SUMMARY

Introduction

The scope and costs of these days' infrastructure projects have increased and therefore the realisation of these projects has become more complex. The legal, organisational and social context in which infrastructure projects are realised is changing and there was dissatisfaction about the functioning of the construction sector. Therefore, the Ministry of Infrastructure and Environment has introduced two new policies to involve private parties in order to decrease the duration and costs, and increase the quality of infrastructure projects. As a consequence more tasks are outsourced to market parties, while the public principal is taking a step back and has fewer responsibilities. Besides that, the public attention for the realisation of infrastructure projects has increased. In case these stakeholders are not carefully involved, this might result in major overruns in time and costs or even cancellation of a project. Therefore managing the parties that have an interest in the project has become more important.

Because project stakeholder management (Dutch: omgevingsmanagement) is relatively new as an individual policy issue within project management of infrastructure, there seems to be little coordination in a combined approach of principal and contractor. This indicates that there is an opportunity to improve the collaboration between principal and contractor. However, this collaboration has to be improved within the legal requirements and in a constantly changing and dynamic project environment. Besides that, the collaboration between principal and contractor is one of the greatest challenges of these days' projects due to the different objectives of both parties. The objective of this research was to gain insight in how the collaboration between principal and contractor on project stakeholder management could be enhanced. In order to achieve this objective the research question was formulated as:

> ***Which possibilities can be defined to enhance the collaboration between principal and contractor on project stakeholder management in large infrastructure projects?***

This research contributed to the theoretical knowledge of collaboration between principal and contractor on project stakeholder management by providing insights to enhance this collaboration. The research was executed under the authority of Neerlands Diep. This organisation has the aim to exchange knowledge from construction projects and to create new knowledge for these and future projects.

Literature

A literature study was conducted with four purposes: (1) to see what is known about project stakeholder management and how this type of project management is embedded in public and private organisations, (2) to discuss the legal context in which this research takes place, (3) to discuss on the organisational context of this research and to show which factors are important for good collaboration and (4) to discuss the social context in which this research takes place. These four topics are elaborated.

Literature indicated different definitions for project stakeholder management. It was concluded that project stakeholder management could be described as '*management that is the link between the project organisation and the project environment with its stakeholders. The interests of the stakeholders have to be taken into account and the aim is to engage stakeholders to the project, to acquire support and to make the realisation of the project possible without interference. The goal of*

project stakeholder management is twofold: satisfaction of the stakeholders and the realisation of the project within scope, time and budget'. Within the organisation of the principal the project stakeholder manager is one of the five roles in the integrated project management model, while not all contracting parties have figured out yet how to embed project stakeholder management in their organisation. Project stakeholder management can be defined by the components communication, conditioning, stakeholder management and traffic management. Project stakeholder management is conducted at strategic, tactical and operational level.

Literature illustrated that the construction sector is changing from a traditional contract model towards a so-called integrated contract model. This means that the role of the principal is more limited, because a contractor becomes responsible for the design and construction of the project. Besides these new types of contracts, there was dissatisfaction about the functioning of the construction sector. This resulted in two policies about involving private parties to improve the duration, costs and quality in the realisation of infrastructure projects. In addition, the Dutch and European legislation has become more complex which makes the development of infrastructure projects more challenging.

The new types of contracts and the changing relationship between principal and contractor resulted in organisational changes. In the nineties, the public resources were not sufficient to meet the requirements with regard to the improvement of the transport infrastructure. This caused the rise of the integrated contracts where the public principal is stepping back as the executing party of construction projects and is focusing more on the strategic and coordinating role as asset owner. The construction sector is changing from a traditional supply driven market to a demand driven market. Because the increased scope and costs of today's projects, contractors have to work together in consortia to be able to bear the risks. In order to realise infrastructure projects principal and contractor have to collaborate, something that could be difficult given the fundamental differences between both organisations. The research has identified six criteria that are important for good collaboration: *objectives, trust, risk, communication, attitude* and *project organisation*.

The form of public participation has changed over the last decades. Citizens have acquired more rights in legislation, use the possibilities of appeal and demanded a greater voice in the decision making process. Public opposition due to various factors has been reported as the main reason for project failure. Therefore, the many different and sometimes conflicting interests of stakeholders must be considered. As a consequence there is a growing interest in management of these stakeholders and different stakeholder management process models are developed. Most important is that stakeholder management is a cyclic process, because the needs and priorities of the stakeholders are constantly changing.

Collaboration model

The six criteria that are important for good collaboration are used to evaluate the state of collaboration between principal and contractor. A collaboration model was designed to compare the points of view of principal and contractor, and to compare the collaboration in different projects. The state of collaboration for each criterion can be positioned on one of the four levels of collaboration that are distinguished based on a literature review. The four different levels of collaboration are: *contractual relationship, collaborative relationship, project partnering* and *strategic partnering*. Based on a questionnaire, with a description of the relationship at each level for all criteria, the state of collaboration can be determined for each criterion.

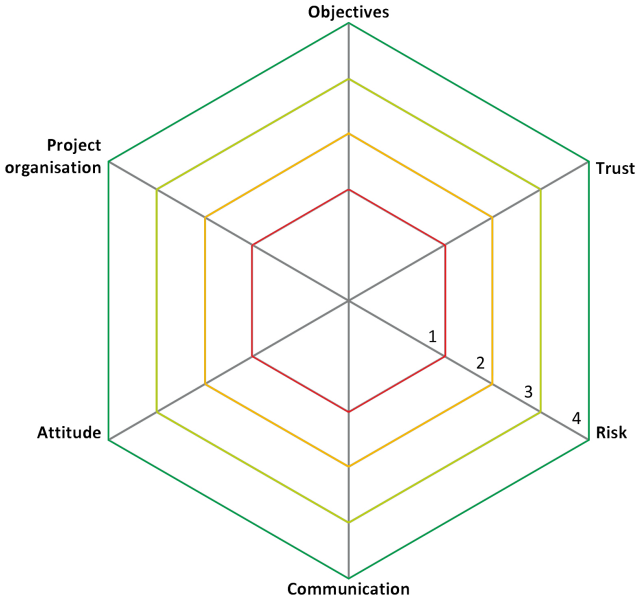

Figure 1: Radar chart for collaboration model (own ill.)

The state of collaboration from point of view of principal and contractor is visualised in a radar chart, which is illustrated in Figure 1. The collaboration visualised in the radar chart illustrates the level of collaboration between principal and contractor, and whether the points of view of principal and contractor are aligned.

Methodology

The research design consisted of a multiple case study, where four construction projects from the network of Neerlands Diep were investigated and compared with each other. To be able to analyse the gathered data, a research framework was designed based on the literature research. The analysis of the cases consisted of two steps. First, the implementation of project stakeholder management in the four cases was explained. Second, the level of collaboration between principal and contractor was determined from both points of view. Hereafter it was possible to explore the possibilities to enhance the collaboration between principal and contractor. This process is illustrated in the research framework in Figure 2 on the next page.

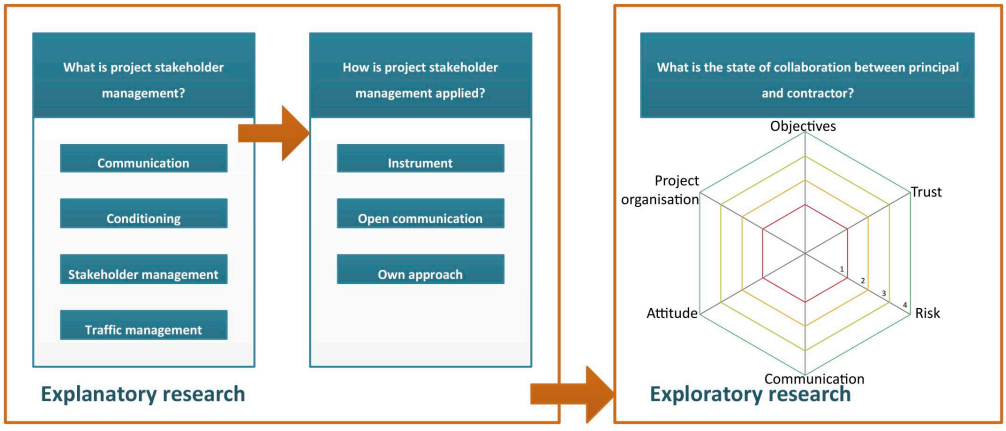

Figure 2: Research framework (own ill.)

In order to obtain valid and reliable findings, empirical data of the case study projects were gathered with the use of several research methods and sources. An extensive analysis of documents about the case gave the researcher an overview of the project context. Semi-structured interviews with the project stakeholder manager of principal and contractor gave insight in the implementation of

project stakeholder management and the collaboration between principal and contractor in the project.

By conducting a case study research, a profound and full insight in the process of project stakeholder management and the collaboration between principal and contractor in gained. The cases that are studied for this research are the construction of a stacked tunnel, the renovation of a bridge, tunnelling of a rail track and road, and trenching forelands. The individual case analyses based on the observations of the researcher were used as input for the cross case comparision. The main findings of this cross case comparision lead to preliminary conclusions. This research reflected on these preliminary conclusions based on the literature study and the discussions during a workshop meeting with the respondents of the interviews.

Conclusions

Project stakeholder management links the project organisation with the stakeholders in the project environment. The goal of project stakeholder management is twofold: satisfaction of the project stakeholders by involving them and creating support for the project, and the realisation of the project within scope, time and budget. The four case study projects recognised that project stakeholder management consists of the components communication, conditioning, stakeholder management and traffic management. Workshop participants indicated that a project stakeholder manager has an important fifth component '*relation manager*'.

The research has illustrated that there are three strategies to enhance the collaboration between principal and contractor. The first strategy is **verification of expectations** with each other regarding all kinds of issues before the realisation of the project starts. It is important that both parties align their expectations and make sure they understand each other correctly. The second strategy to improve the collaboration between principal and contractor is to **focus on the people**. Research illustrated that people can make the difference in a project, but currently there is limited attention for the composition of project teams. The first matter of importance is whether people are willing to collaborate, if this is not the case the collaboration is likely to fail. The third strategy to enhance the collaboration between principal and contractor is to **monitor the collaboration**. This research illustrated that it is important that principal and contractor are able to reflect on their collaboration, without being judged about the collaboration. It was indicated that an instrument is needed to reflect on the collaboration and how to start the dialogue. The collaboration model as designed in this research can be used for this.

This research provided a collaboration model to compare the points of view of principal and contractor, and to compare the collaboration in different projects. The case study research has illustrated that the collaboration is better in projects where principal and contractor have an aligned point of view, compared to projects where the level of collaboration is higher but both parties differ in point of view. Therefore this research concludes that for good collaboration the alignment of points of view is more important than reaching the highest level of collaboration. This conclusion was recognised by the workshop participants. They indicated that it is possible to have a successful business relationship with limited collaboration in case the involved parties have agreed this.

There are three possibilities to apply the collaboration model in practice.

- The collaboration model can be used before the start of a project, to decide which level of collaboration principal and contractor want to achieve.
- The collaboration model can be used as an instrument during the realisation of the project, in order to monitor the collaboration
- The collaboration model can be used after completion of the project to evaluate the collaboration between principal and contractor in this project.

This research indicated that it is a tough challenge to start the dialogue about the collaboration between principal and contractor. Project stakeholder management and collaboration are rather complex issues and have various interrelated aspects. This research did not cover all issues, but the developed collaboration model is a solid foundation to enhance the collaboration and to initiate further research.

Recommendations

This research illustrated that further research can be conducted in the following directions:

- Further development of the collaboration model. Due to the limitations of this research the completeness of this model cannot be ensured, but the first evaluations have illustrated the potential of the model. Therefore further development of the collaboration model is an interesting direction for further research.
- Unawareness of the importance of collaboration and project stakeholder management within project organisations is one of the main barriers for collaboration. Therefore an interesting direction for further research is to investigate how the entire project organisation can become aware of this importance.
- The perspective of the project stakeholders on the collaboration between principal and contractor was not included in this research. Due to the limitations of the researcher in this research the collaboration was only be evaluated from the point of view of principal and contractor. Additional research about the perspective of the project stakeholders on the collaboration could make the research more complete.

Research in these directions will enrich the scientific knowledge about project stakeholder management and the collaboration between principal and contractor.