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# Probable applications of complex networks in public relations practices: A scenario-based approach

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## **Abstract**

*This paper examines the feasibility of using complex networks theory in order to achieve more effective results when establishing and managing relationships. It focuses on the example of relationships with the media, as one of the stakeholders of any organisation, but argues that other relationships managed by public relations will also be able to benefit from the application of complex networks theory. The present study consists of four parts, starting with brief coverage of the importance of public relations for organisations, continuing with complex networks theory and its probable applications in public relations practice, and ending with a hypothetical scenario demonstrating use of complex networks in a media relations situation. The scenario is structured on the results of interviews with managers of small and medium sized accommodation establishments. The article concludes that complex network theory is an area of high relevance to theory building in public relations, and that more work should be done to incorporate it into the discipline's range of theoretical and applied approaches.*

## **Introduction**

The growing importance of public relations has attracted many researchers to focus on the subject, since public relations practices have a vital role in organisations that want to gain competitive advantages through having a good reputation. The increasingly competitive and complex business and social environment makes it critical for organisations to understand how to

apply public relations activities strategically to help ensure success. The challenge for organisations is to survive and to become more efficient or competitive by using suitable tools to achieve better performance of strategic goals. In today's changing business environment, intangible assets of companies such as brand, reputation, and relationships have become more important than physical assets. Stakeholder relationships are intangible assets of corporations. Intangible assets are considered as a major driver of the global economy, and determinant of corporate survival and success (Phillips, 2006).

A stakeholder is classically defined as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984, p. 46, Mitchell & Cohen, 2006, p. 8; Mitchell, Agle & Wood, 1997, p. 854).

The stakeholder groups of any organisation represent a wide and diverse range of interests, given that each stakeholder group has its own unique set of expectations, needs, and values. The most common way of classifying stakeholders is to consider groups of people with a distinguishable relationship with corporations. The most common groups of stakeholders to be considered for an organisation are shareholders, customers, suppliers and distributors, local communities, trade unions and associations, NGOs, competitors, governments, financiers, the media, business partners, academics, the public in general, non-human aspects of the Earth, future and past generations (Friedman & Miles, 2006).

The main idea on which normative approaches to stakeholder theory are based is

the need of managers to deal with key stakeholder relationships (*12Manage*, 2007). Effective management of relationships with stakeholders (stakeholder management) is an important managerial activity in any organisation. Management needs to focus on supervision of relationships that are critical to an organisation's success. The emphasis of stakeholder management strategies is on how to manage conflicting stakeholders to maximise companies' competitive power (Lim, Ahn & Lee, 2005).

### **Public relations today: The importance of communication and relationships**

Public relations can be defined as "the management of communication between an organisation and its publics" (Grunig, 1992, p. 4). Another standard definition of modern public relations by Cutlip, Center and Broom (1994, p. 6) is as "the management function that establishes and maintains mutually beneficial relationships between an organisation and its publics on whom its success or failure depends". Both definitions include the concepts of management, organisations, and publics with the only difference the choice of communication rather than relationship building. Other public relations theorists have focused primarily on the concept of management as the domain of public relations. Caywood (1997), for example, emphasised how public relations people managed communication with stakeholders, including customers, so as to lead to a profitable organisation that creates and protects the brand and reputation of the organisation. Daft (2001), on the other hand, defined public relations as a means of controlling environmental resources through interorganisational linkages. According to Daft, public relations attempts to shape the company's image in the minds of customers, suppliers, and government officials. Others have remained focused on communication as the central concept of public relations (Toth, 2002).

Historically, managing communications has been the centre of public relations

practice. During the recent years the practice of public relations has been conceptualised as relationship management and increasing number of scholars have examined the factors affecting relationships between an organisation and its publics (Bruning, 2002).

Public relations serves as a source of intelligence for organisations. It also adds value to organisations by increasing organisational effectiveness, monitoring the environment, reconciling goals with those of stakeholders, building and maintaining relationships with them and supporting strategy development processes (Ni, 2006). Recently public relations has been examined by researchers, namely Hon and Grunig (1999), Hung (2005), and Ledingham and Bruning (2000), through relationships.

Public relations value is also demonstrated through the management of social and reputational capital (Ni, 2006; Fombrun, 2001). A signalling activity (Shapiro, 1983) based on available information about an organisation's actions (Fombrun & Shanley, 1990) results in corporate reputation. Reputation is not only structured by the information signals sent by an organisation or other information intermediaries (Fombrun & Shanley, 1990), but also the stakeholders' perceptions and interpretations of organisations' actions (Fombrun, 2001) contribute to build corporate reputations. These perceptions and interpretations indicate how organisations' publics perceive the information signals sent by the organisation. Therefore, "reputation is the result of a complex network of interactions between the organisation and its stakeholders and among the stakeholders themselves" (Dentchev & Heene, 2004, p. 58).

There exists an elusive emotional bond between a company and its stakeholders that is central to the most stable reputations (Alsop, 2004). Public relations which perhaps does not create reputation could enhance it (Murray & White, 2004). The contribution of public relations to an organisation's value can be in various ways, such as reduction of conflicts and development of social capital that facilitates the creation of intellectual capital (Nahapiet & Ghoshal, 1998).

It is widely acknowledged that organisational wealth is dependent upon an organisation's relationships with critical stakeholders. These relationships are exceptional because not all competitors pay attention to them or are able to build quality relationships with important publics. Relationships also are unique because building relationships entails causal ambiguity, path dependencies, and social complexity. Some intangible resources, such as experiences, are based on tacit knowledge or could contribute to interpersonal trust; thus are difficult to imitate. Long-term relationships with stakeholders assist organisations in creating value beyond pure market transactions. Relational interactions generate more value than transactional ones, whereas the latter one can be easily duplicated, and thus offer little potential for competitive advantage. In other words, relationships involve investments and so include a 'time dimension', which makes it complicated to duplicate. Moreover, relationships cannot be substituted with tangible resources, such as money, by which loyal customers, motivated employees, and a cooperative community can not be obtained (Ni, 2006).

Ledingham (2003, pp. 193–195) offers one general theory of public relations called relationship management theory, which is structured on the management and interpersonal communication theory, as the proper framework for the study, teaching, and practice of public relations. As the function of public relations is to build and maintain a mutually beneficial relationship between organisations and their publics (Hon & Grunig, 1999; Huang, 2001; Ledingham, 2003), the development of dialogue (Park & Reber, 2008; Taylor, Kent & White, 2001), building strong relationships and maintaining persuasive communication are considered to be vital elements in gaining competitive advantage over rivals. At this point we recommend that public relations practices of organisations can be managed more efficiently and effectively by understanding

the importance of complex networks in building successful relationships and communicating with their publics.

During the 1970s and 1980s PR books printed in the United States focused on the connections between the media and public relations (Alexander, 2004). This approach changed as a result of some researchers' discovery of possible contributions from other disciplines namely speech communication, interpersonal communication, sociology, psychology and organisational development. Theories of persuasion were at the centre of early studies of communication (Grunig & Hunt, 1984; Berger & Chaffee, 1987; Neff, 1989) but subsequently relationship management emerged as the dominant area in public relations studies (Lindenmann, 1998; Hon & Grunig, 1999; Bruning & Ledingham, 1999; Ledingham, 2003; Bruning, 2000). As Ledingham (2001, p. 286) argued, "public relations is undergoing a major paradigmatic shift".

"Establishing and maintaining mutually beneficial relationships" (Pohl & Vandeventer, 2001, p. 359) has become the main indicator of this shift. New means of communication brought by technological revolution has created the need for newly established ways to communicate with stakeholders since technology has created new channels and methods of communication (Alexander, 2004). Mass markets have transformed into discrete, individualised and customised markets where targeting has become prominent (Heath, 1998; Gorelick, 1998).

The change in the public relations paradigm has resulted in an examination of public relations by relationships, and many researchers such as Ledingham and Bruning (1998; 2000), Bruning and Ledingham (1999), Taylor (2004), and Grunig and Huang (2000) have explored this focus. This new approach to public relations has offered an opportunity to manage relationships better (Chia, 2006). Recently, network studies, which demonstrate the mechanism of relationships, have been widely used in the field of public relations.

## The concept of complex networks

Since today's society is described as one dominated by 'connected' networks, an understanding of the functionality of networks plays a crucial role in people's lives. Networks have drawn the attention of many researchers from different fields, because networks exist in all aspects of human lives: electricity, gas, water, and cable TV are brought to homes by interlinked networks; telephone, e-mail and other communication means work based on the network principles; spread patterns of diseases are dependent on connections described as networks; the human body and brain are considered networks; human organisations are networks (Committee on Network Science for Future Army Applications, 2006).

In the research on networks conducted in the fields of mathematics and physics, a network is described as a set of items called vertices (or sometimes nodes) and sets of ties. Sets of edges—which correspond to unordered pairs of nodes or directed edges—may be covered by ties (White, Owen-Smith, Moody, & Powell, 2004; Newman, 2004; Amaral & Ottino, 2004; Crucitti, Latora, Marchiori, & Rapisarda, 2004). Vertices (also known as nodes or points) are the actors, agents or players in social networks. Edges (lines) are the ties or links in social networks. An edge is defined by a link that connects two points. The concept of networks from the 'hard' sciences has been drawn into the social sciences to help demonstrate, model and predict the relationships, connections, and interactions among people. The models of complex networks can help people to understand the mechanisms of dissemination of epidemics, terror attacks, media coverage, friendships, sexual relationships, and cooperation in organisations. Understanding the structures of complex networks provides many opportunities for managerial and administrative bodies, such as transmitting messages easily, preventing disease spreads and terror attacks, structuring better and stronger relationships with stakeholders, etc. (Bingol, 2005).

A complex network is a system which is said to have more than one possible future. In other words, as they are not purely mechanical, they are free enough to make choices other than a single pre-determined path in the future (Allen, 2000). Systems which are in the form of networks abound in the world. All ecologies, food webs, distribution networks, global systems, economic sectors, regional economies, communities, organisations, organisational networks, networks of business relations between companies, the Internet, the World Wide Web, social networks of acquaintance or other connections between individuals can be explained as complex networks (Allen, 2000; Newman 2004; Barabási & Bonabeau, 2003; Amaral & Ottino, 2004).

Although networks have been studied extensively in mathematics and physics they have also found their place in studies of economics and other social sciences (Barthélémy & Amaral, 1999). Typical social network studies are generally related with issues of centrality (which individuals are best connected to others or have most influence) and connectivity (whether and how individuals are connected to one another through the network) (Newman, 2004). Understanding the spreading patterns of things through different social, organisational, and technological structures and the results of these diffusions attracts the attention of many researchers to the field of network studies (Watts, 2003). For example, SSKN (socio-spatial knowledge networks) theory, which is widely used in medical research (especially in nursing, community health, and studies of the spread pattern of disease), suggests that knowledge networks are constructed from activity spaces, place inventories and information nodes (Andrews, 2006).

Socio-spatial knowledge networks (SSKN) theory provides a suitable framework for examining the spatial features of health knowledge (Cravey, Washburn, Gesler, Arcury & Skelly, 2001; Skelly, Arcury, Gesler, Cravey, Dougherty, Washburn & Nash, 2002; Gesler, Dougherty, Arcury, Skelly & Nash, 2003; Gesler, Hayes, Arcury, Skelly, Nash & Soward, 2004). Mapping of socio-spatial knowledge

networks provides insights into how people get information of actual or potential value to them, such as about community health facilities (Cravey et al., 2001; Skelly et al., 2002; Sligo, Massey & Lewis, 2003). SSKNs are evaluated based on a micro-geographical analysis of the communicative networks of social relationships within which they create and maintain their information (Sligo et al., 2003). However, complex networks are scale-free, some nodes have a tremendous number of connections to other nodes, and the popular nodes (hubs) in any complex network can have hundreds, thousand or even millions of links (Barabási & Bonebeau, 2003). Compared with SSKN theory, then, complex networks theory may provide a broader platform for analysing scale-free social networks without any geographical limitations.

Newman (2004) divided networks into four categories: information networks (also sometimes called knowledge networks such as citation networks); technological networks (such as networks designed for the distribution of some commodity or resource—electricity or information); biological networks (such as metabolic network, neural network, marine food web); and social networks. In this study, we mostly focus on social networks as this type of network is composed of people or groups of people with contacts or interactions between them. Some examples include: patterns of friendships between individuals; business relationships between companies; and a company's relations with its stakeholders and publics.

For more than 40 years, all complex networks had been accepted as being completely random—networks consist of nodes with randomly placed connections—but then researchers discovered that some networks contain hubs (nodes with a very high number of links). Networks with hubs are termed 'scale-free' networks. Random network theory fails to explain the existence of hubs, which can be explained by two mechanisms; growth and preferential

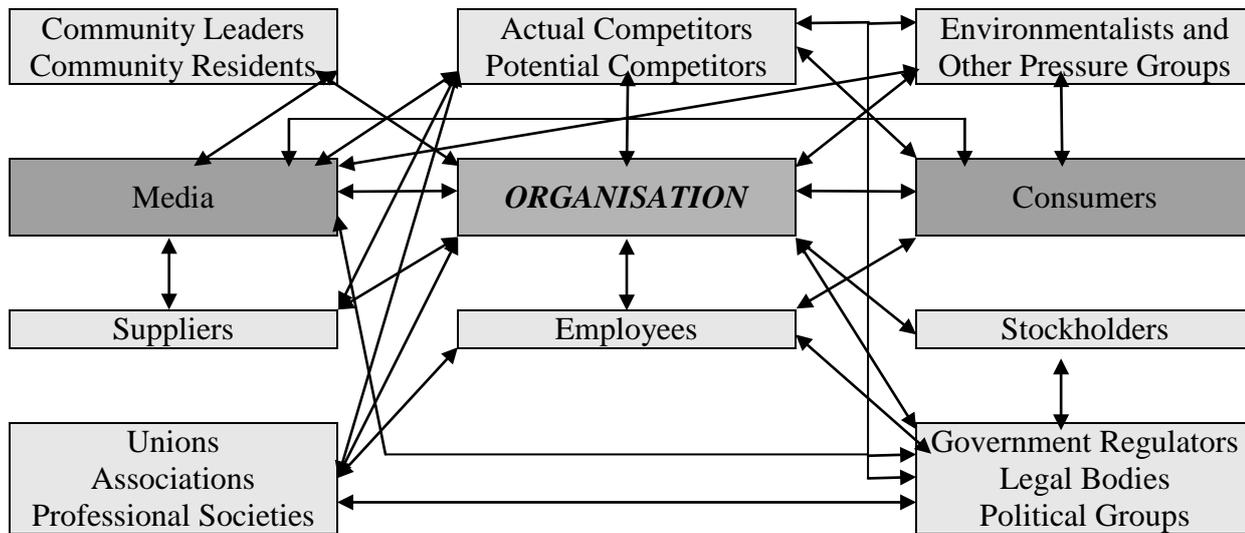
attachment. These two mechanisms depend on a 'rich get richer' process where new nodes tend to connect to the more connected sites and these popular sites acquire more links than their less connected neighbours. Some social networks are scale-free, and scale-free networks can occur in business. The potential implications of scale-free networks for business can be in monitoring potential failures by examining linkages between companies, industries, and economies, and in finding new ways for launching and marketing a new product or service (Barabási & Bonabeau, 2003).

### **Complex networks applications in organisations' public relations practices**

Network studies have been used in order to understand relationships and their impacts in today's society by many researchers from different social science fields. Since the perception of social links differs from one individual to another, social networks are thought to be subjective to some extent. Most real-world networks symbolise the 'small-world' phenomenon (Liljeros, Edling, Amaral, Stanley, & Åberg, 2001). Small world phenomenon can be described as relationships and interactions (links) among people or organisations which make a wide area easily accessible by offering the shortest path. Therefore, applying complex network theory to the field of public relations provides an effective means of reaching an organisation's publics more easily—of turning the 'wide world' into a 'small world'.

Organisations—as a part of social system—are shaped by both internal and external interactions. An organisation's possible interactions are shown simply in **Figure 1**. Figure 1 demonstrates the possible interactions between the organisation and its publics. It is obvious that there also exist interactions among publics of the organisation. The relationships resulting from these interactions are considered the most powerful competitive weapon of the organisation.

**Figure 1: Possible interactions of an organisation**



The success of the organisation depends heavily not only upon consumer satisfaction but also upon strong relationships which the organisation creates with its other publics. The web of interactions is most like a complex network, so in addition to an organisation being a complex network, its environment and publics represent complex networks. Therefore, if an organisation's interactions with its publics are claimed to be a complex network, then, some publics should be considered as hubs to which the organisation must give more importance than other publics in order to make its media and public relations practices more effective.

At this point in the evolution of public relations models and theory, the responsibility of building and sustaining strong relationships with the organisation's publics puts great pressures on media and public relations professionals whose success depends on the effectiveness of these relationships. As mentioned before, media and public relations practitioners' main aim is to interact with organisational publics to manage and facilitate the relationship between the organisation and its publics. Moreover, media and public relations of an organisation are generally regarded as complex, skilled, and strategic practices. Therefore, the relationships with and between publics—all of whom see themselves

as having a legitimate stake in the organisation—should be carefully managed (Gregory, 2006).

As the uncertainty level of the external environment rises, organisations, while competing and cooperating with their competitors simultaneously, are also dealing with complex situations involving a variety of publics (Wheelen & Hunger, 2006; Gregory, 2006).

The media relations activities of an organisation could be seen as a vital communication tool to reach its current and potential consumers. The mass media—including newspapers and magazines, radio and television, and increasingly, the Internet—is important to public relations with its audiences which may be vast like the readers of national newspapers, or quite small, like a magazine's subscribers. Reaching targeted audiences via the mass media involves selecting messages which have news values and selecting appropriate mass media tools that link with the specific publics who need the information to establish or sustain their relationship with the organisation (Fawkes, 2006).

Consequently, public relations practitioners who are responsible for presenting an organisation's message to its publics should be creative (Marconi, 2004), be open to new

approaches, and be able to direct multilateral interactions. Complex networks theory has something to offer in this regard.

### A scenario-based approach

In order to create a scenario group for testing, 21 small and medium sized accommodation establishments (hotels) located in the Aegean Region (Turkey) were chosen. Several questions relating to complex networks and effective public relations with the media (as one of the many stakeholders of an organisation) were asked of the managers responsible for media relations (usually the actual hotel manager). Based on the results of the interviews a simple scenario was written. The results of the interviews are summarised in **Table 1**.

After the questions had been asked of the hotel managers, a short article on complex networks (published in a popular science journal, in Turkish) was given to them. After they finished reading the article, a brief explanation was made: “Social networks, such as your stakeholders or target audiences, can be considered as complex networks. Hubs in complex networks (in our case the media were chosen) reflect communication points which are effective and persuasive, and have high impact potential. By choosing the right hubs—the right

media in this case—your company can reach target audiences more effectively.”

Then, managers were asked whether they had more questions on the concept, and based on their questions, more explanation was provided. After the interviews, based on the statements of the hotel managers, it is concluded that when relationships are considered and organisations have messages to deliver to the public; the transmitter should be evaluated according to its effectiveness, persuasiveness, and impact of communication with stakeholders. Hubs in complex networks reflect communication points which are effective and persuasive, and have high impact potential. Based on relationships, persuasiveness—it was thought that the communication points which have most ties with other nodes could be more persuasive—and communicative power, the media by which the companies have the ability to reach more people were identified as those with the characteristics of hubs by the managers of tourism companies. Evaluating media as hubs means looking not just at circulation, but at the number and nature of relationships that the media outlet has with the other publics with which the organisation has (or wants to have) relationships.

**Table 1: Summary of interview results**

Questions	Have you ever heard about the concept of 'complex networks'?	In order to reach your customers, you prefer:	The factors affecting your choice are:	Are size and effectiveness of the media enterprises important for the success of your public relations activities?	Choosing media enterprises properly increases the impacts of my company's public relations activities' effectiveness.	(After giving information about the complex networks concept and explaining the application) Does this approach sound logical to you?
<b>Hotel 1</b>	No, I have never heard.	Local and national media	Cost and impact of the tool	Yes	Yes	Yes, it can decrease cost and increase the impact.
<b>Hotel 2</b>	I read something about it, but do not know	Local and national media, and internet	Cost, impact of the tool, and activities of competitors	Yes, very important	Of course	You can arrange your public relations

	exactly what it is.					activities effectively.
<b>Hotel 3</b>	No, I have never heard.	Local media and internet	Cost, target audiences' preferences, and impact of the tool	Definitely	Definitely	You can reach your goals easier.
<b>Hotel 4</b>	No, I have never heard.	Local and national media	Cost and impact of the tool	Yes	Yes	Yes
<b>Hotel 5</b>	No, I have never heard.	Local and national media, and internet	Cost and impact of the tool.	Surely	Yes	Definitely, you can be more successful.
<b>Hotel 6</b>	No, I have never heard.	Internet and national media	Cost and impact of the tool.	Yes	Yes	It is worth thinking on.
<b>Hotel 7</b>	I know something about it.	Local media, national media, and internet	Cost, impact of the tool, and activities of competitors	Yes, really important	Yes	More should be done in order to demonstrate applications process, but I agree.
<b>Hotel 8</b>	No, I have never heard.	Local and national media	Cost and impact of the tool	Yes	Surely	Yes, it can increase effectiveness.
<b>Hotel 9</b>	No, I have never heard.	Local and national media	Cost, impact of the tool, and activities of competitors	Yes	Yes	I suppose I should consider using the internet in order to reach all the publics.
<b>Hotel 10</b>	No, I have never heard.	Local media and internet	Cost and impact of the tool	Definitely	Exactly	It can decrease cost.
<b>Hotel 11</b>	No, I have never heard.	Local and national media	Cost and impact of the tool	Surely	Definitely	It can be more effective.
<b>Hotel 12</b>	No, I have never heard.	Local and national media, and internet	Cost and impact of the tool	Yes	Yes	It can increase the effectiveness of your activities.
<b>Hotel 13</b>	No, I have never heard.	Local and national media	Cost, target audiences' preferences, and impact of the tool	Yes	Yes	According to this, the internet is the most effective tool.
<b>Hotel 14</b>	I read something about it, but it is too complicated to understand.	Internet and national media	Cost, target audiences' preferences, impact of the tool, and activities of competitors	Yes, these are the most significant factors for success	Yes, you can't reach your publics if you cannot choose the right means.	You can reach your public without making too much effort.
<b>Hotel 15</b>	No, I have never heard.	Local and national	Cost and impact of the	Yes	Yes	Yes

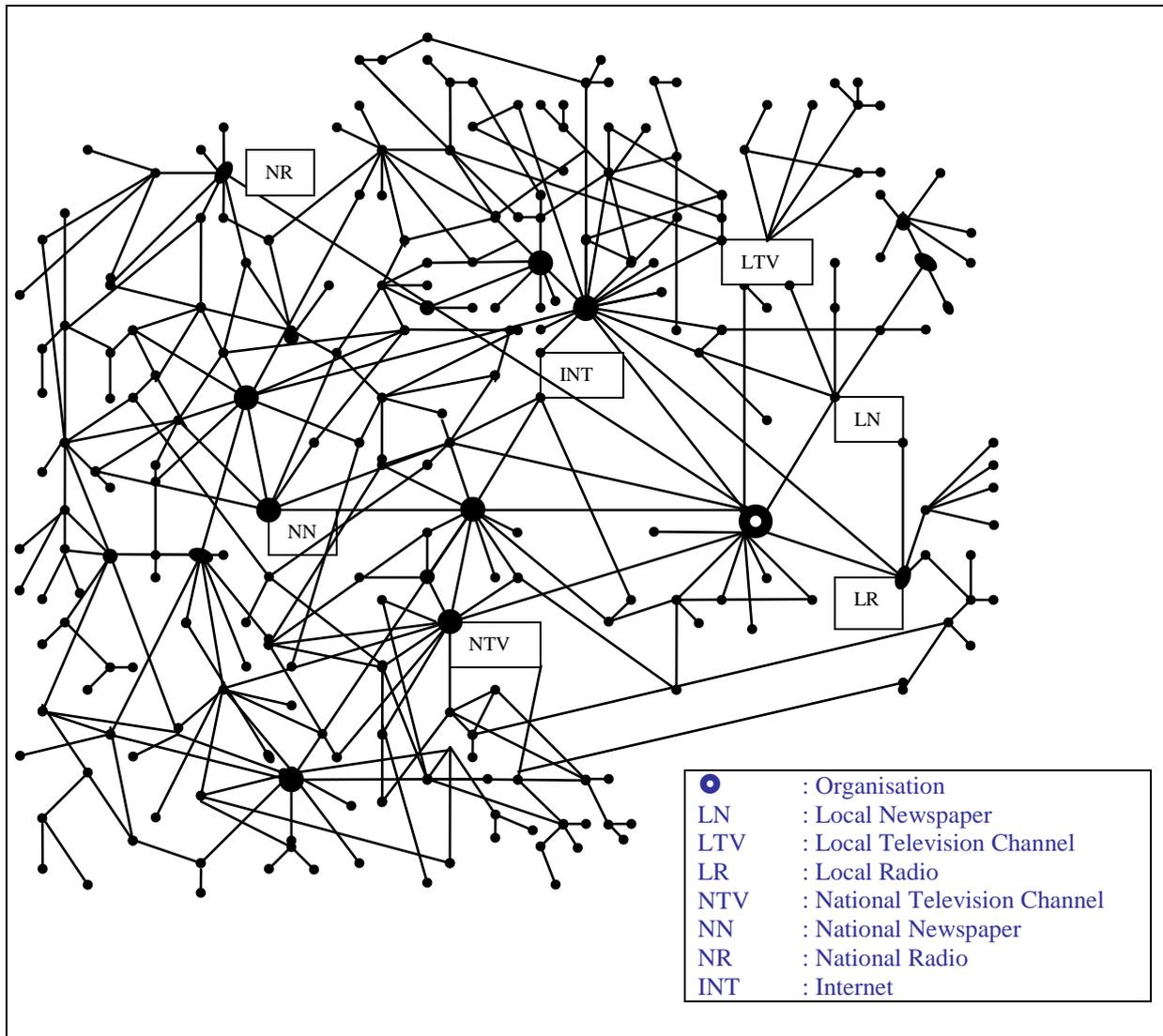
		media, and internet	tool			
<b>Hotel 16</b>	I have heard about it.	Local and national media, and internet	Cost and impact of the tool	Yes	Definitely	Yes, it is worth trying.
<b>Hotel 17</b>	No, I have never heard.	Local and national media, and internet	Cost, target audiences' preferences, impact of the tool, and activities of competitors.	Definitely	Yes	You can conduct your public relations activities effectively.
<b>Hotel 18</b>	No, I have never heard.	Internet and national media.	Cost, target audiences' preferences, and impact of the tool	Yes	Yes	Yes, you can increase the impact of your activities.
<b>Hotel 19</b>	No, I have never heard.	Local and national media, and internet	Cost, target audiences' preferences, and impact of the tool.	Yes	Yes	Yes
<b>Hotel 20</b>	No, I have never heard.	Internet, national media, and local media	Cost, impact of the tool, and activities of competitors	Yes	Definitely	It sounds really logical.
<b>Hotel 21</b>	It sounds strange.	Local media and internet	Cost, target audiences' preferences, and impact of the tool	Yes	Yes	It offers a solid and powerful background for your activities.

Due to the answers given to the interview questions, it can be concluded that the complex networks concept is not comprehensively known by most of the managers interviewed. However, when the concept was explained to the interviewees, all of them considered this approach applicable. Nevertheless, in order to increase the number of managers who apply this approach in planning their public relations activities, they would need to be more informed about the concept of complex networks and its applications process in organisations. (Future work may help to develop process templates, however that is beyond the scope of this theory-

building article which aims to introduce complex networks concept to the public relations theory cluster by substantiating their relevance.)

As mentioned before, all types of relationships of an organisation with its publics can be evaluated as complex networks. Therefore, a simplified demonstration of an organisation's interactions with its publics—using the limited example of its media relations as that was the scenario discussed in this study—is given in **Figure 2** (over the page).

**Figure 2: A simplified complex network demonstration of an organisation's interactions with the media**



The organisation modelled in **Figure 2** is an example of a local service provider company that has been in the market for five years. Its local environment consists of a local newspaper, a local television channel, and a local radio owned by the local television channel. The complex network demonstration of the organisation is drawn based on assumptions about the possible publics of each actor given in the figure. The publics and possible interactions among them are determined approximately without giving the exact number of links in order to simplify the

demonstration, although in the real world, the number of links would be determined based on the full range of knowledge the organisation had about its actual publics and their interactions. Organisations that continue their activities regionally or locally have limited numbers of publics or stakeholders and they can not reach great numbers of audiences. On the other hand, national organisations have large numbers of audiences and greater ability to reach these audiences. As given in Figure 2, while a local newspaper can only reach the publics in a small area (such as local

government, local community, and local businesses), a national newspaper can reach a large number of audiences nationwide.

The company's unsuccessful public relations efforts were directed to those limited local media enterprises with their limited publics. The company's owner had not considered being one of the 'big players' in the national marketplace, but her local focus was under threat due to powerful competitors entering then becoming dominant in the local market. She then hired a new executive manager who had a degree in public relations and who offered a strategy of change, which included reaching national markets as competitors had done, providing growth in revenue, creating competitive advantages, and focusing on public relations practices. The public relations strategies suggested by the new executive manager were structured on the theory of complex networks.

To date, in addition to other efforts to change and innovate, the company has put a radical public relations plan into action by reallocating resources to a nationwide public relations campaign targeted to attract important mass media enterprises that function as hubs for the company's other publics.

Based on the scenario given above, one can see new interactions of the company in the national marketplace. It can be recognised that the company's interactions with its publics as a complex network allow the company to reach an increasing number of consumers and other publics by targeting the right nodes and hubs. When compared with the company's previous efforts in the local arena, it can be suggested that a company aiming to grow should target richer nodes and hubs within its specific complex network in order to make its public relations efforts more efficient and effective. If a company aims to reach its publics easily and cost efficiently it should choose to target rich nodes and hubs as they have a large number of audiences—and will continue to grow those audiences since it is known that 'rich gets richer' in complex networks. However, it should be kept in mind that not all nodes or hubs created by nationwide interactions are always effective, strong, beneficial or

attainable. Selection of appropriate target hubs—which is primarily the responsibility of public relations practitioners—plays a very significant role in determining the company's success or failure.

### **Discussions and recommendations**

The study of complex networks in social sciences is still in its infancy. We have discussed the probability of complex networks theory's application in an organisation's public relations practices, but we believe that this recommendation should be supported and developed by further research. This approach can be applied to all relationships of an organisation with its publics, such as employee relations, stockholder relations, consumer relations and so on.

Nowadays organisations find themselves increasingly at risk from a number of directions. In fact, organisations try to survive in an increasingly interconnected, competitive, dependent, and uncertain world, where no organisation can isolate itself from any of the 'big issues' that are emerging (Gregory, 2006). In order to survive in a chaotic business environment all organisations, regardless of sectoral distinction, should find innovative ways to gain a competitive advantage over their rivals, have strong reputations, and create solid and continuous relationships with and among their publics. For an organisation, one of these ways can be to benefit from an application of complex networks concepts to its public relations practices.

Understanding the structures and growth mechanisms of real-world complex networks can be considered as vitally important especially in solving problems such as internet attacks, spread of internet viruses, terror attacks, ideas or strategic concepts spreading on a social network, and human epidemics (Arquilla & Ronfeldt, 2001; Pastor-Satorras & Vespignani, 2004; Anderson & May, 1992). Since the nodes with the largest number of links (hubs) play a very significant role on the dynamics of systems, they can direct people to take more effective measures or to organise their practices more efficiently (Mossa, Barthélemy, Stanley, & Amaral, 2002).

Especially, in networking, “finding networking contacts who act as bridges to public relations’ professionals ultimate target” (Green, 2006, p. 54) can be considered as an example of complex network application in public relations.

While this study is based on a hypothetical media relations scenario approach, further research would be of benefit on other aspects of the field of public relations such as crisis management and communication, lobbying activities, crafting an image, investor relations, social responsibility, and choosing a public relations agency. Monge and Contractor (2003) and Toth (2006) could be considered as two primary resources that describe various social network principles and theories from the different disciplinary approaches used to date without and within the discipline of public relations. By bringing together these principles and theories a model could be structured showing the potential uses of complex networks in the field of public relations.

### References

- 12Manage (2007). What is intrinsic stakeholder commitment? Definition. Retrieved November 4, 2007, from: [http://www.12manage.com/methods\\_intrinsic\\_stakeholder\\_commitment.html](http://www.12manage.com/methods_intrinsic_stakeholder_commitment.html)
- Alexander, D. (2004). Changing the public relations curriculum; a new challenge for educators. *PRism*, 2(1). Retrieved October 5, 2008, from: [http://praxis.massey.ac.nz/fileadmin/Praxis/Files/Journal\\_Files/Issue2/Alexander.pdf](http://praxis.massey.ac.nz/fileadmin/Praxis/Files/Journal_Files/Issue2/Alexander.pdf)
- Allen, P. (2000). Harnessing complexity. *Management Focus*, Issue 14, Summer 2000. Retrieved December 18, 2007, from <http://www.som.cranfield.ac.uk/som/news/manfocus/downloads/complexity.doc>
- Alsop, R. J. (2004). Corporate reputation: anything but superficial – the deep but fragile nature of corporate reputation. *Journal of Business Strategy*, 25(6), 21-29.
- Amaral, L. A. N. & Ottino, J. M. (2004). Complex networks – augmenting the framework for the study of complex systems. *The European Physical Journal B*, 38, 147-162.
- Anderson R. M. & May, R. M. (1992). *Infectious diseases of humans: Dynamics and control*. Oxford, UK: Oxford University Press.
- Andrews, G. J. (2006). Geographies of health in nursing. *Health & Place*, 12(1), 110-118.
- Arquilla, J. & Ronfeldt, D. (2001). *Networks and netwars: The future of terror, crime, and militancy*. Santa Monica, Calif.: RAND.
- Barabási, A. L. & Bonabeau, E. (2003). Scale-free networks. *Scientific American*, May 2003, 50-59. Retrieved January 6, 2008, from [http://www.nd.edu/%7Enetworks/Publication%20Categories/01%20Review%20Articles/ScaleFree\\_Scientific%20America%20288,%2060-69%20\(2003\).pdf](http://www.nd.edu/%7Enetworks/Publication%20Categories/01%20Review%20Articles/ScaleFree_Scientific%20America%20288,%2060-69%20(2003).pdf)
- Barthélémy, M. & Amaral L. A. N. (1999). Small-world networks: Evidence for a crossover picture. *Physical Review Letters*, 82(15), 3180-3183.
- Berger, C. R., & Chaffee, S. H. (1987). *Handbook of Communication Science*. Newbury Park: Sage Publications.
- Bingol, H. (2005). Kus gribi, deprem, AIDS: ortak yonler ne? (Bird flu, earthquake, AIDS: what are the common points?). *Cumhuriyet Bilim Teknik*, 19 November 2005, 14-15.
- Bruning, S. D. & Ledingham, J. A. (1999). Relationships between organizations and publics: development of a multi-dimensional organization-public relationship scale. *Public Relations Review*, 25(2) 157-170.
- Bruning, S. D. (2000). Examining the role that personal, professional, and community relationships play in respondent relationship recognition and intended

- behavior. *Communication Quarterly*, 48(4), 437–448.
- Bruning, S. D. (2002). Relationship building as a retention strategy: linking relationship attitudes and satisfaction evaluations to behavioral outcomes. *Public Relations Review*, 28(1), 39-48.
- Caywood, C. L. (Ed.) (1997). *The handbook of strategic public relations and integrated communications*. New York: McGraw-Hill.
- Chia, J. (2006). Measuring the immeasurable. *PRism*, 4(2), Retrieved October 10, 2008, from: [http://praxis.massey.ac.nz/fileadmin/Praxis/Files/Journal\\_Files/Evaluation\\_Issue/CHIA\\_ARTICLE.pdf](http://praxis.massey.ac.nz/fileadmin/Praxis/Files/Journal_Files/Evaluation_Issue/CHIA_ARTICLE.pdf)
- Committee on Network Science for Future Army Applications (2006). *Network science*. Washington, DC, USA: National Academies Press.
- Cravey, A.J., Washburn, S., Gesler, W., Arcury, T. & Skelly, A. (2001). Developing socio-spatial knowledge networks: a qualitative methodology for chronic disease prevention. *Social Science in Medicine*, 52(2), 1763-1775.
- Crucitti, P., Latora, V., Marchiori, M. & Rapisarda, A. (2004). Error and attack tolerance of complex networks. *Physica A*, 340, 388-394.
- Cutlip, S. M., Center, A. H. & Broom, G. M. (1994). *Effective public relations (7th Ed.)*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R.L. (2001). *Organizational theory and design (7th Ed.)*. Cincinnati, OH: South-Western College of Publishing.
- Dentchev N. A. & Heene, A. (2004). Managing the reputation of restructuring corporations: send the right signal to the right stakeholder. *Journal of Public Affairs*, 4(1), 56-72.
- Fawkes, J. (2006). Public relations and communications. In A. Theaker (Ed.), *The public relations handbook* (pp.18-31). New York, USA: Routledge.
- Fombrun, C. J. & Shanley, M. (1990). What's in a name? Reputation building and corporate strategy. *Academy of Management Journal*, 33(2), 233-258.
- Fombrun, C. J. (2001). Corporate reputations as economic assets. In M. A. Hitt, R. E. Freeman & J. S. Harrison (Eds.), *The Blackwell handbook of strategic management* (pp. 289-312). Oxford: Blackwell Publishers.
- Freeman, R. E. (1984). *Strategic management: a stakeholder approach*. Boston: Pitman.
- Friedman, A. L. & Miles, S. (2006). *Stakeholders: theory and practice*. New York: Oxford University Press.
- Gesler, W., Dougherty, M., Arcury, T., Skelly, A. & Nash, S. (2003). The importance of obtaining information from assessment of community service providers for a disease prevention program. *Journal of Multicultural Nursing & Health*, 9(2), 14-21.
- Gesler, W., Hayes, M., Arcury, T.A., Skelly, A.H., Nash, S. & Soward, A.C. (2004). Use of mapping technology in health intervention research. *Nursing Outlook*, 52(3), 142-146.
- Gorelick, D. (1998). Understanding marketplace behaviour. *Graphic Arts Monthly*, 70(5), 98.
- Green, A. (2006). *Effective personal communication skills for public relations*. London, UK: Kogan Page Limited.
- Gregory, A. (2006). Public relations and management. In A. Theaker (Ed.), *The public relations handbook* (pp.48-65). New York, USA: Routledge.
- Grunig, J. E & Huang, Y-H. (2000). From organisational effectiveness to relationship indicators: antecedents of relationships, public relations strategies, and relationship outcomes. In J. A. Yilmaz, B. S. & Gunel, O. D. (2009). Probable applications of complex networks in public relations practices: A scenario-based approach. *PRism* 6(1): [http://praxis.massey.ac.nz/prism\\_on-line\\_journ.html](http://praxis.massey.ac.nz/prism_on-line_journ.html)

- Ledingham & S. D. Bruning (Eds.), *Public relations as relationship management: A relational approach to the study and practice of public relations* (pp.3-22). Mahwah, NJ: Lawrence Erlbaum Associates.
- Grunig, J. E. (Ed.) (1992). *Excellence in public relations and communication management*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Grunig, J. E., & Hunt, T. (1984). *Managing public relations*. New York: Holt, Rinehart & Wilson.
- Heath, R. L. (1998). New communication technologies: an issues management point of view. *Public Relations Review*, 24(3), 273-288.
- Hon, L. C., & Grunig, J. E. (1999). Guidelines for measuring relationships in public relations. Retrieved October 12, 2008, from [http://www.instituteforpr.org/files/uploads/Guidelines\\_Measuring\\_Relationships.pdf](http://www.instituteforpr.org/files/uploads/Guidelines_Measuring_Relationships.pdf).
- Huang, Y. H. (2001). OPRA: A cross-cultural, multiple-item scale for measuring organization-public relationships. *Journal of Public Relations Research*, 13(1), 61-90.
- Hung, C. J. F. (2005). Exploring types of organization-public relationships and their implications for relationship management in public relations. *Journal of Public Relations Research*, 17, 393-426.
- Ledingham, J. A. & Bruning, S. D. (1998). Relationship management in public relations: Dimensions of an organization-public relationship. *Public Relations Review*, 24(1), 55-65.
- Ledingham, J. A. & Bruning, S. D. (2000). A longitudinal study of organization-public relationship dimensions: defining the role of communication in the practice of relationship management. In J. A. Ledingham & S. D. Bruning (Eds.), *Public relations as relationship management: a relational approach to the study and practice of public relations* (pp.55-69). Mahwah, NJ: Lawrence Erlbaum Associates.
- Ledingham, J. A. (2001). Government-community relationships: Extending the relational theory of public relations. *Public Relations Review*, 27(3), 285-295.
- Ledingham, J. A. (2003). Explicating relationship management as a general theory of public relations. *Journal of Public Relations Research*, 15(2), 181-198.
- Liljeros, F., Edling, C. R., Amaral, L. A. N., Stanley, H. E., & Åberg, Y. (2001). The web of human sexual contacts. *Nature*, 411, 907-908.
- Lim, G., Ahn, H. & Lee, H. (2005). Formulating strategies for stakeholder management: a case-based reasoning approach. *Expert Systems with Applications*, 28(4), 831-840.
- Lindenmann, W. K. (1998). Measuring relationships is a key to successful public relations. *Public Relations Quarterly*, 43(4) p.18
- Marconi, J. (2004). *Public relations – the complete guide*. New York, USA: Thomson.
- Mitchell, R. K. & Cohen, B. (2006). Stakeholder theory and the entrepreneurial firm. *Journal of Small Business Strategy*, 17(1), 1-15.
- Mitchell, R. K., Agle, B. R. & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: defining the principle of who or what really counts. *Academy of Management Review*, 22(4), 853-886.
- Monge, P. R., & Contractor, N. S. (2003). *Theories of communication networks*. New York: Oxford University Press.
- Mossa, S., Barthélémy, M., Stanley, H. E., & Amaral L. A. N. (2002). Truncation of power law behavior in “scale-free”

- network models due to information filtering. *Physical Review Letters*, 88(13), 138701(4).
- Murray, K., & White, J. (2004). CEO views on reputation management: a report on the value of public relations, as perceived by organizational leaders. *London: Chime Communications*. Retrieved November 10, 2008, from: [www.chime.plc.uk/downloads/reputationkm.pdf](http://www.chime.plc.uk/downloads/reputationkm.pdf).
- Nahapiet, J. & Ghoshal, S. (1998). Social capital, intellectual capital, and the organisational advantage. *Academy of Management Review*, 23(2), 242–266.
- Neff, B. D. (1989). The emerging theoretical perspective in PR: an opportunity for communication departments. In C. H. Botan & V. Hazleton Jr. (Eds.) *Public relations theory*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Newman, M. E. J. (2004). The structure and the function of complex networks. Retrieved January 18, 2008 from <http://www-personal.umich.edu/~mejn/courses/2004/cscs535/review.pdf>
- Ni, L. (2006). Relationships as organisational resources: Examining public relations impact through its connection with organisational strategies. *Public Relations Review*, 32(3), 276-281.
- Park, H. & Reber, B. H. (2008). Relationship building and the use of web sites: how fortune 500 corporations use their web sites to build relationships. *Public Relations Review*, 34(4), 409-411.
- Pastor-Satorras, R. & Vespignani, A. (2004). *Evolution and structure of the internet: a statistical physics approach*. Cambridge, UK: Cambridge University Press.
- Phillips, D. (2006). Relationships are the core value for organizations: A practitioner perspective. *Corporate Communications: An International Journal*, 11(1), 34-42.
- Pohl, G. M. & Vandeventer, D. (2001). The workplace, undergraduate education, and career preparation. In R. L Heath (Ed.) *Handbook of Public Relations* (pp. 357–368). Thousand Oaks: Sage Publications.
- Shapiro, C. (1983). Premiums for high quality products as returns to reputations. *The Quarterly Journal of Economics*, 98(4), pp. 661-679.
- Skelly, A., Arcury, T., Gesler, W., Cravey, A., Dougherty, M., Washburn, S. & Nash, S. (2002). Sociospatial knowledge networks: appraising community as place. *Research in Nursing and Health*, 25, 159-170.
- Sligo, F. X., Massey, C. & Lewis, K. (2003). What are the benefits of interpersonal communication within socio-spatial knowledge networks? Retrieved October 14, 2008, from [http://sme-centre.massey.ac.nz/files/ANZCA\\_2003\\_Sligo\\_Massey\\_Lewis.pdf](http://sme-centre.massey.ac.nz/files/ANZCA_2003_Sligo_Massey_Lewis.pdf)
- Taylor, M. (2004). Exploring public relations in Croatia through relational communication and media richness theories. *Public Relations Review* 30, 145-160.
- Taylor, M., Kent, M. L. & White, W.J. (2001). How activist organizations are using the Internet to build relationships. *Public Relations Review*, 27(3), 263–284.
- Toth, E. L. (2002). Postmodernism for modernist public relations: The cash value and application of critical research in public relations. *Public Relations Review*, 28(3), 243-250.
- Toth, E. L. (Ed.) (2006). *The future of excellence in public relations and communication management / challenges for the next generation*. New York, USA: Routledge.
- Watts, D. J. (2003). *Six degrees: the science of a connected age*. New York: Norton.
- Wheelen, T. L. & Hunger, J. D. (2006). *Strategic management and business*

*policy (10th Ed.)*. New Jersey, USA: Pearson Prentice Hall.

White, D. R., Owen-Smith, J., Moody, J., & Powell, W.W. (2004). Networks, fields and organisations: Micro-dynamics, scale and cohesive embeddings. Special Issue on Mathematical Representations for the Analysis of Social Networks within and between Organisations. *Computational and Mathematical Organisation Theory*, January. Retrieved December 8, 2007, from <http://www.santafe.edu/research/publications/workingpapers/04-03-009.pdf>

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