

VISUALIZATIONS OF SOCIAL NETWORKS AS SUPPORT FOR STAKEHOLDER MANAGEMENT WITHIN CONSTRUCTION PROJECTS

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Abstract

Engaging the right stakeholders at the right time is a key factor to successfully complete a construction project. However, the decision which stakeholders to engage within a project can often be difficult. This research looks into the applicability of visualizations of Social Networks as a tool to support project managers to decide which stakeholders to engage and with consecutively engaging these chosen stakeholders. To provide empirical evidence for the utility of Social Network Analysis, we conducted a case study on a public-private redevelopment project in the Netherlands. The findings from this case study show that representations of social networks give project managers a quick overview of the cliques, key players, and the general position of stakeholders in the social project network. This overview helped the project managers to identify which stakeholders to engage. At the same time, our findings show that visual representations of social networks help to engage stakeholders by giving them clear insights into their respective position in the social project network. Overall, the study illustrates the utility of social network visualizations to understand and engage stakeholders on public-private construction and design projects.

Keywords: Social Network Analysis; stakeholder engagement; public-private construction

INTRODUCTION

Stakeholders are all the people, groups of people, or organizations, such as neighborhoods, institutes, or societies, with a concern for the outcomes of a certain construction project (Mitchell et al., 1997).

The influence of stakeholders on public project outcomes is traditionally high. Stakeholders can for example often rely on legal procedures to slow down or stop a project that is against their will and interests. Another option stakeholders often use to gain influence on project outcomes are political lobbies. Hence, project managers need to manage stakeholders well to achieve desired project outcomes (Achterkamp & Vos, 2007). Goals of such stakeholder management efforts are, among others, to increase support and reduce project costs and durations (Zhong et al., 2007). If stakeholders support a plan, this will prevent that time and money is spent on legal procedures and objection procedures. Another goal might be

community learning or better and more sustainable project acceptance (Innes & Booher, 1999).

As a first step in stakeholder management, project managers should start with mapping all those people and organizations with an interest in a project. This will provide project managers with a complete overview of the project's stakeholder environment. Ideally, project managers should do that early on in the project because At the very outset of a project, stakeholders have the most chance to get actively involved in the planning activities.

After identifying stakeholders, project managers have then to decide which stakeholders they like to engage in the planning process and how they like to engage them. Stakeholder engagement focuses on the participation of stakeholders, or enabling stakeholders to exert an influence on a project and its outcomes. Project managers should engage stakeholders, to reach project outcomes that are more likely to be successful in the implementation and maintenance phase. This greater success is a consequence of incorporating the ideas and opinion of a broad set of stakeholders in the eventual plans.

However, identifying and engaging stakeholders is not an easy task. Stakeholders form a complex social network that project managers need to understand to be able to engage the right stakeholders at the right moment. Further, if the stakeholders understand the social network too, this will probably grant them better understanding of the decisions project managers make regarding the engagement process. In any case, to successfully identify and engage stakeholders, project managers have to understand the social interdependencies between stakeholders within a project's social stakeholder network. The visualization of such a social stakeholder network in the form of a graph seems to be a good tool to support project managers in their stakeholder identification and engagement efforts. To explore empirically how such social network visualizations can support stakeholder management activities, we conducted a case study on a public private partnership project in the Netherlands during which we introduced social network graphs in the planning process. This paper reports the results of this case study.

The paper is structured as follows: in the next section, we will discuss the theory we used as basic knowledge for our research. In the subsequent section, we will discuss the research method we applied during the twelve weeks of research. After that, we will describe the data we collected during this research, and the results of the analysis of this data. The report will conclude with the conclusions and the limitations of the research.

VISUALIZATIONS OF SOCIAL NETWORKS IN STAKEHOLDER MANAGEMENT

If project managers set up well managed participation processes for stakeholders, this can lead to better project outcomes, reduce of costs (Zhong et al., 2007), and lead to broader support of the project. That is why it is important for project managers to identify the important stakeholders within a project. One important step during such identification efforts is to analyze the interdependencies between stakeholders in a social network. Current models for stakeholder management (Mitchell et al.,1997; Achterkamp & Vos, 2007; Bakens et al., 2005) do not provide insight in those interdependencies. Visualizations of social networks do. To theoretically underline our work, this section offers an overview about current available models in stakeholder management and briefly discusses their advantages and shortcomings. Afterwards, this section then introduces methods to visualize social networks, and derives a number of theoretical benefits of such visualizations during the stakeholder management process.

Currently applied stakeholder management methods focus on the same basic principles to support project managers in their decisions on stakeholder engagement: identifying and categorizing the stakeholders. Identification is often done by brainstorming sessions. This is a good way to stimulate out-of-the-box thinking and produce an as complete as possible list of (potential) stakeholders of a project.

Based on the list of identified stakeholders, current methods then suggest that project managers categorize stakeholders. This categorization can be done in several ways. For example by categorizing stakeholders based on attributes they possess, such as power, legitimacy and urgency (Mitchell et al., 1997), or based on the role a stakeholder has in a project, like a client or a representative stakeholder (Achterkamp & Vos, 2007). For their own purposes, these are useful techniques. Nevertheless, the techniques do not give project managers and external stakeholders insight in the interdependencies between stakeholders in the social (project) network.

These interdependencies between stakeholders can be visualized by a social network graph that shows the stakeholders as nodes and their mutual relations as edges between these nodes. This presentation can grant project managers and external stakeholders insight in the key characteristics of stakeholders within the network: their centrality, their prestige, whether they form cliques with other stakeholders, and their relative position. Further, the graph representation can show missing ties between stakeholders. The following subsections will elaborate on how social network graphs can help to identify the above listed characteristics.

Prominence: Centrality & Prestige

Prominence of a stakeholder in a network exists in two forms: centrality and prestige. Centrality reflects the involvement of a stakeholder within many relations in the network. The centrality of a stakeholder can easily be determined by the number of relations they have within the network. Take for example a non-directed network with six stakeholders (figure 1).

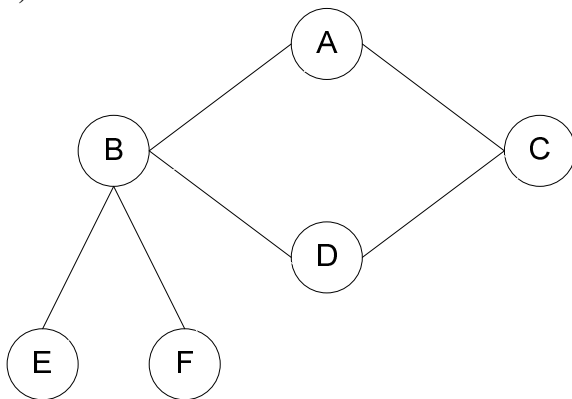


Figure 1: Example of a non-directed social network (Knoke & Yang, 2008)

In this network, stakeholder B is the most central stakeholder with four relations. Through this, B is the most visible to the other stakeholders and can be considered a key stakeholder. Stakeholders with many relations are likely to have a high influence on a project, as they can reach many other stakeholders in the network to convince those stakeholders of their view on a project and the desired project outcomes.

The other form of prominence in a social network is prestige. Prestigious stakeholders are receivers of many relations; i.e. they don't initiate many relations within the network, but

receive many ties from other stakeholders. The amount of such “sender-receiver” or “source-target relations”, implies the control over resources and a certain amount of authority over other stakeholders by the prestigious stakeholder. Prestigious stakeholders often collect information from other stakeholders, making them interesting parties to be engaged. This makes them also a key player that should be engaged according to ‘the law of the few’ (Bakens et al., 2005).

The centrality and prestige concepts grant external stakeholders insight in their own position relative to other stakeholders. They can determine whether they have a strong position compared to other stakeholders (“Am I in a more central position than the others?”).

Project managers benefit from the external stakeholders’ better understanding of their positions through the two concepts. The external stakeholders are more likely to understand the decisions project managers make on stakeholder engagement. These decisions on stakeholder engagement can be based on the quick overview of the key stakeholders which a visualization of the social network grants project managers. This helps project managers when determining which stakeholders to engage. The key stakeholders, based on their centrality and prestige, are likely to be able to influence project outcomes and have information of the other stakeholders. Furthermore, because networks often show great variety between the stakeholders, it is time consuming for a project manager to approach every stakeholder with a tailor-made approach (de Bruijn & ten Heuvelhof, 2008).

External stakeholders benefit from the centrality and prestige concepts by knowing what their opportunities are, regarding their position in the network. They can make better decisions about what they can demand from a project manager. For example, they can try to attract a lot of attention for their interests, but if they are somewhere on the side of the network with only one tie to another remote stakeholder, they probably won’t be noticed.

Cliques

Cliques give information about groups of stakeholders that are closely related to each other through their interdependencies and relational ties. Cliques consist of groups of stakeholders who have ties with all of the other members of the cliques, whereas no other stakeholder in the network has direct ties to all the stakeholders in the clique. Prerequisite is, that there are at least three stakeholders involved in a clique. Using these requirements, the boundaries of cliques within a social network can be determined. For example, see figure 2.

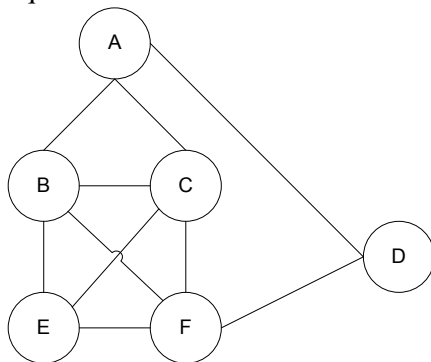


Figure 2: Example of a clique in a social network (Knoke & Yang, 2008)

Two cliques can be recognized in this example. There is a clique consisting of A, B, and C and a clique consisting B, C, E, and F. These stakeholders have mutual relations with each other, whereas no other stakeholder in the network has connections with all of the stakeholders in the clique. A, D, and F don’t form a clique, because there is no direct tie between A and F.

Knowledge about existing cliques and prominent stakeholders within a clique is important for the project manager. Project managers can engage the prominent stakeholder that can then act as a representative for a group of stakeholders. The opposite can also be done: after determining the boundaries of a clique, the project manager can determine whether the clique has a prominent stakeholder in their midst. Furthermore, the cliques grant the project manager insight in the individual stakeholders that might be empowered by being part of a clique, and which cliques are present in the network.

Understanding about clique membership can also help stakeholders to get engaged with the project. In general, stakeholders can gain more influence as a group than individually. In combination with the technique to recognize prominent stakeholders, members of a clique can also again determine whether there is a prominent stakeholder inside their clique who can act as their representative.

Cliques are, like centrality and prestige, based on the relations and interdependencies between stakeholders in the social network. Possessing the same attributes or playing the same role in a project does not imply a mutual relation between stakeholders. Because of this, current models for supporting project managers with stakeholder management are not useful in recognizing cliques.

Insight in missing ties

The visual representation of a social network shows the relations between stakeholders. It also shows which stakeholders have no connection with each other: missing ties.

Project managers can also benefit from knowledge about missing ties. For example, through the complete oversight of apparent and non-apparent ties, the project manager can evaluate whether every stakeholder is adequately engaged in the social stakeholder network of the project. Stakeholders can also benefit from knowledge about missing ties. Stakeholders can, for example, initiate new relations to gain a more central or prestigious position in the network or to form a new clique. Another option would be to initiate a relation with a key stakeholder to get their information to the project manager.

Though project managers can use the current models to make sure every stakeholder is represented (simply by engaging all identified stakeholders), this does not grant them and the external stakeholders insight in the non-apparent relations. Because of this, external stakeholders can't use the information from the categorization models for strategic purposes.

Overview

In summary, visual representations of social networks can support project managers with their decisions on stakeholder management and help external stakeholders with understanding the decisions a project manager makes. An overview of the different concepts and their utility to respectively project managers and external stakeholders is in table 1.

Social Network Analysis technique	Utility for Project Managers	Utility for external stakeholders
<i>Centrality</i>	Grants insight in the key stakeholders within the network.	Grants insight in their own relative position compared to other stakeholders. Also, makes them better understand their position and the choices project managers make.

<i>Prestige</i>	Grants insight in the authoritative stakeholders within the network.	Grants insight in their authority compared to other stakeholders.
<i>Cliques</i>	Grants insight in the stakeholders who gain power by being a group.	Empowers stakeholders as they can reach more with a group than as an individual. Ability to choose a representative inside the boundaries of the clique.
<i>Insight in missing ties</i>	Grants a quick overview of the relations between stakeholders, so the project manager can evaluate who is represented in the engagement process.	Grants a quick overview of the relations they should initiate to become more central or to become part of a clique, giving them a strategical advantage.

Table 1: Summary of the utility of social network analysis

RESEARCH METHOD

To provide empirical evidence and explore if social network analysis is useful in managerial practice, we conducted a case-study on a public-private partnership project of the city of Almelo in the Netherlands. The project's goal is to establish a building that accommodates a hotel, several catering companies, and other peripheral retail organizations. The project got the name Almelo Nouveau and had to be an attractive building, both inside and outside. For several years, the municipality of Almelo and the private party they cooperated with, a project developer, worked on the plans for Almelo Nouveau.



Figure 3: Artist impression of Almelo Nouveau (Tubantia, 2010)

However, the municipality has designated more sites in Almelo for peripheral retail. This means that the municipality is going to realize a lot of extra commercial space in the upcoming years. It is questionable whether the municipality can fill all of this space with private commercial parties, as the designated functions of the new locations are all similar. Additionally, the previous responsible politicians (from other political parties than the current responsible politicians) have initiated the revitalization and restructuring of the town centre, which will be under construction for the upcoming years. This has led to enormous opposition by entrepreneurs throughout the city against the realization of Almelo Nouveau. Eventually, the City Council decided to put a hold on the project.

The project managers of the municipality and the project developer wanted to know how this stakeholder obstruction could occur, as they thought they were working on plans that were good for the city. But, during the years of preparation, making the plans for Almelo Nouveau, the project managers of the municipality and the project developer hadn't paid much attention to stakeholder management. At the end, this led to the opposition of several stakeholders, delaying the project. So they wanted to know how to proceed *with* these stakeholders involved and how to engage the opposing stakeholders better in the planning phase. Hence, this project was an ideal opportunity to test our hypothesis on the utility of social network analysis in stakeholder management on a real life project and in close collaboration with practitioners. Figure 4 illustrates our overall research effort.

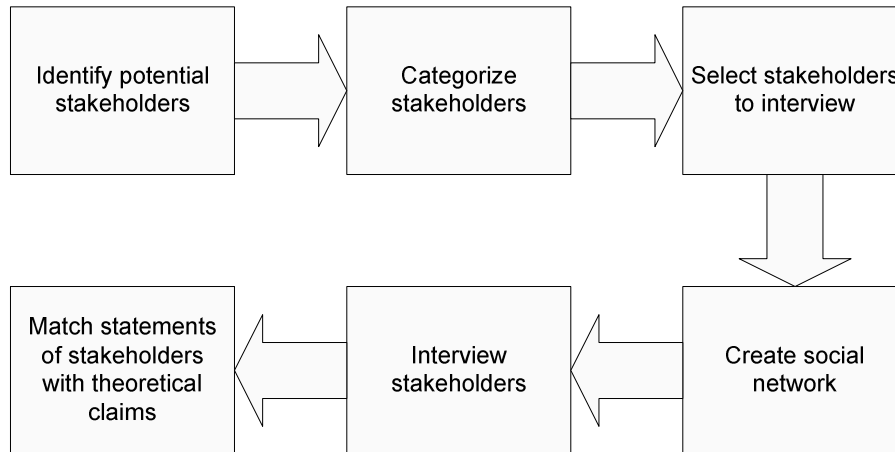


Figure 4: Overview of research methodology

When we started on the project, we first identified the potential stakeholders of the project. So, we conducted a brainstorming session with two members of the project team of the municipality; two employees of the Department of Economical Affairs. This resulted in a vast list of (potential) stakeholders.

From this list we selected seven stakeholders to interview. Overall, we selected some internal stakeholders from the community of Almelo (Alderman, project manager) and some external stakeholders. To allow for a meaningful collection of interview data, we selected only stakeholders which had already come in contact with the functional interpretation of Almelo Nouveau.

We also tried to select interviewees from a broad range of stakeholder groups to enable us to draft a complete image of the problem perceptions on the project. Table 2 lists the seven interviewees and why we selected them.

Stakeholder	Selected because
Alderman	He played an important role during his time in the opposition (till march 2010) and in the time he has been Alderman. He was part of the opposition in the City Council that has set a hold to the plans. As Alderman he still objects to with the initial plans for the project.

Project manager municipality	The project manager is responsible for the management of the project and the additional processes, including stakeholder management.
Chamber of Commerce	The objecting parties asked the Chamber of Commerce for advise about Almelo Nouveau. The Chamber of Commerce was also part of the group of speakers who convinced the City Council to bring the project to a halt. The main role of the Chamber of Commerce is giving objective advise to the municipality and entrepreneurs.
SOBA (Foundation Entrepreneurs Town Centre Almelo)	The SOBA is one of the objecting parties, but also the representation of most entrepreneurs in the town centre. With the revitalization plans for the town centre, the SOBA has a clear opinion about other projects.
Owners residential boulevard	The residential boulevard is another commercial part of town that struggles with the financial crisis and fears competition from Almelo Nouveau and other projects.
MKB Almelo (Small to Medium-sized Entreprises Almelo)	MKB Almelo is the organization that represents most of the objecting parties. MKB Almelo was also part of the group that spoke to the City Council to convince them that the current plans would harm the economical balance in the city.
Project manager project developer	The project developer is the partner in the Public Private Partnership with the municipality of Almelo.

Table 2: Reasons for selection of interviewees

In advance of the interviews, we created an example of the social network of this project. We created this network with the information we retrieved from our conversations with the project manager of the municipality and the information we got from the project team members during the brainstorm session. During the interviews, we presented a more detailed graphical representation of the network (Figure 5).

In Figure 5, the thickness of the arrows represents the frequency of contact between stakeholders. The arrows between stakeholders within the municipality the thickest arrows, as there is frequent contact between them. The arrows between the stakeholders of the municipality and the external stakeholders are thinner, as there is less contact between these stakeholders. They only communicate with each other when there are new developments to mention. The same is valid for the group of external stakeholders at the right side of the chart. They only communicate in relation to the project Almelo Nouveau when there is news to discuss.

After showing them the social network and the chart below, we asked the interviewees two questions regarding the social network analysis: (1) what they thought of their own position and that of other stakeholders and (2) what they thought of the value of such a visualization to them. After conducting the interviews we then analyzed the statements of the stakeholders.

During this analysis, we tried to link the interview statements with the claims we made in table 1 for the utility of the social network concepts centrality/prestige, cliques, and missing ties. In the next section, we will describe these analysis outcomes for each of the concepts.

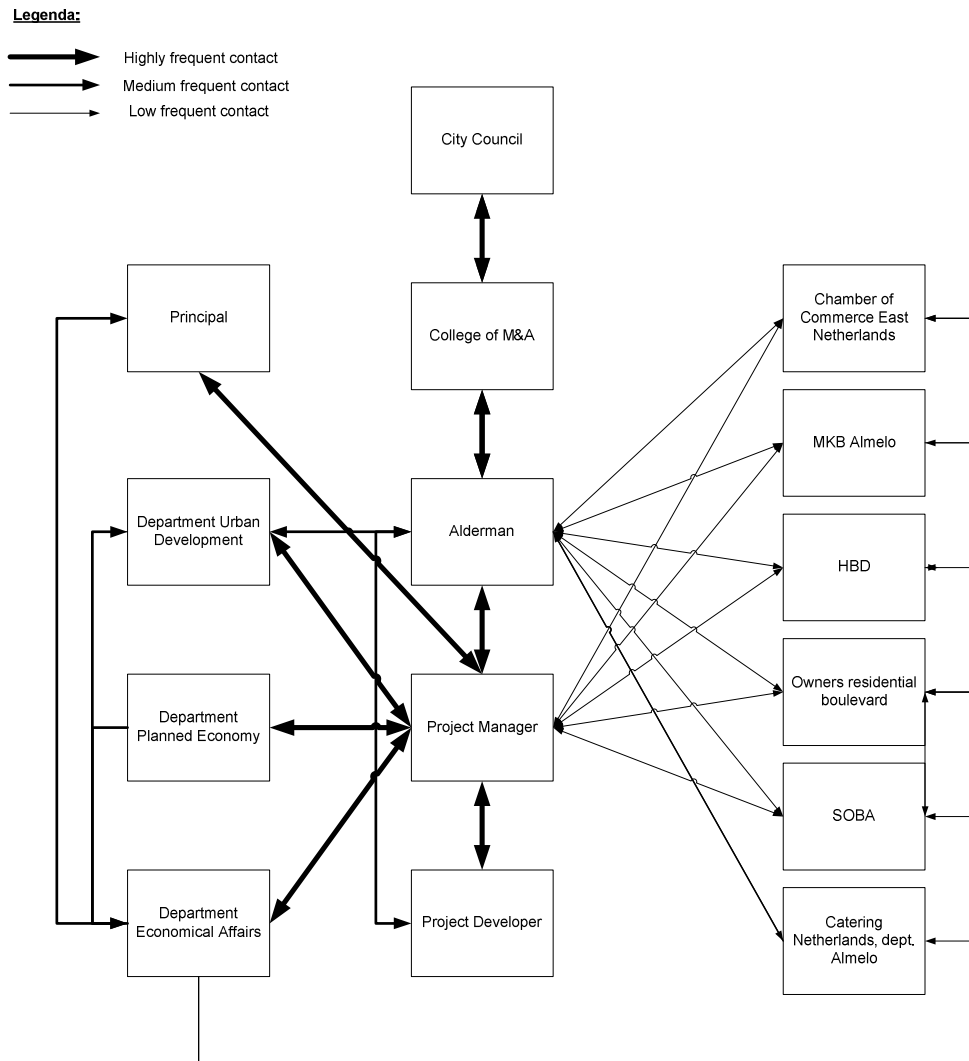


Figure 5: Chart of relations between stakeholders, shown to interviewees

RESULTS OF DATA ANALYSIS

Centrality & Prestige

Utility to external stakeholders: Grants insight in their own relative position and authority compared to other stakeholders.

In general, the external stakeholders saw a practical value in the visualization of the social network for determining their own relative position compared to other stakeholders. They could decide whether they felt they were on the right place or not. The representative of MKB Almelo said the following about his central position in the network and his resulting role as key stakeholder: “It’s our responsibility to represent entrepreneurs”. As a central

stakeholder in the network, MKB Almelo can act as a representative for the external stakeholders they are in contact with. The representative of the Chamber of Commerce is more a prestigious stakeholder, as he receives many ties that are initiated by external stakeholders. He tries “to group these a little bit and let them function better.” As an authoritative stakeholder, he is asked for advice by the external stakeholders.

Utility to project managers: Grants insight in the key stakeholders within the network.

The first remark of the project manager of the municipality was the importance of the correct filling in of the network. If the right names are not on the right place and the information on ties and the direction of relations is not correct, the network loses its analytical value. If the prerequisite of correctness is fulfilled, the visualization of the social network clarifies the stakeholder environment to the project manager. This clarification of the social network is established through the insight in the relative prominence of the stakeholders, reflecting their importance to the project manager.

For the project manager of the project developer centrality also played a role. Especially their own centrality in the network. “We are not in the right place here. We have to be much more in the middle”, was his first comment after seeing the visualization of the social network. He would like to be more central, to be visible to external stakeholders and proclaim the positive message of their building aspirations. He also saw in the visualization that the municipality has a central position in between the project developer and the other external stakeholders. This gives him the information to consider a strategy with the municipality as middle person: “All of the other stakeholders can bring their questions to us via the municipality”. Furthermore, as “the importance of stakeholders is tested by the municipality and their project manager, and us”, the visualization of the social network grants them insight in the importance of stakeholders based on the relations these stakeholder have.

Cliques

Utility to external stakeholders: Grants insight in the cliques they can join or leave, giving them a strategic advantage.

The visualization also gives the project managers and the external stakeholders insight in the existing cliques. As the representative of the Chamber of Commerce mentioned, the visual representation of the social network gives him an idea of which stakeholders he can group together to make them better organized in protecting their interests. The stakeholders we spoke to who were in the clique, were content with their position, as they had a strong position with the other stakeholders as a clique opposing the plans.

Grants insight in the stakeholders who gain power by being a group.

The experience of the project manager of the municipality is that “making an overview of the relationships between stakeholders is very enlightening”. This is because of the insight in the cliques stakeholders form and the consequences of those alliances to their power to influence project outcomes.

Insight in missing ties

Utility to external stakeholders: Let’s them better understand why they are in a certain position.

The final utility of the visualization of the social network is the insight in missing ties. The visualization helped the interviewees to determine which relations they should initiate for certain goals. External stakeholders could for example see why they were not in direct contact with the municipality: they were already represented by a prominent stakeholder in their clique, the MKB. As the Alderman said, “this also makes the structure clear”. The

visualization makes clear to project managers and external stakeholders which relations are apparent and non-apparent between other stakeholders as well.

As we stated earlier, the visualization showed the project manager of the project developer that he was de-central in the network, despite his company having invested a lot of money in the project. The visualization gave him insight in the missing ties: there was no direct contact with the external stakeholders, whereas initiating these relations could enlarge his visibility within the network. Furthermore, the insight in the missing ties also emphasized the ties he did have: he had a direct tie to the Alderman and the project manager of the municipality. This led to the earlier mentioned strategy to give the centrally positioned representatives of the municipality a role as intermediate between the project developer and the external stakeholders.

Utility to project managers: Gives a quick overview of the stakeholder environment and the relations between stakeholders.

The visualization also showed the project manager of the municipality that he was a central figure within the project team and the municipality, but to the outside world, the external stakeholders, the Alderman held a more central position. "On the new project I have too little influence," was the remark of the project manager. The visualization of the social network showed him why: the greater part of the communication with external stakeholders went through the Alderman. External stakeholders also mentioned during the interviews the minimal contact they had with the municipalities project manager. The Alderman is their 'reference point' for decisions.

Overall, the above shows that the visualization of a social network can indeed help project managers with stakeholder management, and external stakeholders with the determination of their position and strategies.

LIMITATIONS & SUGGESTIONS FOR FUTURE RESEARCH

Generalization comes with numbers. When executing a case-study, these numbers come in the number of cases that are studied in one research. A researcher does this to discover a pattern in the form of similarities between comparable cases. Due to a limited period of time to execute the research, we could only perform a study on one case. This makes the results possibly sensitive to deviations in comparison to similar cases. Nevertheless, the case studied in this research, Almelo Nouveau, is suitable for generalization because this sort of construction project is likely to be found elsewhere. A Public Private Partnership, where a municipality, or other governmental organization, cooperates with a private party on the realization of a commercial building. The public party facilitates, while the private party bears the risks. Furthermore, commercial activity is everywhere. The chance to find similar kind of construction projects elsewhere is quite high. At last, the kind of stakeholders identified in this research were quite general ones in relation to the realization of the construction of a commercial building (entrepreneurs from elsewhere within the city, umbrella organizations for these entrepreneurs, public party, private party). Nevertheless, we suggest that future research efforts start to evaluate the utility of social network visualizations on other projects as well to improve the generality of the here presented work.

Because the conclusions of the research are mainly based on the interview data collected during the twelve weeks of research and on a specific case, the data have possibly been influenced by the opinion of the interviewees or their emotional involvement with the project. Besides, the amount of interviewees has been very limited in comparison to the total amount of identified stakeholders. This has (partly) led to assumptions about the non-interviewed stakeholders.

Another limitation of this research is the relative simplicity of the used network graph. The more variety and interdependencies among stakeholders, the more complex and less

transparent the social network will be. That makes it harder for the project manager to oversee the network using a visual graph presentation (de Bruijn & ten Heuvelhof, 2008). For example, if a social network consists of more stakeholders, it will be harder for project managers to identify the central stakeholders or find out where the cliques are. However, mathematical methods exist that can allow for the calculation of centrality values and cliques within social networks (Knoke & Yang, 2008). We suggest that future research also evaluates the utility of these methods to support stakeholder management activities.

Another downside of this research is that we did not look at the process itself wherein project managers will use the social network analysis. In general, project managers should identify stakeholders at the start, during the initiative phase of a project. They should do this to build support among the stakeholders and give them the possibility to add their own ideas. In our research, we applied the social network analysis only late in the project planning efforts. In the initiative phase, the goals and implications of a construction project are still ambiguous. It is likely that boundary conditions (e.g. political environment, legal regulations) will change during the decision-making process, changing the stakeholders and their relationships which again will make it harder to understand a graphical network presentation. Additionally, the social network on projects will change over time. Researchers should evaluate how to best integrate social network analysis in the planning process and how once established social network graphs can be updated throughout a project.

Overall, we claim that social network analysis visualizations should make the work of project managers easier, because the external stakeholders better understand their own relative position. However, stakeholders will choose their own strategy to reach their individual goals and serve their interests which might be quite different from the ones of the project manager. Hence, there is a real chance that the application of social network tools in the stakeholder management process will increase the overall complexity of the planning process.

CONCLUSION

Social network analysis is a tool that can both help project managers and external stakeholders. The project managers get a quick overview of all the cliques, key players, and overall position of stakeholders. Through the interdependencies between these stakeholders, project managers can determine pathways of communication. This means, which stakeholders they can reach through other stakeholders they already have ties with. The visualization and analysis also helps in determining which cliques are apparent and which stakeholders are part of these cliques. If project managers take in account the expectations and opinions about the project of the stakeholders within the clique, threats or opportunities can be mapped.

The visualization and analysis of the social network gives external stakeholders insight in their own relative position, compared to other stakeholders. It can help them to determine whether they are central or at the side of a network and which ties to make or strengthen to gain more influence within a project by becoming a more prominent stakeholder themselves or forging cliques with equally minded stakeholders. This grants them better understanding of their possibilities to cooperate with other stakeholders. It also gives them better understanding of the choices made by a project manager about the stakeholders that project manager engage. They can also determine whether they are part of a clique and if they can choose someone in their midst to act as a representative on their behalf.

Our case-study shows that social network analysis is a useful tool in complementing the 'tool box' of project managers. It helps to determine positioning, cliques and key players within the complete setting of stakeholders. Not only the project manager(s) benefit, also the other stakeholders, in being able to gain a visual insight in their own positions and that of others, giving them information on the strategies they can follow.

LITERATURE

- Achterkamp, M. C., & Vos, J. F. (2007.) Critically Identifying Stakeholders. *Systems Research and Behavioral Science*, 3-14.
- Bakens, W., Foliente, G., & Jasuja, M. (2005). Engaging stakeholders in performance-based building: lessons from the Performance-Based Building (PeBBu) Network. *Building Research & Information* , 149-158.
- de Bruijn, H., & ten Heuvelhof, E. (2008). *Management in Networks On multi-actor decision making*. Oxon: Routledge.
- Innes, J. E., & Booher, D. E. (1999). Consensus Building and Complex Adaptive Systems. *APA Journal* , 412-423.
- Knoke, D., & Yang, S. (2008). *Social Network Analysis*. California: Sage Publications, Inc. .
- Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *Academy of Management* , 853-886.
- Zhong, T., Young, K., Lowry, M., & Rutherford, G. (2007). A model for public involvement in transportation improvement programming using participatory Geographic Information Systems. *Computers, Environment and Urban Systems* , 123-133.