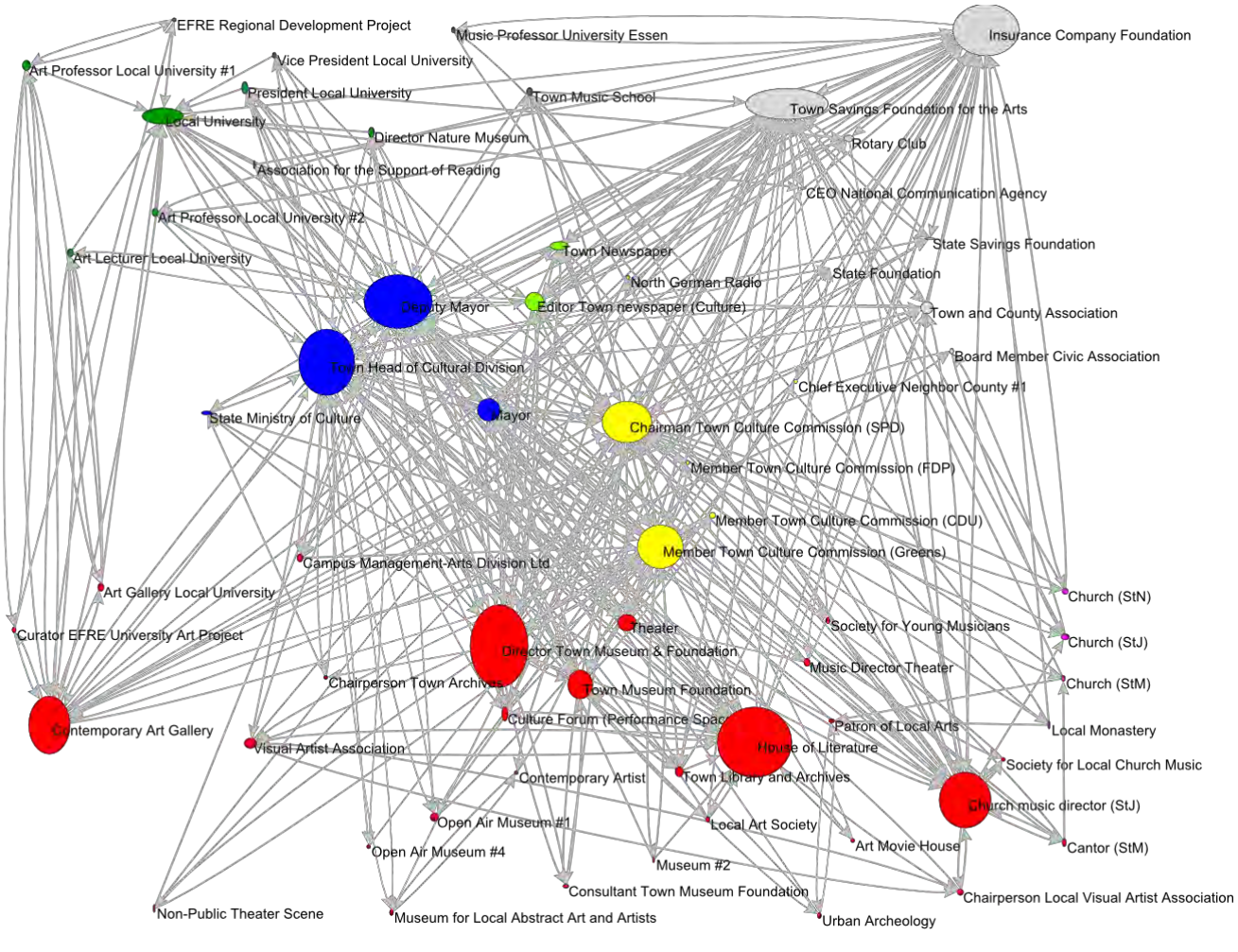
Only 11 of the 186 actors in the art network have an indegree centrality of higher than .10, and only 7 have an indegree centrality of higher than .15, among them the two major foundations for the arts and the two major municipal cultural administrative players. Just four actors among these 11 top direct prestige players are from the immediate cultural sector.

If we widen the 'prestige' variable for all indirect actors that are – by different path lengths – connected to the observed actor, the picture looks different. Even though the savings foundation for the arts maintains it leading top rank, there is definitely a shuffle in the following ranks. The three administrative powers for the arts, including the mayor, and the chairman of the commission for culture follow closely on top, as does the head of the second arts supporting foundation. For instance, the mayor has a relatively small indegree centrality, i.e. immediate social capital, as does the editor of the culture section of the town newspaper but both have relatively high proximity prestige measures, i.e., indirect social capital that spans more than just the direct contacts of the network. There are only three actors from the local arts production field among these top actors with a high proximity prestige – all of them in the lower ranks (house of literature, church music director, theatre). The closeness centrality (centrality of the position in the network) is very similar to the proximity prestige, and the interpretation can be, thus, the same. Administrative, political, and financial powers lead the ranks whereas the cultural actors lag behind.

[18] The measure of indegree closeness centrality is used here because it emphasizes more than the non-directed closeness centrality the variable 'prestige'.

These indicators for 'social capital' can be well displayed in the following two figures. For the purpose of visual clarity the following figures only present the major players with four or more links to other actors of the network.

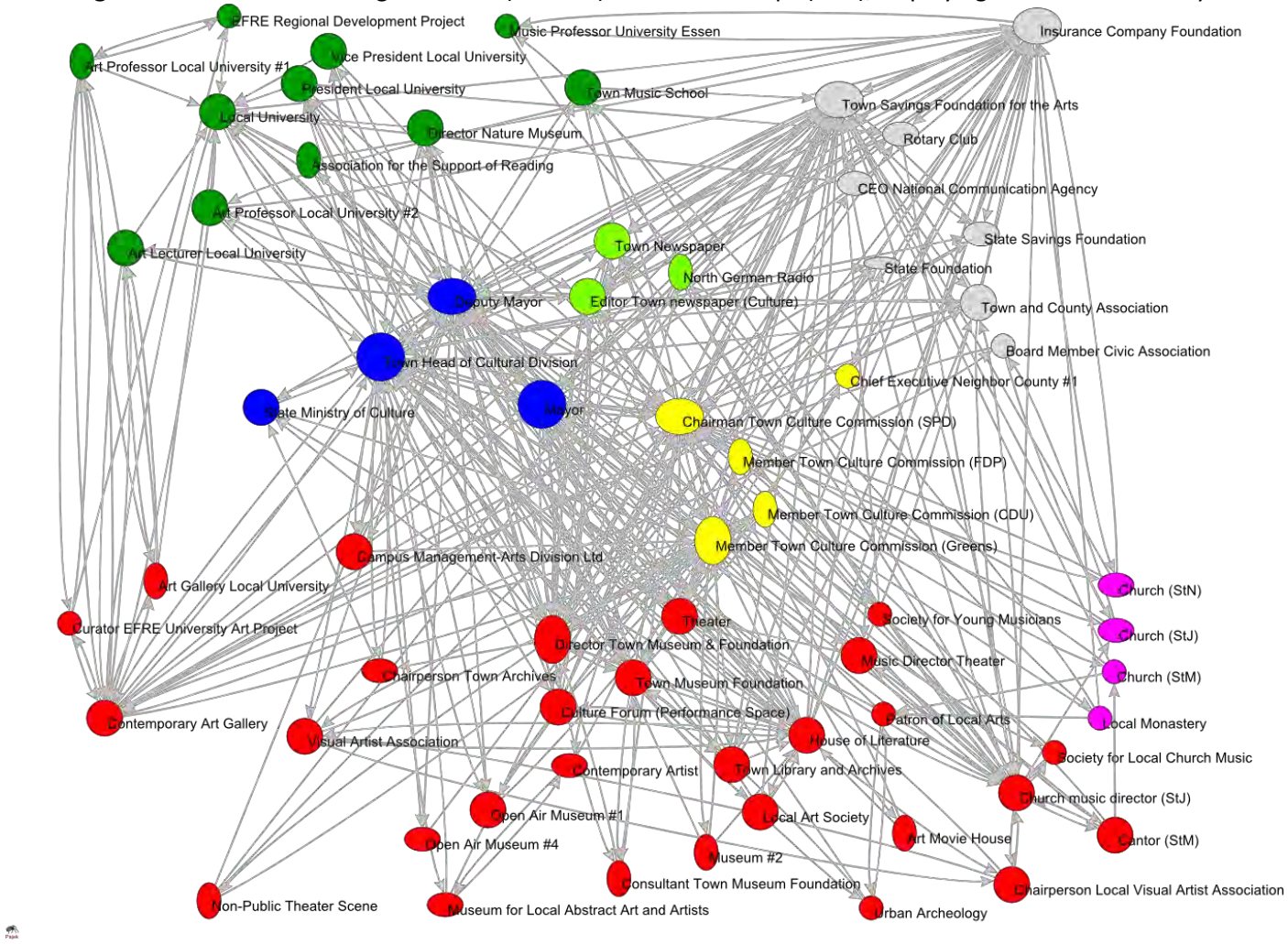
Fig. 3 Network with all 4-degree actors (vertices) and relationships (arcs), displaying indegree and outdegree centrality



The size of each node symbolizes the centrality of each actor. The elliptical form of the node symbolizes a potential imbalance of indegree and outdegree centrality for each actor. A horizontally positioned ("lying") ellipse indicates a dominance of indegree centrality (more direct neighbors demand resources, products or services from the actor) , a vertically positioned ("standing") ellipse indicates a dominance of outdegree centrality (more direct neighbors are asked by the actor for resources, products or services). Obviously, the major cultural actors are vertically positioned (high outdegree centrality) whereas the two foundations and the university are strongly horizontally positioned (high indegree centrality).

Due to very similar values of prestige proximity and closeness centrality I only display the indegree-outdegree closeness centrality in the following figure 4. This figure shows a not quite so strong heterogeneity of the actors as the direct indegree – outdegree centrality. The sizes of the ellipses of many cultural actors show that they – at least indirectly – are all quite connected, although not as much as the municipal administrative or the supporting foundation players.

Fig. 4 Network with all 4-degree actors (vertices) and relationships (arcs), displaying closeness centrality



3.2.2 Sovereignty and autonomy

The network concepts ‘sovereignty’ and ‘autonomy’ are very close to the sociological concept of ‘power’. Central for the understanding of these concepts in network analysis is the significance of the role of some actors as monopolistic bridge or broker of resources among a larger number of other actors. If these actors cease to exist in the network, the network may fall apart (creating a “structural hole”), or the communication among distant actors becomes even more distant and complicated.

The indicators for this concept are betweenness and eigenvector centrality. The betweenness centrality ignores the direction of connections and calculates the geodesic distance (number of all shortest paths) between pairs of nodes that have to cross the observed actor. It is thus an indicator for the role of an actor as a broker but without recognizing the direction of the links. The eigenvector centrality indicates the extent to which an actor is a bridge between other nodes with high eigenvector centrality.

Pajek also calculates ‘authority weights’ and ‘hub weights’; the authority weight is identical with the eigenvector centrality. Hubs are senders (soliciting resources, products or services) connected to important authorities. Authorities are receivers (giving resources, products or services) connected to

important hubs. Different to the betweenness centrality the eigenvector centrality acknowledges the direction of connections.[19]

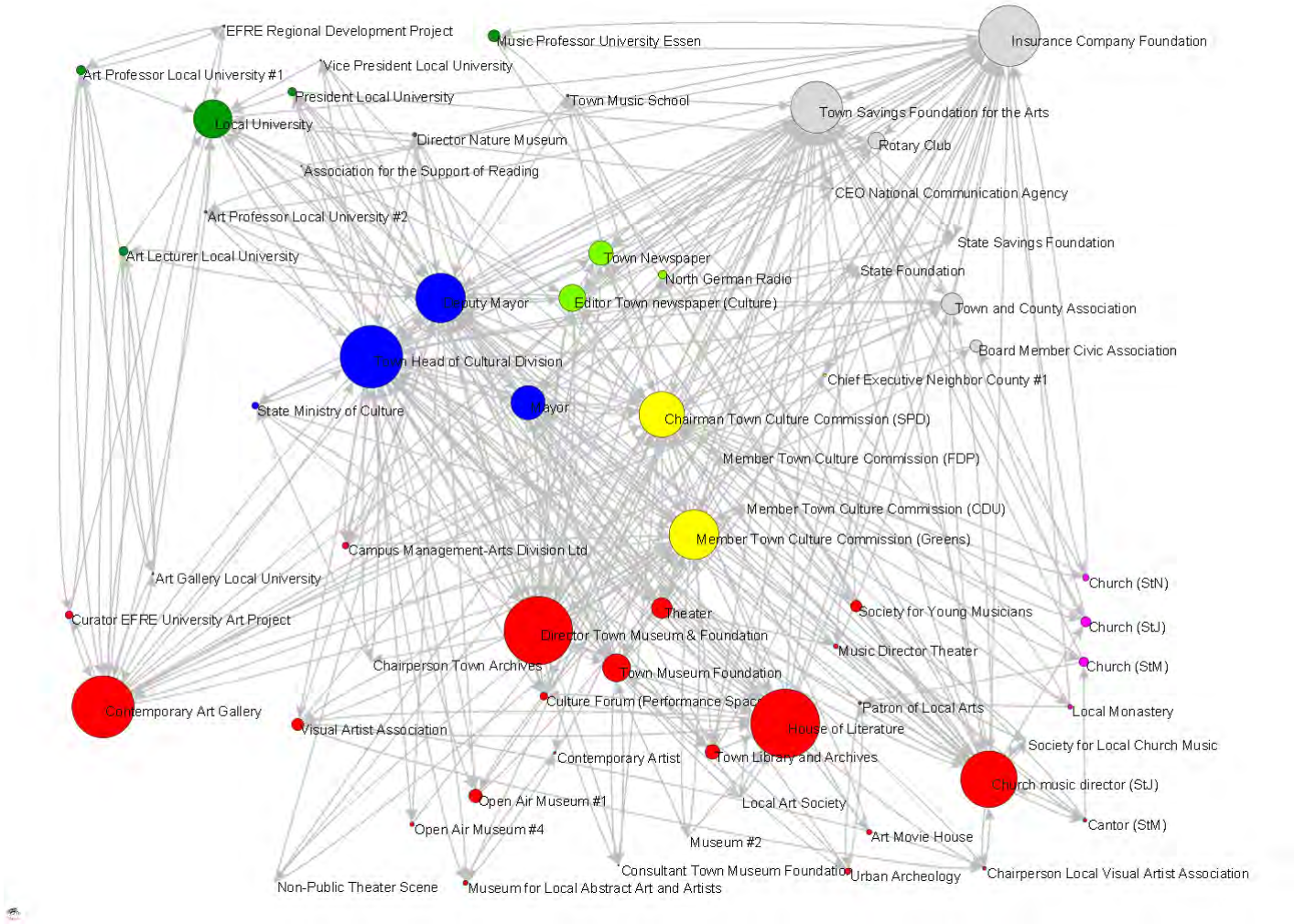
Table 6 Eigenvector centrality and betweenness centrality of important actors of the network

	eigenvector centrality	**betweenness centrality**
Town Savings Institution Foundation for the Arts	0,4743034	0,0986477
Deputy Mayor	0,3108257	0,0905283
Chairman Town Commission of Culture (SPD)	0,2713705	0,0770397
Town Head of Culture Division	0,2618639	0,1442472
Mayor	0,2560446	0,0428994
Insurance Company Foundation	0,2361549	0,1367524
Editor for Culture - Town Newspaper	0,1868414	0,0266207
Church music director	0,1686405	0,1176152
Director Museum and Town Museum Foundation	0,1565479	0,1724913
Local University	0,1522936	0,0547649
Member Town Commission of Culture (Greens)	0,1520955	0,0917087
House of Literature	0,1436436	0,17517
Contemporary Art Gallery	0,0615482	0,1559307

The difference between the 'structural hole' measure of 'betweenness centrality' and the 'bridging' measure of 'eigenvector centrality' is considerable; the ranking by eigenvector centrality (i.e. the bridging function of being an 'authority') is almost reverse to the ranking of the betweenness centrality. The players from the municipal administration and the supporting arts foundations lead the ranks (eigenvector centrality values >.20), and the cultural institutions lag behind when looking at their eigenvector centrality values. However, when looking at the numbers for betweenness centrality the cultural institutions head the table (betweenness centrality values >.15), and some of the municipal administrative players lag behind.

[19] However, in the sense of Burt's (1995) 'structural hole' concept, the direction of the relationship does not matter; if the node vanishes the connection is lost whatever the direction was. On the other hand, an actor or node who only receives or who only commits requests for information etc. cannot really function as a broker because s/he cannot continue the flow of information etc., and this argument is considered by the calculation of the eigenvector centrality (identical to the authority weight).

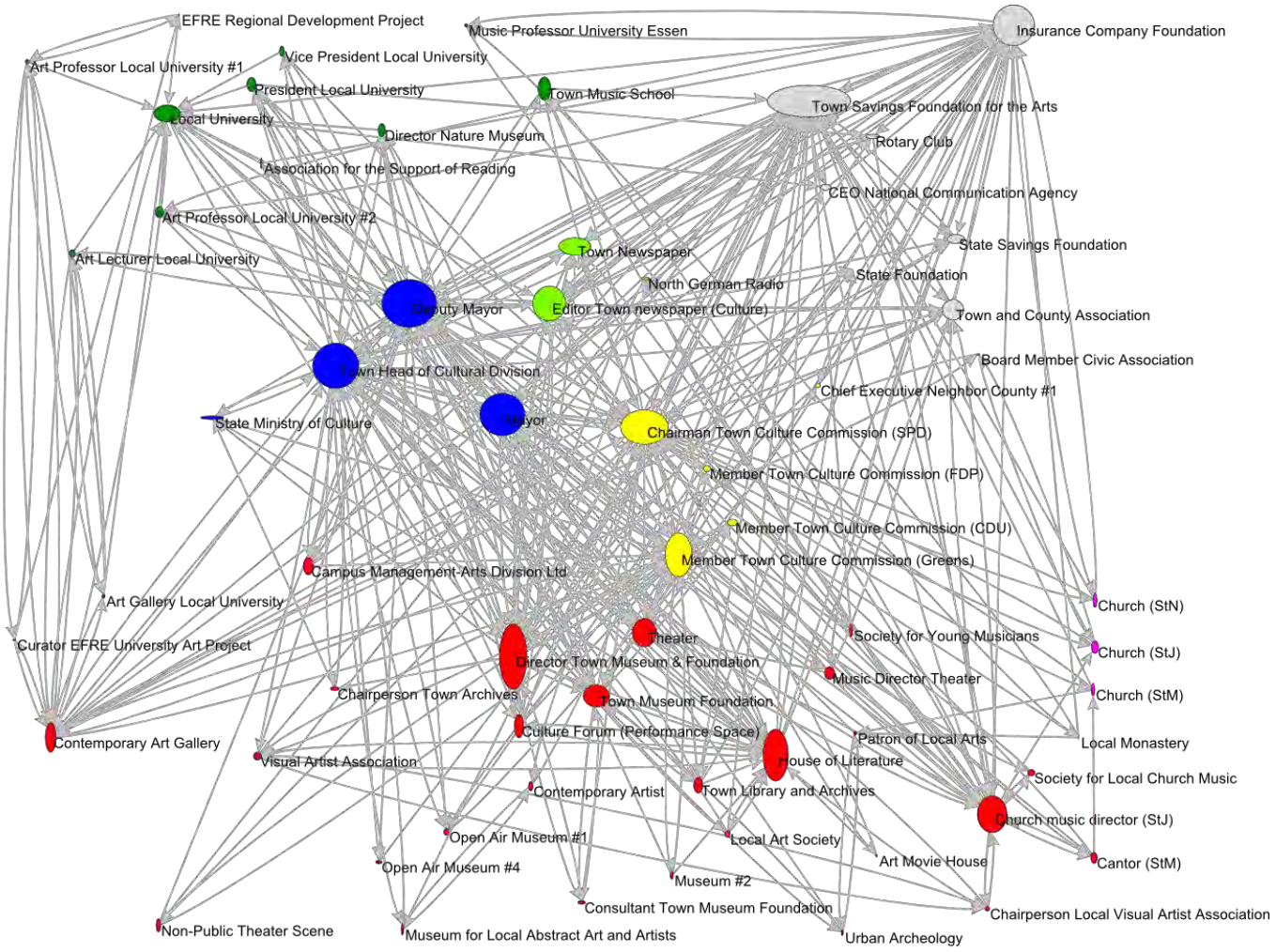
Fig. 5 Network with all 4-degree actors (vertices) and relationships (arcs), displaying betweenness centrality



Regarding figure 5 and following the concept of Burt's structural holes the high betweenness centralities of a few cultural actors might give proof for the indeed not so small significance of these players in the local arts arena. However, the disregard for the direction of the relationship gives an unrealistic picture of the power distribution in the network. This is better displayed by comparison of authority and hub weights (indicating eigenvector centrality).

In figure 6, the brokerage position of the cultural institutions is still not insignificant; however, the vertical setting of their ellipses signify that they are hubs (solicitors) connected to authorities (givers); they are not authorities (because of their low eigenvector centrality values) with other hubs being dependent on them. The town savings foundation for the arts, the chairman of the town culture commission and even the local university are such authorities; also, the town newspaper can be put into this category.

Fig. 6 Network with all 4-degree actors (vertices) and relationships (arcs), displaying the effects of authority and hub weights



This is the best evidence for the unequal power distribution in this local arts network. The cultural institutions are still not in a powerless position to shape this network because they are still significant 'hubs' (and might be counted as 'authorities' for the audience who, indeed, have not been mentioned as network players). However, the municipal agencies, including the highly influential political chairman of the culture commission and the local foundations could be identified as real gatekeepers. Interestingly enough, the agents of the municipal administrations are not only in the powerful position of 'authorities' but they can indeed function as real bridges because they have – symbolized by the circular instead the elliptical form – a balanced role of authority and hub, i.e., they have a similar large number of receiving contacts (being solicited) and of sending contacts (being solicitors). This makes them exemplary for being brokers. On the other hand, this also indicates their monopolistic position – if they remove themselves from the business of networking there will be no real alternative that could substitute their connectivity function.

3.2.3 Cohesion and sub-networks/clique distinction

The existence of cliques and sub-networks is evidence for an unequally structured network (Jansen 2006: 164). Negative traits of the existence of such sub-networks are the competition among actors for links to a few powerful actors and the lack of alternative connections, e.g., bypassing powerful brokers (and making them thus less powerful). The main indicator of an influence or power network is the distribution of scarce resources in the hand of a few powerful actors without any possibility of an equal exchange of resources.

Measures of cohesion and clique structures are the clustering coefficient, k-cores, and triads. The clustering coefficient measures the transitivity, i.e., a measure for the strength of sub-networks where the proportion of all two-paths is calculated that are closed relations. K-cores are clusters, i.e., a maximal (dense) sub-network in which each vertex (node) has a minimum of at least k degrees within the sub-network. K-cores can be only applied for undirected networks. Triads are indeed small sub-networks consisting of three vertices, and a clique is a maximal complete sub-network containing three vertices or more.

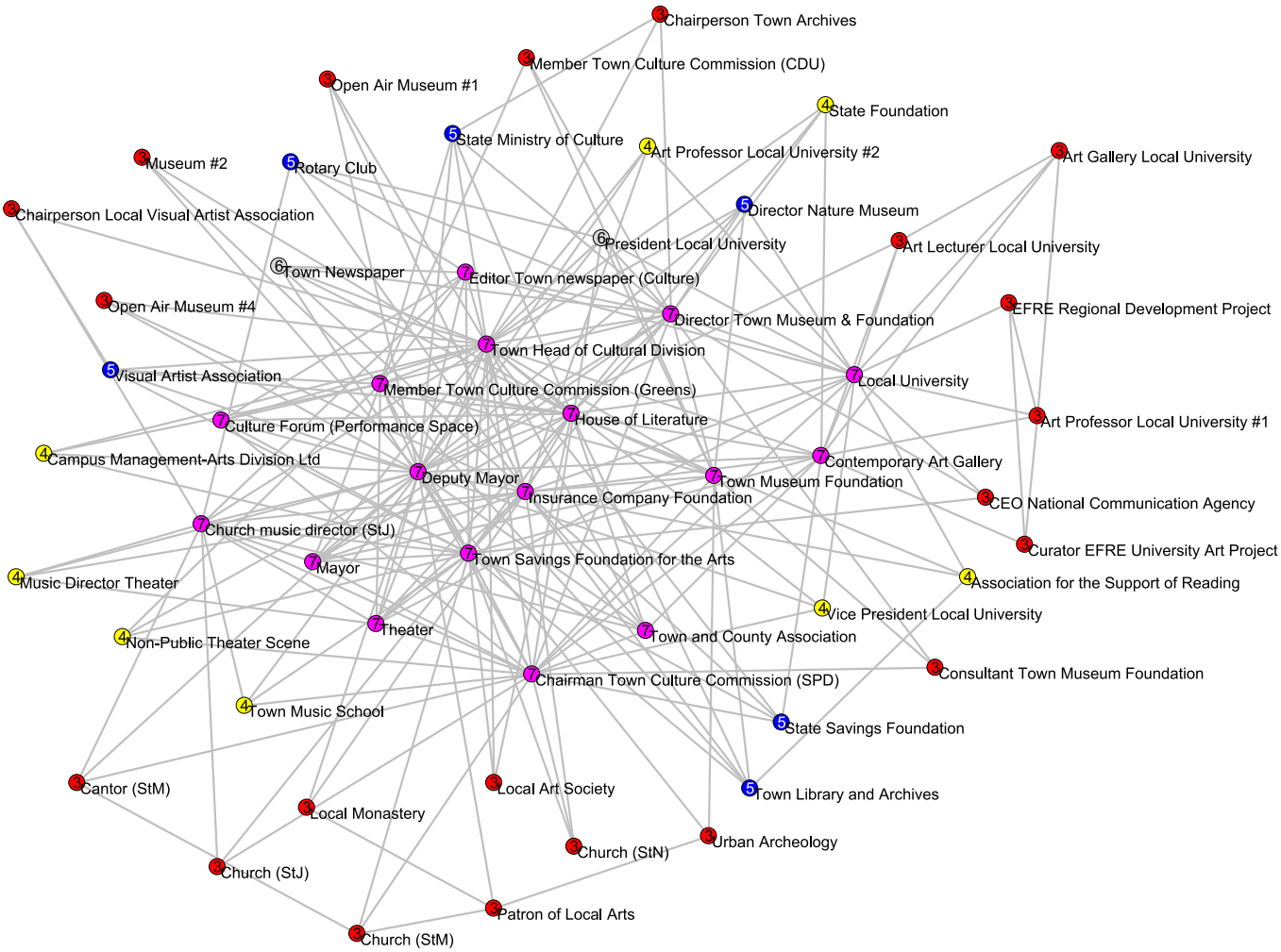
The clustering coefficient indicates the isolation of actors as a first approach to cohesion. A larger clustering coefficient indicates a tendency of actors to be positioned outside the main area of the network. In fact, several local university members have very high clustering coefficients (equal or close to 1); on the other hand, the main actors of the local arts sector have low clustering coefficients (between .25 and .43) and are thus not a part of a specific sub-network.

Table 7 Selected clustering coefficients of important actors of the network

	Clustering coefficient	**k-cores/sub-networks**
House of Literature	0,0402758	7
Director Town Museum & Foundation	0,0591463	7
Contemporary Art Gallery	0,0615764	7
Deputy Mayor	0,0833333	7
Insurance Company Foundation	0,0833333	7
Church Music Director	0,0874384	7
Town Savings Foundation for the Arts	0,0963415	7
Member Town Culture Commission (Greens)	0,1322751	7
Town Head of Cultural Division	0,1345811	7
Chairman Town Culture Commission (SPD)	0,1507937	7
Town Museum Foundation	0,2333333	7
Rotary Club	0,2666667	5
Town Newspaper	0,2916667	6
Editor Town newspaper (Culture)	0,3111111	7
Town Library and Archives	0,3666667	5
Theatre	0,4272727	7

Pajek calculates clusters of potential sub-networks and then attaches a sub-network number as a label to each actor participant. In this case, almost all arts actors belong in the same group “7” that is in fact the core-network of the whole network. The potential fragmentation of the network can be visualized as follows.

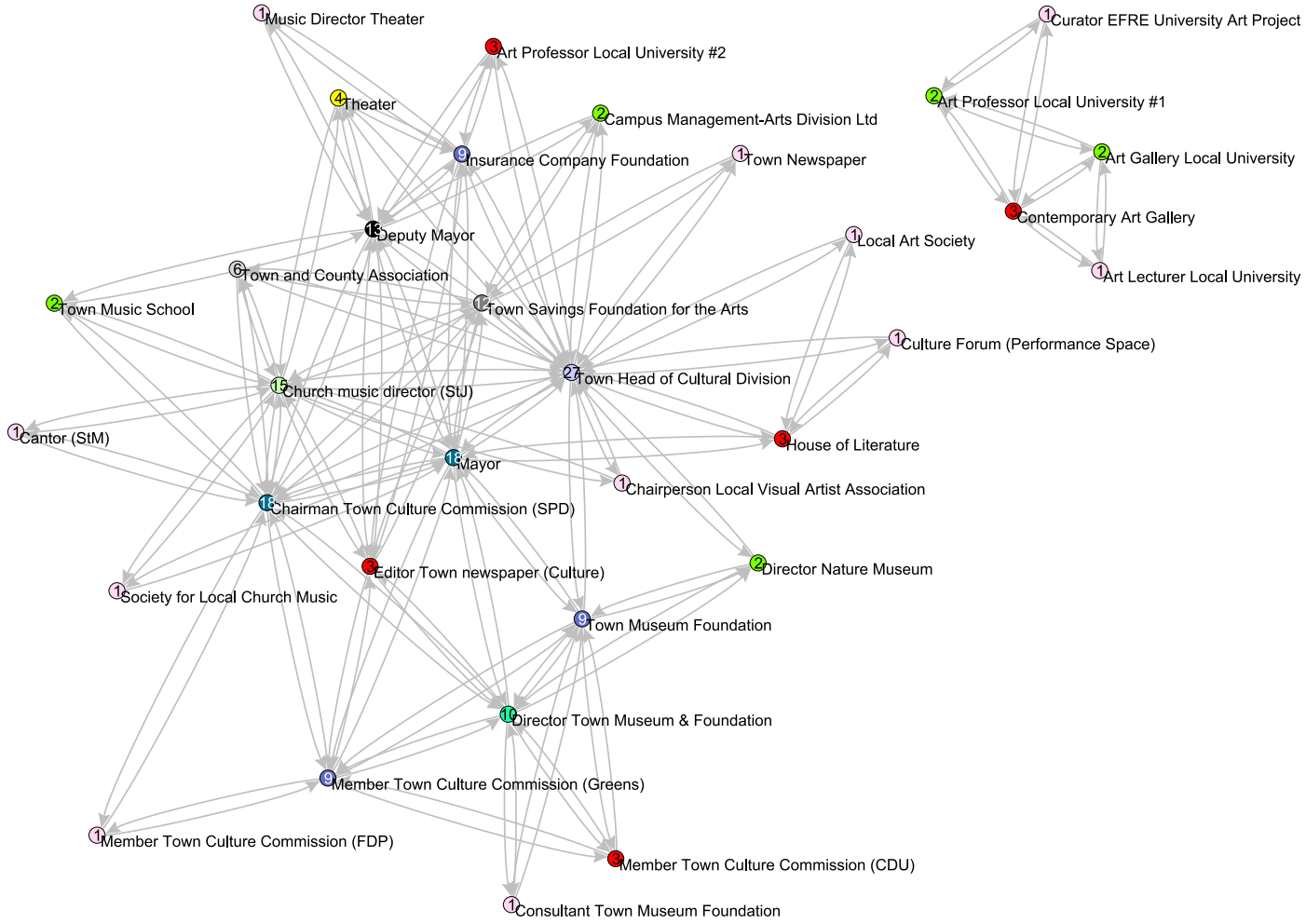
Fig. 7 Network with all 4-degree actors (vertices) and relationships (arcs), displaying the k-cores (i.e., assignation to potential sub-networks 1 to 7)



The core network “7” is surrounded by a few sub-networks that suggest the existence of some more isolated partial networks or cliques. In this case the churches seem to be such a sub-network (in the lower part of the above visualization) as are some members of the university (in the upper right part of the above visualization).

Finally, to further pursue the search for subgroups, especially in view of this rather large “core” network in the middle of the above visualization, a stricter definition for a cohesive subgroup is needed. As already mentioned, a ‘clique’ is a very dense sub-network, containing three vertices (nodes) or more that are highly interconnected in a ‘triad’. Pajek can discover such cliques, and indeed, the local arts and cultural network consists of two such cliques.

Fig. 8 Network with actors who are part of cliques; the number in each node is the number of triads the actor is a member of



Apart from the major ‘core-clique’ of the art network (which encompasses the center and most of the above figure) there is in fact one isolated clique that is removed from the local arts network. Five actors, the contemporary art gallery, the art gallery of the university, the EFRE university art project, and two university art teachers are members of this ‘university clique’. However, the discovery of the above ‘core-clique’ with 28 actors also indicates that there is a densely connected network within the network, with several interconnected triads. Among them are, however, only two arts-oriented densely interconnected triads, a church music ‘double-triad’ (that includes the mayor and the chairman of the culture commission) and a museum ‘double-triad’ (that also includes the mayor). The theatre and the house of literature are parts of triads of this ‘core clique’ but these triads do not consist of further actors working in the theatre or literature field.

4 Summary and prospects

Having studied a town of solely 70,000 residents it came as a surprise to me that the local arts network is such a large, intricate and inter-connected structure. 186 permanent actors with 596 steady contacts show an astonishing arena of interconnectedness and variability. However, it also becomes clear that there are only a few major players in this arena. As an average, every actor of the network has about three contacts, but the top ten players maintain more than 40 contacts each. This is a first indicator for the heterogeneity of this network. The analysis of prestige and popularity, sovereignty and autonomy, and cohesion and cliques further discloses that the network is very unevenly structured.

With respect to 'prestige and popularity' the comparison of outdegree and indegree centrality shows that the major cultural actors have a high outdegree centrality (being solicitors for resources) whereas the two foundations and the university have a strong indegree centrality (being solicited for resources). The 'social capital' measure of closeness centrality does not show such a distinct difference between the arts institutions and other players in the arts network; arts institutions are rather well connected – but not in a way that they increase their influence in the network.

With respect to 'sovereignty and autonomy' the arts institutions of the network have a high 'betweenness centrality', indicating their high connectedness to other players of the network. However, the important 'brokerage' measure of 'eigenvector centrality' gives a different picture. Here, the main power brokers or gatekeepers are the municipal administration and the local foundations, and the cultural institutions lag considerably behind in their ability to shape. The authority weights of the arts institutions indicate that most of them are in a powerless position to influence this network because they are not able to leave their roles as solicitors. Instead, the municipal administrative agencies, including the highly influential political chairman of the culture commission and the local foundations are the real gatekeepers.

With respect to 'cohesion and cliques' all local arts institutions belong to the 'core sub-network', the main body of the network. The arts are thus well related to the local elite (as has already been shown by the above degree centrality and betweenness centrality) but this finding neglects the indegree (or solicitor) role of most arts institutions. There are some exceptions, the analysis of clique structures within the network reveals that the art university actors isolate themselves as a unique clique from the rest of the network; this might be due to the different (and somewhat better) resource situation of these academic institutions. Secondly, there is a 'core clique' where many players of the larger network are densely connected to each other. However, just a few of the members of this 'core clique' are arts producers or distributors. Only two genres (church music and museums) are interconnected in dense 'triad' structures of this 'core clique' where the power is evenly spread among the members and exchange instead of power rules.

According to Scott (2005) the interorganizational field can be described along two 'macro climates': Either the actors want to be relatively independent and keep their distance to each other, and the field's funders and sponsors limit their influence to transient donations, or all actors want to structurally improve the system of cooperation on a common and acknowledged network level, as a collective system that has the objective to support every member. Swanson (1968) labels the former 'macro climate' as heteronomy system, and the latter 'macro climate' as collective system. The described network is still a heteronomy system. However, major players, especially the foundations, understand the need to shift this perspective. Just as an outlook for future research (on a theoretical but also on an

applied and knowledge transfer level) it might be necessary to announce local governance rules with the objective to overcome the mechanisms of resource dependency and to initiate an overall strategic choice process that takes arts institutions – by improving their position in an acknowledged network – out of the limited role of solicitors, and putting them in a position that understand their role as 'authority' for the city and its residents that ask for these ideas, services and products. More general, an objective of further research could also be the analysis of motives that actors have to relate to others – or to also avoid relationships.

Future research for and about local arts networks will compare these results of ten merged egocentrical networks with a standardized survey of all actors of this local network. This is pivotal for gauging the potential bias of a survey of several 'egocentrical networks' (gathered by qualitative interviews) compared to a survey of one representative (or 'non-egocentrical') network (gathered by a standardized and quantitative questionnaire). In addition, it would be worthwhile to conduct a comparative study in a town of similar size (and with a similar composition of arts organizations) to understand how much these results are particular or general.[20]

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[20] Further analysis also has to tackle the structure, causes and consequences of the following dichotomies: strength of relationships (weak vs. strong ties), geographical scope (parochial vs. cosmopolitan ties), path dependency (established and historical vs. alternative and contemporary ties), support structure (private vs. public), power structure (bottom-up vs. top-down decisions), knowledge dissemination (explicit vs. tacit knowledge), openness of network structure (latent vs. manifest ties), art classification (cohesion of art genres).

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