Unsocial Networks – Restoring the social in social networks

Donald Steiny
University of Oulu, Finland
steiny@steiny.com

Abstract

This paper discusses multiple meanings of the idea of “social networks.” It discusses how the most common view of social networks in Information Systems, as the result of the interaction of autonomous agents, could be tested. It then introduces research that falsifies that premise. It introduces an alternative view of social networks that comes from sociology and discusses how Information Systems could make significant contributions to social science and be more of a natural science.

1. Introduction

This paper looks at two views of social networks, the “economic view” and the “social view.” The economic view of networks is the simplest to understand and has far-reaching implications in Information Systems. The paper first gives the definition of “social network” that it will be using. It then describes social networks from an “economic” point of view. It then shows how this view cannot explain simple social structures like hierarchies, and then it discusses the problem with using density as the only means of decomposition. It makes some suggestions of practical applications. That social structures cannot be created by the action of independent agents has implications for some of the fundamental assumptions of Information Systems.

2. Social networks

The basic definition of a “social network,” is that it is a network of relations between social objects. A social network can be represented as a graph of lines and dots or by some other representation, such as matrices. There are different ideas about what the lines and dots represent. In one view they are “pipes” with something flowing between the nodes; the economic view is that the independent action of the nodes causes the flow. Networks can also be views as descriptions of relations between the objects. The first view locates the source of action in the nodes; the second view takes the observer into account. Our perception of the nodes can change when relationships change. The increased or decreased deference to a person may indicate change in status. Change in the number of members of a team or a family will usually cause a reshuffling of the roles and duties of those who remain.

3. Economic view of social networks

The economic view of social networks has as a starting point the idea of rational actors, independent entities that are “physical symbol systems …” that “… are goal-seeking, information-processing systems, usually enlisted in the service of the larger systems in which they are incorporated” (Simon 1996, p. 21-22). Each of these systems are “… basically serial in its operation; … it can process a few symbols at a time …” (Simon 1996, p. 81). This creates a view of social networks as networks of symbol manipulating systems that interact with each other using streams of symbols. Each node inputs, outputs or transforms symbols and social networks can be viewed as similar to a computer network.

This view makes it easy to think of areas where many of these systems are communicating and other areas where fewer are, just as in computer networks within an organization the connections would be denser and more frequently used than to outside the organization. He says that he proposes to “identify social hierarchies not only by observing who lives close to whom but by observing who interacts with whom” (p. 187). He generalizes the importance of hierarchies and sees “hierarchically organized list structure as a basic principle of [human] memory organization (Simon 1996, p. 77). In addition Simon says that “formal organizations are not the only, or most common, kind of social hierarchy. Almost all societies have elemental units called families, which may be grouped into villages or tribes, and those into larger groupings and so on” (p. 186). He is suggesting that hierarchies are a matter of density and frequency of interaction. There is no point where he differentiates between the types of interaction. The
communication streams are differentiated because they different streams of symbols.

One advantage of this model is that computer simulations can be created where simulated agents follow rules when interacting with other agents. This is possible because “[h]uman beings, viewed as behaving systems, are quite simple” (Simon 1996, p. 53). In this view macro structures, like hierarchies, are derived from micro interactions, simple rules followed by the agents.

If the “simple” behavior of humans leads to macro structures, then there might be some commonality between different networks. Networks of relations between businesses, people, countries and so on follows a similar underlying pattern to the Web or other networks, such as the network of disease transmission and finding the rules that create these networks will uncover natural laws that apply from everything to proteins to the Internet (Barabási 2002; Newman, Watts et al. 2002).

Social networking site like Facebook and LinkedIn are macro structures that are in a format that is relatively easy to analyze. The analysis of such networks is predated and paralleled by interest in the more general properties of networks and connectivity dating back to the famous Milgram “six degrees of separation” study of 1967 (Travers and Milgram 1969; Granovetter 1973; Barabási 2002; Newman, Watts et al. 2002; Dodds, Muhamad et al. 2003; Watts 2004). These networks are called “Small World networks.” One characteristic property is that a few members have lots of links and most have few which is called “scale free.” The result is a network with areas of density connected by “weak ties,” which is, on the surface, similar to the type of hierarchies Simon proposes.

Recently there have been flurries of excitement over discoveries that various things, like Internet tags and MSM have Small World properties (Cattuto, Loreto et al. 2007; Leskovec and Horvitz 2007) because of the implication that some “simple” observation about humans has been uncovered.

Human social networks can be mapped. When this is done it is common to find areas of density often with scale free distributions. In principle this will allow decomposition of the system into functional subsystems that can be investigated for the rules that the systems are using to achieve their particular goals. There is now excellent software to represent this (de Nooy, Mrvar et al. 2005). Each physical symbol system is “called into service” for a larger system so memory, process and transformation are components of any system. This allows us to look at individuals, organizations or society as a whole as systems with input, output, goals, and memory.

This is an appealing view because it allows a single representational system to describe people, organizations and society and makes it possible to discover the “simple” rules that are being followed by each to be discovered. This view is especially useful in information system, because if humans, organizations and computers are all “physical symbol systems” then it seems possible that solutions to problems of human behavior could be modeled and simulated on computers and that knowledge applied. In addition the question of designing and architecting organizations and even society itself would be simply an extension of the same techniques used to design computer systems. The seamless integration of computers and society are a natural outgrowth of this view and an important drivers in Information Systems (Simon 1996).

4. Objections to the economic view of social networks

To express the objections to the model proposed in the last section it is useful to recapitulate the ideas from a slightly different point of view, one that examines the “taken for granted” aspects of the view.

Our legal system, moral system and our intuitions locate decisions in a “person” that has the ability to make decisions. Descartes’ famous “I think, there for I am” and his attempt to use deductive reasoning to explain the world has become common sense in our culture. To deduce things there needs to be something doing the reasoning, which is generally called a “mind” which is remarkably like the “physical symbol system” of Simon. It is located in place, it uses deductive reasoning, it has inputs, outputs goals and, in principle, all reality can be understood and described by it.

This is a difficult idea to question for a number of reasons, most obviously because of it is simple and intuitively appealing. We have discrete bodies and brains and we can be perceived by others as distinct individuals. It is an almost a foregone conclusion that social structure evolves from the interaction of atomic actors (actors who have their own “CPU” and memory). This is the basis of modern economic theory and understanding the “CPU” in our brains is part of the focus of modern cognitive science. Since this is a scientific claim, that macro structure like organizations can be understood in terms of micro interactions, it gives us several ways to test it. If we
can create macro structures from some specific rules, it provides evidence that we might be doing this, or that it could be done this way. If it can be shown that macro structures cannot be created by the interaction of individuals, then it cast doubt on the idea of individuals as the source of action. This would call into question the whole idea of “physical symbol systems” in any circumstances.

One method used to test the micro rules is to create computer simulations based on theories of how individuals function, simulate their interaction and see if they create the expected social formations. However, even if the resulting formation is the same we still need to ask, “How do we know that the steps the simulation took to create the social formation are the same as people take?” Both 2 + 2 and 3 + 1 add to 4. If the numbers represent real things, then there might be cases where one is possible, but not the other. We see the results from the simulation and the process the simulation used to get there, but unless we match it to observed action we can only show that it is possible that the action of individual agents behaving as instructed could create a social formation and not that it did.

The only way that we can be sure a simulation is simulating a natural process is micro observation. In the case of a hierarchy in animals for instance, detailed observation of every observable interaction needs to be coded. If the interactions in the simulation and the interactions the observed behavior can be argued to be similar it is an argument that the simulation could be simulating the hierarchy formation. If the two are hugely different than the simulation is unlikely to be representing actual social process.

Animal behavior researcher, Ivan Chase, has spent several decades doing experiments with vertebrate hierarchies. His careful empirical observations have lead to some remarkable conclusions.

One is that prior attributes have only a small effect on the hierarchy. The most obvious reason for a hierarchy is that the biggest animal beats up the second biggest and so on down the chain. Chase has performed many inventive experiments over the years including separating the animals until they forget the hierarchy. When they are reunited they form into different hierarchies. He points out that this could not be because they changed attributes because the hierarchies are generally stable. If attributes were causative and changed, then the hierarchies would be unstable. Chase and Lindquist conclude: “theoretical models broadly based upon individual differences among individuals—either resulting from attributes that they possess before joining in groups or from dynamically updated qualities that they develop during group formation—are not sufficient to explain the formation of linear structures” (Chase and Lindquist 2009).

Considering the difficulty of empirical analysis of simulations it is a profound result that one of the simplest and most ubiquitous of social structures cannot be modeled using attributes. One of the most common discussions in Information Systems is the idea of “ontologies,” “typologies” and other classification systems, however, if attributes have no effect on social structure there is no point to doing this. This result is a empirical argument that shows that the “physical symbol system” idea cannot be correct, because both the programs and the memory in the system are “prior attributes” which cannot account for even the simplest social structure.

Though Chase’s work is especially compelling because of the extraordinary care he took to make his empirical arguments, the impossibility of social structure being the result of the interaction of atomic actors has been a key point of New Economic Sociology since its inception. A number of researchers over the years have argued this point in a variety of ways. One of the most cited and compelling articles in this area was Mark Granovetter’s “Economic action and Social Structure: The Problem of Embeddedness” (Granovetter 1985). In this paper he talks of an “over-” and “under-” socialized view of social structure and argues that they both follow from the idea of an atomic actor. In the under-socialized case, each actor is like a machine whose whole view of the world is in its memory, a view of humans proposed by Simon and others. This is the “economic man,” or “boundedly rational actor.” The over-socialized case, from this point of view, is little different but assumes that various variable and parameters in the physical symbol system (the mind) are set by the society or culture in which it lives. These shared variables allow multiple systems to coordinate with each other and provide an explanation for social structures like organizations. The shared variables occur, in this model, as values which come into being because systems have purposes, they want to live, grow, make profits and so on. This allows analysts to decompose aggregates of systems (organizations) into smaller systems or even individual symbol systems by their “function” or the role they play in the overall purpose of the system. The metaphor is of living systems. Granovetter gives many examples such as “honor among thieves” that show people are able to operate with different rules at different times. He shows that “economic” action, rational choice, takes
place constrained by the social structure in which the actor is embedded.

The hypothesis that values are causes of behavior was tested in a study of high risk activism by Doug McAdam. McAdam interviewed and followed the activities of a group of mainly white, wealthy students from the Northeast of the US who spent a summer during the early years of US desegregation registering black voters in the South as part of a movement called “Freedom Summer.” It was extremely dangerous and several of the participants were beaten and even killed. McAdam showed that there was no measure of values or belief that could predict participation in the movement but that the type and number of contacts was. In others words, when close family members and others participated, then those close to them were much more likely to do it (McAdam 1986). Belief and values may as often be explanations of behavior as causes.

In the rational choice view of networks the links are undifferentiated and networks are seen as “flat” in that a link is either binary (there or not) or valued “weak” to “strong.” Interestingly, this is partially due to a simplification of a study done in 1963 a social scientist, Anatol Rapoport, of a junior high school. He traced the links between the children and the intensity of the links (how good a friend it was). This study was later reexamined by Granovetter.

Granovetter derived from Rapoport’s results the conclusion that ties and network were intertwined in a manner that was, at first sight, paradoxical. Ties that were intrinsically weaker, more casual, yielded higher connectivity across the network: weak ties are strong. That is, the way in which weak ties spread themselves around is such that they connect a larger fraction of a world together than do the same number of strong ties spread out in their way (White 2008, p. 43).

Granovetter’s simplification of Rapoport’s networks made network analysis much easier to do. Rapoport had multiple ties from each person and Granovetter reduced them to a single tie of varying strength. This had the unintended consequence that many networks were seen as single ties. This mapped perfectly to the rational actor model, something which Granovetter was explicitly criticizing in his paper.

We are members of many networks: a network of family members, a network of work colleagues, a network for volunteer work, or a network of old college chums. If we view them as just links we will see the communities with ourselves as the link between them. The data from the Microsoft IM network shows this. But, as was pointed out, this is a “flat” view of the networks and misses the richness of the multiple relationships.

Suppose we took the same picture and colored the links for family in one color, the links for work in another and so on. That would be getting at the concept, but it does not show that at any given time, you might be active in one or more networks but not in the others. Think of the experience of someone asking for information and then remembering that someone would know the answer that you know in a completely different context than the one in which the question was asked. Some people, more in some countries than others, deliberately keep their networks separate and don’t talk about family at work or work with family. If one has a hobby it is possible to not know the occupation of fellow hobbyists. In a flat network, a person in that situation would appear to be a bridge, but in practice no information would flow from one group to another through them.

In addition, you might have multiple links to another; you might work with a family member with whom you share a hobby. This is to some degree a measure of tie strength and in a flat drawing the different relationships would be hidden. Beneficial diversity is probably not just diversity of communications links, that would be a consequence, but also diversity of the reasons for the relationships. Rather than the flat view of networks taken by Simon, an alternate view to social networks focuses on the relations.

5. Relations – the other social network model

If prior attributes cannot be used for classification, and nodes are not the source of action, how can we talk about social structure?

Our cognition tends to classify thing by attributes, qualities or essences. This is how we search the internet, say for a male or female. Profiles are ways of listing the attributes of individuals. Over the years there have been many schemes to classify human beings by attributes. Many of them are still widely used. Some examples are: race, intelligence, income, sexual preference, location, and personality. One of the Nobel Prize winning discoverers of the double helix of DNA, James Watson, created a hubbub when he said that the problems in Africa were intractable because blacks were less intelligent than whites (Times 2007). Though Watson later said he
was misunderstood, his statement made sense to many because intelligence is, like race, seen as an attribute or quality, something that is part of what someone is. But looking at either race or intelligence carefully show countless other explanations (Suzuki and Aronson 2005). An alternative method of classification is by relations.

![Figure 1 - Boys and girls](image)

The “relational view” (Wellman 1988) can be explained by looking at the drawing in Figure #1, “Boys and Girls.” The white circles represent boys and the dark ones girls. The lines between them mean they know each other and talk to each other. This is a tiny example, just 5 individuals but it is meant to illustrate a point. If we divide the group based on the attribute “boy” or “girl,” we will get the sets [A, B, C] and [D, E]. But A and C do not talk to each other and D and E do not talk to each other so from a relational point of view the sets [A, B, D] and [C, E] are more natural. The attribute view also misses the special nature of [B], who is in both groups. Besides the different logical division there is another point to the relational view which is that if any node or edge is removed the relationships of the entire graph change. Removing [B] would split the graph in two. Removing the link between [B, D] would increase the distance a message would need to travel to [D] and put [A] in the middle. This is the role of a “broker,” who can control the communication between [A] and [D] and is a powerful role (Burt 1992). Removing a girl node or boy node would have no affect on the “girlness” or “boyness” of the other nodes. Attribute based categories assume independence, relational categories assume interdependence. In addition, the patterns of relationships are only useful in a global view.

One area of interest is places in the network that are denser. Though Simon’s view that these areas of density represent systems as part of a hierarchy can- not be correct, there is a considerable amount of work that has been done showing that the areas of less density, the bridges between the communities are areas of great interest in networks, but for different reasons. The most probably reason is that some degree of the density is either because of or results in a shared world view in that area (McPherson, Smith-Lovin et al. 2001). It is a stretch to think that there is a purpose for the cohesion as Simon suggests, but it information is passed from one place to another about something like jobs (Granovetter 1973). A number of studies that show that even with a flat view innovation is more likely to occur at areas where there is bridging between communities. One reason that is given is that ideas are borrowed from one network into another. People who bridge multiple communities make more money, do better at their jobs, and have better health (Steiny and Oinas-Kukkonen 2007).

Interestingly, some observable behaviors are clearly the result of social influence, but the influence is not always by proximity, yet another argument against Simon’s view that density and frequency of communication is related to function. To discuss this type of influence it is necessary to introduce the concept of a role.

6. Roles

The idea of a “roles has long been important in sociology. Roles are something that we are all familiar with in a common sense way. However, there are multiple ways that the term is used. For this discussion, two will be highlighted. One is a “prescribed” role and the other is a “described” role. A prescribed role is one that is created by organizational scientists in an attempt to create a physical symbol system. In this view and organization can be thought of as a system with subsystems that interact with each other symbolically. This is defined as the function that system performs in the overall operation of the system, say, accounts receivable clerk. In principle, that role can be reduced to a set of tasks that are required for that function in the overall system. This is, exactly the model of the physical symbol system of Simon and has its roots in his work on organizations.

Descriptive roles have been a part of sociology since its inception and we explored by Durkheim in his *Division of Labor*. Later Sigfried Nadel in his book *Theory of Social Structure* carefully looked at roles that we are born or fall into and roles that we work to achieve.
An example of a role is a police officer. When a police officer pulls over a speeding vehicle the driver of the vehicle is probably not thinking about personal attributes of the officer (and, of course, if an hierarchy is formed, we know that it can’t be because of the attributes of the officer). When the officer and the driver interact, it is most likely in a socially determined way; both participants will know their roles. To some degree it might matter who the police officer is, but often it is an anonymous transaction.

If we go into a market, it is possible to interact with the cashier in a completely generic way where the interaction is completely scripted and known by both participants. The same is true in a restaurant and even with an accountant, lawyer or doctor.

Many roles we are born into or fall into. There are the familiar roles of leader, father, mother, or there are also roles like “icebreaker,” “clown,” and many others. Once a role is assigned in a community, it is difficult to change. We are identified by the role.

Some roles are coveted “CEO,” “judge,” or “president.” We work hard to achieve them and those in the role are afforded extra respect. However, these roles are often transient and the respect is for the role and not the individual that fills it.

From the prescriptive view of roles, physical symbol systems with assigned lists of tasks, we can see a problem with functionalism. An organization of any size is so complex and there are so many tasks that are being done, the only way to figure it out is to reverse engineer it. To do this, researchers use techniques to figure out the work flows and roles of the organization, the “business processes.” But, this must take place on existing organizations.

An essay by Steven J. Gould’s on evolutionary biology called this approach “panglossian”(Gould and Lewontin 1979) emphasizing that we do not know of other possible ways creatures can function because they function the way they do. The panglossian view is that we live in the best of all possible worlds. Granovetter show that economics institutions are socially constructed and not only are the details of their function not predictable before hand, but we now know that the ways they chose were at social cost (Granovetter 1992; Granovetter 2005). For instance, the way that the electric power industry wound up being configured and the rates we are charged had little to do with function and everything to do with politics and preexisting relations (Yakubovich, Granovetter et al. 2005). It is increasingly clear to many that simply thinking of profit as the function of an organization might be missing other functions it performs, jobs for the community and the social value of the service it provides.

The functional view is static; we are not expected to grow new organs any time soon. However in a time where huge companies like GM are dying, financial institutions are creating crises it is hard to argue that this functional system, the bedrock of ERP, business processes and MBA programs is really the best possible solution.

The functionalist approach explains the coordination of the system than shared goals and values. Unfortunately, values are a kind of prior attribute, one that is put into memory by “culture” or some such mysterious external force. We are always in the position of having to guess the causes from the effects, something that evades empirical observation and empirical studies, like the one by McAdam above, do not support the idea.

Trying to prescribe roles in an organization created a descriptive process that is like ethnography, carefully observing and documenting the work. For instance, it is possible to find that a task can be done with fewer steps, something that has been worked on all the way back to Charles Taylor. On the other hand, this gives a single dimensional view of an organization. Social network studies of organizations have shown is that the formal structure of an organization is not a good model of the organization and that the organization is often changing. It is difficult to model multiple roles. However, multiple roles are the norm persons. We are not “physical symbol systems” but a confluence of networks. What makes us unique is not only attributes, but also the multiple roles we play in social networks (White, Boorman et al. 1976; White 2008). The view of humans as discrete components in a machine is inaccurate.

It needs to be emphasized that in the sociological view of roles the role is independent from who is occupying it. Whether they are prescribed roles like in organizations or described roles using some other technique, the behavior of both the person and those with whom the person interacts is strongly influenced by the role. Think back to Chase’s hierarchies, that each position in the hierarchy is a role that is occupied by different animals in different experiments. The roles remain and are stable, but by processes that are still unknown. Information Systems could help discover these processes if it could start with different assumptions.
7. **Structural Equivalence**

One way of talking about roles that does not require ethnography study is "structural equivalence." Looking at Figure #2 it is not difficult to see that even without assigning names to the nodes, the nodes on the top level have the same patterns of links to the nodes on the middle level and that pattern is repeated from the middle level to the bottom. If this were to be represented as an array, the rows on each level would be identical. There are many similar configurations in society such as professors, TA’s and students; auto manufactures, auto dealers and customers. This type of pattern is called “structural equivalence” and research shows that people in the same “set” (who are at the same level) are often perceived as “similar” by observers (Michaelson and Contractor 1992). This is the other view of social network; the roles emerge from the relationships.

There are several types of these types of equivalence with structural equivalence the most restrictive and regular equivalence the least. Regular equivalence would recognize that vice presidents generally appear in the same relation to presidents and general managers (which can be identified by their relations as well) and are not restricted to having a relationship with a specific president or general manager. In the drawing, if the organization had exactly this many customers, tech support people and developers the drawing would represent structural equivalence, but if they are general types, then it is regular equivalence (this paper follows Harrison White and refers to all types as “structural equivalence”).

Structural equivalence cuts across the network. There is strong evidence that ideas, products (and other innovations) spread for people that think of themselves as the same, not like disease in binary diffusion, but across structurally equivalent sets. Strong evidence for this was provided by University of Chicago sociologist Ron Burt.

Burt reanalyzed a study by James Coleman on diffusion of a medical innovation, tetracycline (Coleman, Katz et al. 1957). He discovered that if he compared the hypothesis that the innovation spread by contact like a cold, to the hypothesis that innovation spread across structurally equivalent sets that structural equivalence was a far better predictor (Burt 1987) of the spread of innovation. To rephrase this, the hypothesis that people are more likely to adopt innovations from people they think are like them than those that are not like them is verified by social network analysis (Cialdini 2000). The difference is that by using “structurally equivalent” as the criteria for matching, we are not as dependent on profiles.

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8. **Practical Ideas**

The idea of thinking about users as being derived from described roles instead attributes has practical applications at the most mundane level. Web 2.0 “social networking” users do not provide demographic or geographic information unless they want to so it is difficult to target advertising (Economist 2007). There is great hope to use the networks to spread
products and other messages, but it has had limited success.

Someone that wants to sell a product or otherwise influence many people can use a broad approach like television, radio, billboards and other sorts of ads. Advertisers can get better results by targeting ads to geographic and demographics areas, advertising expensive items in zip codes with high incomes and lower cost items in others. They can target ads to women on television shows generally watched by women and ads to men on those watched by men. Google has become rich because their ads are targeted based on the keyword that the user is using to search and the user not only has the correct attributes, but an active interest in what is being advertised. This has been more difficult to achieve on Facebook (Economist 2007; Economist 2007; Economist 2008).

The structure of Small World networks would predict many small clusters and it is difficult to guess their demographics.

One of the main uses of networks like Spoke, LinkedIn and Facebook is searching by attributes. We can search out people who know something we need to know the way that we search for jobs, through weak ties. This type of search is analogous to finding an apartment. Certainly some apartments are advertised, but the best ones are spoken for before they become vacant. To find them it is necessary to search using people, word of mouth. Network search traces through the links radiating out from an individual node search for nodes with the desired properties. How does the matching take place?

The answer is: profiles with lists of attributes such as age, sex, location, job title and so on. Maintaining this information is both labor-intensive and intrusive on the user’s part. It is good for search, but what about advertising, health promotion or other ways of pushing out to the networks?

Suppose people are trying to sell a product. Years of market research has show which demographics are the most likely to buy their product. A social networking site can become a database of demographic information about individuals and the marketers simply need to do standard database searches to find the information about who is most likely to buy it and present ads to them, no different than television. That, perhaps, is a dream and the goal of social networking businesses, but it does not have much to do with networks at all. The social networking aspect is a way of influencing people to give marketing information, an entertainment and search platform paid for by advertising.

Though Facebook has a database of connections between people, the user’s experience is to look at the network from his or her point of view. They can’t see the larger structures in the network. Users maintain their profiles and log in to update their status or check what’s happening. Applications are distributed from one user to another. This is a bit like going down the road to probe for what is out there. The application starts at a single point and the spreads from that point. There is no reason to assume the whole network is connected. (Disconnected parts of networks are called “components”). The owners of the data from Facebook, LinkedIn, the phone networks, IM sites like MSM and Yahoo, email hubs have the whole view. They have the ability to see if there are separate components. How can this view of the network, by either a marketing organization or an organization’s information system take advantage of that information?

The whole network view requires some concepts that are not quite so obvious when thinking about the network from an individual’s point of view. The network view emphasizes the idea of cohesion; areas of the networks are denser than other. Network analysts call these areas of density “clusters,” but the term “community” gives a sense that the links are not arbitrary (Reichardt and White 2007).

Considering a message from one person to another to be a link, one thing that social networking sites increasingly have is the ability to give meaning to the link. For instance, in white label social networks each network has a purpose and in LinkedIn there are many groups with messages related to that particular interest area. This allows the network to be treated as multiple networks and the techniques for finding descriptive roles to be applied to each network. Since we know that people that are structurally equivalent see themselves as similar to each other, then structural equivalence can be used as a proxy for market segmentation.

One of the promises of social networking software technology is that within organizations, social networking can become a routine part of the work process. Major ERP vendors like SAP are incorporating social networking software into their offering. The networks can be personal or business related as many corporations these days take the view that employees with good networks besides work will have fewer personal problems and be better employees. Because there are multiple social networks for differ-
ent purposes, unlike the “flat” networks we can see from the cell phone or IM traffic they have meaning and allow us to see the persons that emerge from the multiple relations.

There are non intrusive ways of giving “meaning” to email IM and other traffic. For a given email it is hard to know if it is positive, negative, simply or simply a gratuitous CC. Latent Semantic Analysis (LSA) can classify messages and relate them to each other in ways that mirror human subjective classification so it is possible to segregate networks in IM and email traffic (Walter 2002). We are starting to have the ability to do this, but what will we gain?

It is especially important to consider difference between flat and multiple networks here. Relationships are not pipes hooked together with fittings, they take effort to create and maintain. Places where multiple points of view and sources of information intersect are where innovation takes place. It is not just individual action that initiates our judgment that innovation has take place, but the special intersection of roles, something we may be able to see with new generations of social software, network analysis and network awareness.

9. Future Research

The easy story is that social networks are created by the interaction of physical symbol systems, each with a control unit, memory, input, output and a purpose. These systems can be assembled and nested to create organizations and societies and cleanly interfaced with computers, which are just another type of physical symbol system. But evidence shows that this model cannot explain social systems even in simple animals.

In the 12 years since Simon’s last edition of Sciences of the Artificial several things have come to pass. The ability to make random access recordings of behavior has gone from rare and expensive to common place and cheap. Software to analyze and visualize social networks has been created. The amount of time that people spend communicating through the Internet, cell phones, IM and other traceable ways has increased unimaginably. We need to balance the outcome driven aspects of Information Systems with our responsibility as social scientists. Persons are both their own temperament and the expectations they and others have of their actions (roles). Our current assumption about roles, that they are sets of tasks within a functional system is fine as far as it goes, but since it will not explain or predict human behavior outside of that narrow context it is not working on the big picture. The ability to discover roles through descriptive techniques is new and needs to be explored.

10. Conclusion

This paper covers a number of topics, but its main thrust is that careful examination of social networks uncovers problems in some of the most fundamental assumptions of Information Systems. Because of the importance of computers in Information Systems the discipline seems to have adopted the premise that a single metaphor “physical symbol systems” works for computers, humans and organizations. Careful examination of simple “networks” in the form of hierarchies shows that this view cannot be true. In addition more complex network analysis, such as structural equivalence shows that organizations can also not analyzed by the type of decomposition that this model requires.

We now have the tools and data to start creating and testing theories on described roles and other emergent “things.” It is time to consider other models the “physical symbol system” model and perhaps even the idea of “systems” themselves, at least in the narrow sense proposed by Simon and Churchman. Social network can be thought of as just a new way of talking about systems, or a new way of talking about persons and organizations, and someday even computers. Information Systems has a chance to be a scientific discipline exploring the unknown as well as an engineering discipline.


University of California.


