Actors and Links in the Media System: Applying a Network Perspective to the Study of Media Production, Content and Audience [1]

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Abstract:
This work looks into the network mechanisms which underlie the three major parts of the media system: the industry, the content and the audience. It identifies key theoretical frameworks that can be used to explain the formation and dissolution of ties in each of those three areas. The paper outlines a relational interpretation of classic media studies theories and advocates for the use of a network approach to their application in research.

The first three sections of the paper discuss the network structures behind media production, content and consumption. Section one looks into interorganizational ties (industry level), section two deals with semantic relations (content level), while the third section surveys social bonds (audience level). The last part of this study lists five framework packages (or combined approaches) which allow for a comprehensive relational analysis at all three levels of the media system.

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Actors and Links in the Media System: Applying a Network Perspective to the Study of Media Production, Content and Audience

This paper looks into the network mechanisms that underlie the three major parts of a media system: the industry, the content and the audience. It identifies key theoretical frameworks which can explain the formation and dissolution of ties in each of the three areas. The theories and methods outlined in the text are derived from multiple fields: media studies, organizational communication, economics, sociology, and linguistics among others.

The first three sections of the paper outline the main types of networks that can be used to study the media: interorganizational (industry level), semantic (content level) and social (audience level). The last section lists five *framework packages* (or combined approaches) which, each from its own perspective, can be used to study all three parts of the media system through a network approach.

Appendix A provides a diagram (see Fig. 1) and table (see Table 1) summarizing the role of different theoretical approaches in the study of media organizations, content and consumers.

Media Industry: Interorganizational Networks

Ties define the Industry

From a macro-level perspective, the global media industry can be seen as an interconnected set of corporate actors, linked through economic, social, political and cultural ties (Arsenault & Castells, 2008). Networked forms of organization, production and distribution, which are becoming ubiquitous across industries, are particularly prominent in the media sector, a business whose primary domain is mass communication. The well-studied ongoing processes of media ownership concentration (McChesney, 2000, 2004) contribute to the complex layer of dense ownership, partnership and cross-investment relationships between news outlets.

Most of the research studying the industry looks into individual or aggregated data about media companies without much regard for the links that exist between them. It is often grounded in standard economic theory, which rarely considers networks explicitly in the analysis (Konig & Battiston, 2009). A better analytical approach may employ a network perspective, taking into the account the existing relationships and interactions between corporate actors.

Interorganizational networks have been a subject of inquiry in the fields of sociology and organizational theory (Baum, 2002). In this type of analysis, individual organizations constitute the network nodes, each of which may have a set of properties based on the research questions posed by the study. A wide range of formal and informal relationships can be used to define the network ties. Baker and Faulkner (2002) list some of the major domains from which links can be derived: market exchanges, strategic alliances, joint participation in syndicates, joint political action, interlocking

directorates, family ties, and illegal activities such as collusion. All of those are applicable to the media industry which is, in addition, characterized by frequent content/information exchange relationships.

Another set of ties between the companies in the media sector can be constructed on the basis of human resources. This domain is especially relevant there - both because the industry is known to have high turnover rates, and because journalists, more so than other professionals, tend to work for multiple organizations. Having overlapping staff and transfer of employees can create a connection between two companies, even if they have no other interactions. For one thing, the individual social networks of the employees span across the two organizations, opening up possibilities for information transfer. Furthermore, as people move to a new workplace, they bring in knowledge and practices learned from their previous experience (Aldrich & Ruef, 2006).

Two theoretical frameworks that capture the relationships outlined above are *resource dependency* and *social exchange theory*. Those theories seek to explain interactions and relationships based on the supply, demand and exchange of material and information resources (Monge & Contractor, 2003). Initially limited to interactions between two actors, the frameworks have expanded to include more complicated relationships embedded in network structures. Participating in a network allows members to gain access to various resources: financial, institutional and information-related among others (Gulati, Dialdin, & Wang, 2002). Financial resources are linked to capital acquisition and investments, while institutional resources have to do with gaining legitimacy, credibility and status. Both money and reputation can be accumulated based on network ties. Knowledge and information resources are particularly important in the media industry, where information dissemination is crucial and the adoption of new technologies and practices needs to happen faster than it does in many other sectors (Morgan, et al., 2010).

While network members can benefit from increased financial opportunities, improved survival chances and enhanced learning capabilities, it is important to note that some patterns of network ties can also be detrimental (Gulati, et al., 2002). Companies may be vulnerable to exclusion from valuable resources (Monge & Contractor, 2003). Furthermore, over-embeddedness can prevent members from discovering new opportunities existing outside the scope of their network (Uzzi, 1997).

Taking a network perspective gives researchers the opportunity to explore configuration of ties in order to assess the influence of companies in the global media network. Centrality measures can be used to identify actors holding strategic positions that give them a degree of control over the network flow (Freeman, 1979). In the terms of social exchange theory, the powerful nodes in a network have two main characteristics. First, they have multiple ways to access a valuable resource and so are not overly dependent on any single connection to provide them with crucial material or information supplies. Second, influential organizations are able to control resources valuable to others in the network (Easley & Kleinberg, 2010; Monge & Contractor, 2003).

Aspects of power and influence are usually captured through three major indicators of network centrality: degree, closeness and betweenness. One of the simplest ways to evaluate the structural

position of an organization is through the number of ties it has to other entities (*degree centrality*). Actors with many connections are by definition involved in multiple relationships and interactions and are potentially highly visible or prominent (Wasserman & Faust, 1994). In directed networks - ones where links between organizations are not seen as necessarily being mutual - the number of incoming ties (*in-degree centrality*) can be used as a proxy for status (Podolny, Stuart, & Hannan, 1996). In a network of media companies linked through ownership ties, for example, we can expect the central organizations - ones which own a lot of property - to be particularly prominent.

The *closeness centrality* of a firm takes into account not only direct, but also indirect connections to other members of the network. The calculation is based on the shortest paths from the focal actor to all other reachable nodes. Firms with high closeness centrality have quick access to information and other resources. They may also have the ability to quickly and efficiently spread information (Buechel, 2009).

Organizations high in *betweenness* are ones that lie on many of the shortest paths connecting pairs of nodes. Based on this indicator, the most central firms will tend to be ones who bridge otherwise unconnected parts of the network. Actors who, in Ronald Burt's (1992) terminology, *span structural holes* are strategically positioned to control the network flow.

How does this play out on the arena of global media networks? Looking into the operational dynamics of media conglomerates, Arsenault and Castells (Arsenault & Castells, 2008; Castells, 2009) put forward the concept of *switching power.* Organizations are called *switchers* when they have control over strategic intersection points connecting multiple networks. Arsenault & Castells use the example of Murdoch's News Corporation: an organization connecting media, political and economic networks which all contribute to the shared project of the company's financial expansion. To identify the network structures in which News Corp. is embedded, the research looks into several types of relationships between media organizations. Among them are ownership and partnership ties, as well as interlocking directorates. The study goes on to suggest that the strategic network position of News Corp. has allowed its subsidiary Fox News to influence not only the public opinion, but also the practices and norms of other media outlets.

For a long time, scholars studying interorganizational networks worked predominantly with static snapshots of the complex relationships between organizations. Recent developments in computational techniques have changed this. Approaches like actor-based modeling (Snijders, Van de Bunt, & Steglich, 2010) and exponential random graph modeling (Robins, Pattison, Kalish, & Lusher, 2007) allow researchers to study the dynamics of network formation and evolution over time. Both methods permit, furthermore, the modeling of network change driven not only by link structure, but also by attributes of the actors. In the context of a network composed of news outlets, node attributes may include for example size indicators like number of employees, market capitalization, audience size or volume of content production. Other potential node properties include type (newspaper, magazine, radio, TV station, website, etc.), age, geographic location, and political orientation.

As suggested by Monge, Heiss and Margolin (2008), *evolutionary* and *ecological* theories provide a useful lens through which the dynamics of network change can be studied. Evolutionary theory - by definition a theory of change - looks into organizational birth, development, transformation, decline and death (Baum, 2002). The ecological approach focuses on the composition of organizational populations and the resource environments they are located in (Aldrich & Ruef, 2006). It emphasizes the interdependencies between organizations, looking into both competitive and cooperative relations. As Monge et al (2008) have pointed out, the combination of evolutionary and network theory can be applied to the area of mass media, providing the tools to study the changing interactions between news outlets as they compete for the attention of the public.

The ecological framework is particularly helpful in the context of one rather difficult task that empirical research of interorganizational relations presents: defining the network boundaries. The set of media outlets that need to be included in a research is not always immediately obvious. Considering only companies which operate within a certain geographic region (such as the area where a newspaper is circulated) becomes somewhat problematic as the Web lifts territorial restrictions on content distribution. In a book taking an ecological perspective to the media sector, John Dimmick (2003) proposes using the *theory of the niche* to define the scope of populations and industries. Organizations are in the same population - or occupy the same niche - if they compete for the same set of resources. Among the resource dimensions suggested by Dimmick are consumer time and spending, advertising revenues, type of gratifications provided by the media (as described in Ball-Rokeach & DeFleur, 1976) and content. Content has its rightful place as a niche dimension. For one thing, it can be seen as a resource that media need to survive. For another, the type of content produced by media organizations determines the size and characteristics of the audience they will attract.

Organizational Networks and Content Production

As suggested by organizational ecology, the content produced by media outlets is bound to be influenced by some of their organizational characteristics. Larger, generalist companies have broad content niches - they provide a wide variety of materials in an attempt to appeal to large audiences. Smaller, specialized news enterprises have narrow niches in that they focus on a limited number and type of stories (Dimmick, 2003). At an institutional level, selection of stories depends on established internal routines. Media outlets vary in type, location, projected identity, social context, target audiences, political orientation, production technologies, available resources and ties to other organizations. All of those characteristics – and many more – affect content production (Allern, 2002; McManus, 2008).

It is only to be expected that the properties of an individual outlet will affect the type, volume and diversity of its content. What is more interesting for the purposes of this paper is that content is also influenced by the *links* between organizations. The network relationships described in the previous section - financial, corporate, interpersonal - have some bearing on the production process and output.

Ownership and partnership ties are particularly important in that respect. Research has found that the corporate policies of parent companies affect the news agenda of their subsidiaries - as do ties with advertisers and sponsors (Duplessis & Li, 2004). The impact is not only due to the adoption of formal policies. As corporations seek economies of scale, they share organizational knowledge and resources, including information and staff, between the media outlets they own. As a result, journalistic and editorial practices are transferred between different news sources. Studies in that area have confirmed the impact of ownership structure on news quality (Dunaway, 2008) and diversity (Huber, 2006).

In addition to being affected by links between organizations, media content can also constitute a link in itself. One potential tie of that kind is created through exchange of stories between partnering news outlets. Another possibility, suggested by Ognyanova (2009) involves defining links based on the overlap of issue coverage between media outlets. News providers who tend to publish on similar topics are seen as connected through shared patterns of story selection. Taking that perspective on the media network allows for an exploration of outlets clustered around similar news topics. It can also highlight dependencies between the selection patterns of organizations owned by the same parent corporation.

Researchers studying the interdependencies between the topics covered by different news providers often employ the mass communication paradigm of *inter-media agenda-setting*. The theory suggests that elite media like the New York Times have the ability to influence the topic selection of other outlets (Rogers, Dearing, & Bregman, 1993). The current dominant approach to inter-media agenda setting involves computing correlations between rank-ordered lists of media issue priorities (Coleman & McCombs, 2007). While useful in demonstrating similarities, this method is problematic when trying to answer more specific questions about directions of influence, centrality of outlets and external factors affecting the agenda overlap. Moreover, it does not provide a particularly useful description of the global patterns of shared issue priorities. A network approach, on the other hand, gives some methodological flexibility allowing for more sophisticated exploration of social influence between actors.

Inter-media Ties and Online Content

As media outlets increasingly often offer their content on the Web, researchers have developed online methods to trace patterns of influence. News websites (e.g. nytimes.com) can be seen as online representations of media organizations (The New York Times). Hyperlinks embedded in the content constitute the network connections.

Taking that perspective, scholars have most often set out to explore the ties that exist between mainstream news sites and blogs. For the purposes of those studies, blogs are often implicitly regarded as a special, more opinionated, individualized type of Web media outlets. Research viewing bloggers as audience members who use online tools to propagate content produced by news organizations will be discussed in a following section of this paper.

When it comes to deriving meaning from hyperlinks, two major approaches can be identified in existing research: one based on *affiliation*, the other on *value*. The *affiliation* approach regards hyperlinks as a proxy for social and organizational relationships (Mika, 2007), positing that more linking is likely to occur between the websites of actors who share some common ground. This may refer to existing relationships - between people who know each other, between organizations that work together, between subsidiaries of the same parent company (Ali-Hasan & Adamic, 2007). The existence of online links, however, may also indicate a different type of commonality based on shared properties. Elite news venues may, for instance, only post links to other outlets of the same type (Meraz, 2009). Political bloggers may overwhelmingly link to people with similar party affiliations (Adamic & Glance, 2005). The social network principle underlying those findings is *homophily* - the tendency of actors to associate with like-minded others (Easley & Kleinberg, 2010). This maps on related concepts found in media and political studies: selective exposure to media content and the political polarization of the public discourse (Sunstein, 2007).

Network analysis methods, which take into account actor attributes, inter-actor connections, and the dependencies between the two, are particularly well-suited to study these processes. Cluster analysis provides one way of exploring the tendency of similar media actors to link to each other. Another method that has been used to examine the social patterns of linking in blogs employs community detection algorithms (Chin & Chignell, 2006).

The *value* approach - the second view on the significance of online ties mentioned above - sees the hyperlink as an information exchange tie. Links are expected to point to content or organizations that are considered relevant, credible, and authoritative. Similar to citations in scientometric research, hyperlinks are treated as an indicator of quality and a marker for reputation (Park & Thelwall, 2003). In its simplest version, this approach can assess the influence of a media site based on *in-degree* centrality (the number of hyperlinks pointing to it). More sophisticated network algorithms have also been developed to explore the relevance of online content within a specific knowledge domain (Easley & Kleinberg, 2010). One framework suggests distinguishing between sites containing valuable links, called *hubs,* and sites containing valuable content called *authorities* (Kleinberg, Kumar, Raghavan, Rajagopalan, & Tomkins, 1999).

Researchers looking into patterns of online influence have found that mechanisms of preferential attachment are shaping the structure of the Web. "The rich get richer" principle leads to a power law distribution of links to mainstream media and blog sites (Drezner & Farrell, 2004). Studies have associated those findings with the existence of an *elite bias*. The presumption is that a small number of high-profile news venues have a major impact over the rest of the media and the public opinion.

Link analysis has thus emerged as a useful new method in the area of *agenda-setting* research. The ability of prominent news sources to set the issue coverage priorities of other outlets is assessed through patterns of hyperlinking. In one study of that kind, Meraz (2009) looks at links to examine the power of the New York Times and the Washington Post to set the political news agenda. More

sophisticated research designs may also consider the organizational attributes that drive linking behavior, as well as structural patterns of linking like reciprocity and transitivity (Lusher & Ackland, 2010).

Media Content Networks and Concept Maps

The previous section of this paper looks into networks of media organizations, drawing upon relevant theories and discussing the potential effects of interorganizational ties on content production. Another level at which networks can be constructed is that of content itself. News articles, either individually or as a larger corpus of multiple texts, can be presented as maps of interrelated concepts. This allows for an exploration of the way issues and ideas are linked together in journalistic materials. It also facilitates the comparative analysis of different discourses that develop around contested social issues.

Two major frameworks come together in studies that employ concept maps to analyze news content. The theoretical background is provided by the media effects theory of *framing.* The analytical approach is that of *semantic analysis* (SA).

The main idea behind framing theory is that media can affect the way we think about an issue by making some of its aspects more salient while ignoring others. Framing is not necessarily limited to a media "spin" on controversial issues. Rather it serves as a parsing mechanism, a collective sense-making tool aiding the understanding of everyday events and social interactions (Goffman, 1974).

Most of the research on framing confirms the assumption that media frames have a powerful impact on public opinion (Castells, 2009; Shen & Edwards, 2005). Pan and Kosicki (2001) go as far as to suggest that it is an essential part of public deliberation. Recognizing the significance of frames as socially shared, persistent organizing principles that structure meaning (Reese, 2007), scholars in media and political studies began looking for ways to access those structures. Developing a practical definition of framing that can be used in empirical research is recognized as a notoriously difficult task (Koenig, 2004). One attempt to do that comes from Entman (1993), who suggests looking for the presence of absence of certain "keywords, stock phrases, stereotyped images, sources of information and sentences that provide thematically reinforcing clusters of facts or judgments". This notion that we can examine a text to identify key concepts and clusters of ideas is central to the field of semantic analysis.

Semantic analysis is based on the premise that knowledge can be presented as networks of words and their relationships to each other in a given context (Carley, 1993). SA software identifies the important concepts in a written work based on the frequency of their occurrence. Some types of words - transitive verbs, prepositions, conjunctions, etc. - tend to appear often in any text but are not necessarily considered very important. Those are typically excluded from the analysis (Murphy & Maynard, 2000). A network - in this case also called a semantic map - is constructed based on a set of terms which have been identified as most relevant.

A number of methods have been developed to evaluate the strength of semantic relationships. The ties in a semantic map are typically based on related or overlapping meaning. One simple and often used way to detect a link between two words is based on the frequency of their proximate co-occurrence. If two concepts are related in the context of the framing applied to a text, they are also likely to frequently appear within several words of each other (Doerfel & Barnett, 1999). This approach has theoretic foundations grounded in cognitive processes (Scott, 2005). Words are hierarchically clustered in memory and their meaning is retrieved through associations with other words. If we assume that some patterns of those cognitive associations emerge in written text, semantic maps could be one way to capture them.

Once the semantic map is compiled, it can be interpreted directly based on the researcher's knowledge of the domain - or used to derive other measures and perform different types of quantitative analyses (Rice & Danowski, 1993). Clustering analysis, for example, may be used to examine groups of concepts that tend to appear together. Different frames can emerge as different clusters including the focal concepts. Another type of analysis takes separate bodies of texts and constructs a semantic network for each one of them. Quadratic Assignment Procedure (QAP) can then be used to do a comparison between different semantic maps over the same concepts (Doerfel & Barnett, 1999).

Though it has its disadvantages, automated semantic mapping is likely to produce more consistent results across texts than human coders. It is, furthermore, particularly well suited for analysis of large corpuses of media content which would present some challenge to manual coding.

Exploring the implications of media framing, researchers have applied semantic analysis in a wide diversity of contexts. SA studies have looked into political debates, organizational literature, media framing of genetic testing, health crises, nicotine, artificial sweeteners and other topics (Hellsten, Dawson, & Leydesdorff, 2009; Murphy, 2001; Murphy & Maynard, 2000; Samkin & Schneider, 2008; Tian & Stewart, 2005).

Semantic mapping can also be helpful in studies that bridge the content and organizational levels of analysis. Research may, for instance, explore the theoretically predicted similarity between the frames employed by news outlets which are part of the same media conglomerate (Allern, 2002; McManus, 2008). Scholars have already used SA to compare the framing strategies of different media companies. Tian and Stewart (2005) for example use automated semantic mapping to compare the framing of the SARS crisis by the news sites of CNN and BBC.

SA is expected to become more sophisticated in terms of methodology and more popular as a research technique with the advent of the Semantic Web. The key driving force behind that new strategy of information representation is the use of formal languages that computers can process to describe the meaning of online content (Mika, 2007). Embedded metadata will allow machines to understand the context of information, combining facts from multiple sources to perform an ever more intelligent knowledge analysis. Media outlets like the New York Times have already begun releasing information under a new *linked open data* format (The New York Times, 2009). This allows computers to

automatically determine which names in the text refer to people, organizations or places - and retrieve background information about those entities.

Audience Social Networks and Content Diffusion

At the third level of analysis discussed in this paper, the focus is on networks constructed by audience members and the connections between them. Those may be social ties of friendship, common affiliations and media preferences, as well as links based on information exchange. Once again here, the two academic domains of media studies and network analysis complement each other in explaining the social aspects of media use.

In the field of social networks, a host of mechanisms underlying the structure of interpersonal relationships has been identified. Those include, among others, homophily, proximity and balance theories (Monge & Contractor, 2003).

In the realm of media studies, multiple paradigms provide insight into the audience relationship with media organizations and content. Media system dependency suggests that individuals rely on media for their information needs - understanding the environment, learning social norms and escaping from everyday pressures through entertainment (Ball-Rokeach, 1985; Ball-Rokeach & DeFleur, 1976). The uses and gratifications approach (Katz, Blumler, & Gurevitch, 1973) similarly emphasizes the role of the consumer in selecting the appropriate media to meet their needs.

One framework which explicitly focuses on both social ties and news content is the *communication infrastructure theory* or CIT (Ball-Rokeach, Kim, & Matei, 2001; Kim & Ball-Rokeach, 2006). The model proposes a holistic, multi-method approach to studying the community *storytelling network* - an integrated system that involves local residents, organizations and media outlets. CIT emphasizes the importance of both interpersonal ties and engagement with media as factors contributing to civic engagement. The social connections between residents, the affiliation links between residents and their preferred media outlets, and the diffusion of media stories through the population are among the important aspects of the local storytelling system.

Another media effects theory, the two-step flow of communication, provides the basis for network studies of media content diffusion. The model suggests that instead of reaching the public directly, the ideas broadcasted by media outlets are channeled through a particularly active segment of audience members: the opinion leaders (Katz, 1957; Katz & Lazarsfeld, 1955). Translating the two-step flow in network terms, we can see the mechanism it describes as a diffusion process (Valente, 1996). Certain central, well-connected nodes in the network - the opinion leaders - pick up ideas or bits of information from the media. That information is then disseminated further through their interpersonal connections.

The diffusion of media content has been particularly well studied in an online context. In the past few years, Web platforms have started providing multiple tools that allow users to reconstruct their

real life social networks in an online space (Kleinberg, 2008). Sites like Facebook and Twitter give audience members the option to forward media content to their connections with the click of a button. A recent Pew report suggests that that's exactly what 37% of the Internet users are doing (Purcell, Rainie, Mitchell, Rosenstiel, & Olmstead, 2010). More than half of the people using social networking sites, furthermore, receive and follow links to news items on a daily basis. Blogs are another medium in which news content is propagated. As it is an accepted norm for bloggers to link to their sources (Chin & Chignell, 2006; Ferdig & Trammell, 2004), information diffusion in the blogosphere can be tracked based on hyperlink patterns and time stamps.

Taking into account those new trends, scholars have started studying the spread of topics through both social networking platforms (Oh, Susarla, & Tan, 2008) and blogs (Leskovec, Backstrom, & Kleinberg, 2009; Leskovec, McGlohon, Faloutsos, Glance, & Hurst, 2007). The two analytical approaches used to explore the online diffusion of media content involve threshold models (Valente, 1996) and cascade models (Cointet & Roth, 2009). In threshold models, an actor's decision to disseminate a topic is based on the proportion of their connections who have already started discussing the subject. In a cascade model, each time an actor is "infected" with a new topic there is a certain probability that the infection will spread to neighboring nodes.

Epidemic models of diffusion are often used for online content as their robustness has been well established through long use in other scientific fields. Much of the research looking into the network flow of information is based on methods initially developed to model the spread of disease through interpersonal connections. Clinical research in epidemiology often uses the *SIR* (susceptible - infected - recovered) cycle to describe the stages through which a node may go. The same model has been adapted to study audience members and their exposure to media content (Leskovec, et al., 2007). In the online-diffusion version of SIR, users may become *susceptible* to a topic when it is suggested to them by a friend (either through a blog post or via a service like Twitter or Facebook). The person may then be *infected* with the topic, in that they write a post about it or publish it on a social networking platform. With this, the individual is considered to have *recovered* from the topic, although a relapse is possible when something new appears on the subject.

Modeling the spread of media content through social networks has allowed researchers to understand topic life-cycles, spikes and declines (Cointet, Faure, & Roth, 2007; Gruhl, Guha, Liben-Nowell, & Tomkins, 2004; Leskovec, et al., 2007). It has also provided a way to explore patterns of influence and identify opinion leaders (Java, 2006; Nakajima, Tatemura, Hara, Tanaka, & Uemura, 2006).

Conclusion: Multilevel Frameworks

The previous three sections briefly outlined media theories and network applications relevant at the level of media organizations, content and audience. Studies and frameworks that bridge two or all three of those levels were discussed. In this section, we go back to Monge & Contractor's (2003) suggestion that complementary theoretical mechanisms and analytical tools are needed to explain network phenomena. In conclusion, five *framework packages* consisting of compatible theories and

methodologies will be proposed. Those have been selected as they seem conducive to research that encompasses aspects of media production, output and consumption.

Ecological theory + Interorganizational Networks

This group of theoretical tools allows for the construction of networks between media outlets based on resource exchange, ownership, partnership or strategic alliances. Media audiences and content are, under this framework, integrated in their role of strategic resource dimensions, as outlined by Dimmick (2003). A study taking this approach may explore the effects of those key resources on the organizational decision to form a tie with another actor. Research can also investigate effects going in the opposite direction: shifts in content and target audiences caused by a new partnership, ownership or resource exchange link.

Agenda-setting + Hyperlink Analysis

The online space provides a unique opportunity for large-scale collection of network data. Furthermore, as media organization and user sites coexist on the Web and link to each other's content, patterns of influence can be detected from the network of links. For the purposes of agenda-setting, it is quite appropriate to accept the *value* approach to the meaning of links. In this particular context, it does not much matter if an audience member has linked to a news story in order to criticize rather than endorse or share it. Criticized or not, the story is still on the agenda as a topic for public discussion. Studies in that area can identify influential news outlets, but they can also look for bottom-up effects of topics crossing from audience members to mainstream media.

Framing + Semantic Analysis

As suggested in the content section of this paper, concept mapping will probably become more widely used in the social sciences as the Semantic Web and the open linked data format allow an intelligent automated parsing of media content. Semantic analysis is already used to identify the dominant frames of media texts. While this approach focuses on content, it has potential applications bridging the levels of media organizations and consumers. Semantic tools may, for example, be used to compare the framing of issues between different news outlets. The differences in framing (which may be operationalized through distances between vectors in a semantic space) can then be mapped onto the distances in an organizational network. Alternatively, frames used by media outlets and audience members can be compared.

Communication Infrastructure Theory + Social Network Analysis

CIT is explicitly formulated in network terms, as emphasizes the importance of links between residents, media and community organizations. The storytelling system proposed by the theory is postulated as a network incorporating three types of actors: individuals, news outlets, and NGOs. The network links are based on information exchange (or more specifically, story exchange) relationships. Research using this framework can look into the structure, density and clustering patterns of the storytelling network. Central actors, as well as actors serving as bridges between different groups can be identified.

Diffusion Theories + Semantic/Hyperlink Analysis

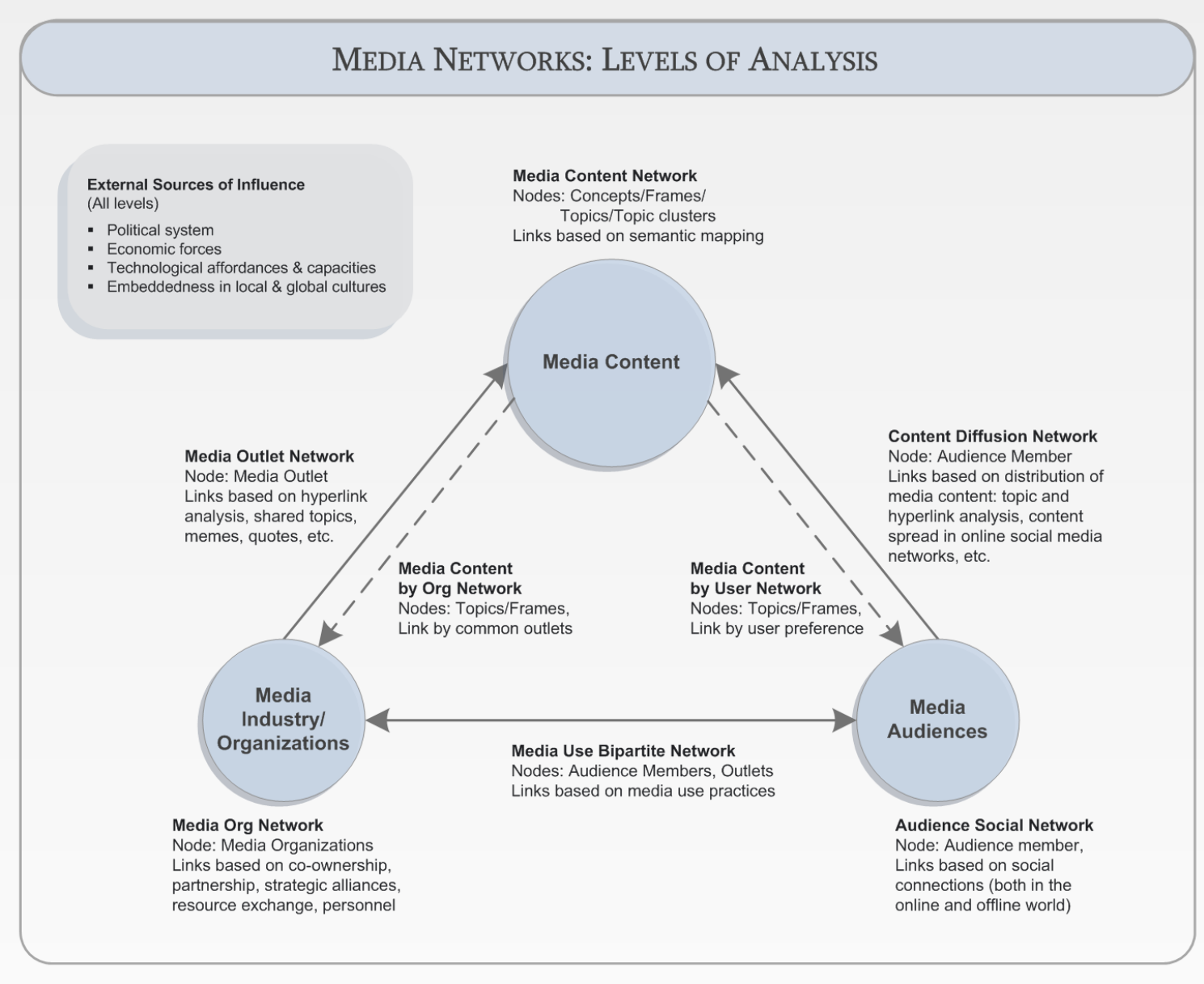
Social contagion and diffusion theories are used to track the online spread of topics or specific stories between both media outlets and consumers. Extracting the underlying topics from text requires the use of semantic parsing (Leskovec, et al., 2009). Tracking the spread of specific media stories can be done on the basis of linking patterns. Studies in the area model the diffusion, trying to cycle patterns, influential nodes, and mechanisms guiding the dissemination.

Appendix A

Table 1. Theories and Methods

Theories & Methods (Network Analysis, Application to Media Studies)			
Level of Analysis	**Media Industry/Orgs**	**Media Content**	**Media Audiences**
Media Industry/ Orgs	▪ Evolutionary Theories, Population ecology, Theory of the Niche ▪ Resource Dependence ▪ Exchange Theories ▪ Equilibrium Theories		
Media Content	▪ Evolutionary Theories, Population ecology, Theory of the Niche ▪ Intra and inter-media level agenda-setting ▪ Media bias	▪ Semantic Networks, cognitive concept mapping, Framing theories	
Media Audiences	▪ Media Ecology ▪ Selective exposure ▪ Uses & Gratifications ▪ Media System Dependency ▪ Information Seeking ▪ Transaction cost	▪ Two Step Flow Theory ▪ Contagion/Diffusion ▪ Social Capital ▪ Structural Holes ▪ Collective Action, Public Goods	▪ Homophily theories ▪ Proximity theories ▪ Electronic Propinquity ▪ Balance theories ▪ CIT & Storytelling Networks

Fig.1. Defining Network Actors and Ties



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