TOWARDS PROJECT SUCCESS THROUGH MUTUAL FEEDBACK IN CONSTRUCTION

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ABSTRACT

The success of the construction project is based on the performance of multiple networks, where customer and end-user satisfaction is highly influenced through independent work done by the parties and the co-operation between parties. The team member's satisfaction has found to be one of the key performance indicators (KPI) of project success amongst other subjective measures. Also, management of the feedback and the operation, which are based on the content of the feedback, increases mutual trust between parties, where problems are discussed and aimed to solve.

This paper examines the evaluation of project success through different parties in the construction: the customer, project consultant, designer, general contractor and the subsidiary contractor. Project success is explored by analysing project parties´ dissatisfaction factors. In practise, this is done by analysing the results of the web-based project feedback system (ProPal), which have been recently developed in Finland.

ProPal project feedback system is a technically developed and versatile feedback system for the entire construction business. With the help of a simple Web interface, the various parties in the construction project can give and receive feedback in the different stages of the project. Additionally, the reporting tool of the project feedback system enables versatile benchmark comparisons between different projects and companies. Through versatile feedback information, the various parties can observe the essential needs for development and target the necessary actions.

In the feedback system, the project is evaluated by four factors: project management, co-operation, staff and accomplishing goals. Analysis of the feedback, given by different project parties, shows that they differ at least some extent. For example, project consultants were critical to designers project management tasks. In general good performance was found in all relationship items related to staff and skills.

Keywords: Project success, ICT in construction, customer satisfaction, team members' satisfaction, feedback

1. INTRODUCTION

The importance of subjective, soft measures, such as customer satisfaction has been highlighted recently in the construction. Customer satisfaction and value can be seen either as a goal or as a measurement tool in the development of the quality of the construction process. Increasingly, construction companies have adopted customer satisfaction as one of the success factors of a project (Maloney, 2002; Yasamis *et al.* 2002; Sanvido *et al.* 2004). Also design and construction team's satisfaction have been found to indicate a successful project (Chan and Chan, 2004). Subjective measures, such as participants' satisfaction have rise up alongside with the traditional project success measures, such as time, cost and quality. Soft measurement tools are focusing on perceptions and attitudes, rather than on more concrete objective criteria. They have also identified as important key performance

indicators (KPIs), which are general indicators of performance that focus on critical aspects of project outcomes (see e.g. Atkinson, 1999).

Leung *et al.* (2004) emphasise the role of feedback in the management process. Participants (client and project team) with successful construction experience and performance in previous projects can contribute valuable comments to the project. They can also specify the goal in the goal setting process and subsequently improve the participant satisfaction.

Feedback can be divided conceptually in the formative and in the summative entity. The objective of the formative feedback is to achieve development. With the help of formative feedback it could support the performance which is in the target during the implementation. The motive of the formal feedback is to explore areas of the development and to present recommendations to improve performance. The objective of the summative feedback is to produce justifiable assessment how successful performance has been and how performance is achieved its intended goals (Scriven, 1991).

The objective of feedback is also to improve the preconditions for operating provided by one group to another, and to ensure the fluency of operations among parties. The success of the project and fulfilling customer needs is dependent on contactors ability to continuous performance improvement, where one essential factor is the development of the cooperation between parties. (Soetanto *et al*. 2001). Customer and stakeholder feedback supports companies' efforts towards improving quality and cooperation. In the construction industry, the quality of the end product and, thus, customer and end-user satisfaction is highly influenced through independent work done by the parties involved in the construction project and the co-operation between parties (Kärnä and Junnonen, 2009).

This study is examining project team member's mutual feedback, which are results from the Finnish project feedback system. First, a brief review of the importance of feedback is discussed and then project feedback system is introduced. Subsequently, the results of a data analysis are presented, based on performance of different parties in construction. Finally, some conclusions are also discussed.

2. THE IMPORTANCE OF FEEDBACK IN THE PROJECT

The construction industry deals with both products and services. In terms of product, we need to measure performance in quality, cost, delivery and safety. Measuring these attributes is well known and traditional. However, in the terms of services we need to measure performance in the different way and by the different method. One aspect of service performance is satisfaction about cooperation and mutual benefits. According to Leung *et al.* (2004) cooperation/participation, task/team conflict and goal commitment are the critical factors influencing the final outcome (satisfaction) in the complicated management process.

When measuring end user customer satisfaction, most companies use general customer feedback e.g. post contract reviews, which are very subjective and when used to compare the project to project is equivalent to comparing apples and pears. This type of customer feedback is usually dependent on "mood", the relationships between key players and also who it is within the customer company, is giving the feedback – as personal agendas, individual expectations, knowledge of the project, etc., can influence the outcome of the feedback (Kärnä, 2004). Therefore we need also feedback when construction projects are still going on. Construction project is becoming more and more complex and there are also more parties involved. The need for continuous communication is crucial in order that delays and lack of information won't cause losses in productive on site.

Also changes in business environments have radically increased demands that businesses have to fulfil to stay competitive. Construction firms are facing challenges from a number of sources: demands for enhanced quality and variability of services and goods, severe price competition etc. To cope with these challenges, firms have begun to implement organizational and co-operational innovations within firms and in their relations with other firms. Among the latter, relational contracting, networks, strategic alliances and horizontal cooperation have become particularly prevalent (Piore and Sabel 1984; Powell, 1990; Ring and van de Ven, 1992). Cooperation must base on facts and figures.

Neither the steep increase in the number and variety of exchange relations, nor the increased complexity and uncertainty of the business environment, can be handled without the presence of interpersonal and interorganizational trust (e.g., Lane, 1998). Trust is generally seen as a key factor in the establishment of long-

term relationships, often appearing as a requisite or phenomenon that smoothes the functioning of relationship activities. On the other hand, trust is also an essential precondition for the development of cooperation between firms. If an actor does not trust his partners, then he will usually try to hold on to information, his ideas and conclusions. He adopts an attitude suspicious of the proposals of others and will be secretive as to his views in an attempt to minimise the influence of others. This leads to, for example, the exchange of information between actors becoming bounded and unpunctual (see e.g., Zand, 1972).

Close relationships with parties may involve the sharing of information and process development and joint cost improvement activities, and trust allows such relationships to flourish. One way to increase trust between parties is feedback. Trust also reduces the possibility of opportunistic behavior (e.g. Axelrod, 1984). In addition, trust may increase the predictability of mutual behavior through each party honoring commitments and allowing partners to deal with unforeseen contingencies in mutually acceptable ways (Sako, 1992). Also limiting vulnerability to opportunistic behavior by a partner and choosing co-operative approach is minimizing the costs of doing so (Williamson, 1996).

In a project environment, it is essential to that project feedback should cover the most important parties in the supply chain and be bidirectional (Kärnä, 2009). There are several reasons for that kind of thinking:

1. The complex nature of the construction process, changes in project organisation, the uniqueness of each project and the project parties' different objectives make it difficult to make use of past experiences and customer feedback in future projects. These fundamental characteristics of construction projects also complicate the evaluation of the project outcome and emphasise the need for developing effective and efficient evaluation system (Kumaraswamy and Thorpe,1996).
2. Project organisation usually involves complex goals. Each project member (owners, architects and engineers, construction management consultants, general contractors and sub-contractors) look at the project from their own perspectives and also have their own criteria for measuring success. In order to attain the project goals, a systematic evaluation of the organizations' performance is required to provide feedback for guiding the participants' behavior (Liu and Walker, 1998).
3. Traditional project success measurements, expressed in terms of time, cost and quality no longer meet the needs of today. Also the end-user's satisfaction, customer satisfaction and the participants satisfaction has been used as important measures of project success (Chan and Chan, 2004; Cheung *et al.* 2000). For example, Ward et al. (1991), argued that other factors, such as the quality of relationships among participants and, can influence customer satisfaction and thus affect the success/failure of the project.
4. Each firm in the construction supply chain is both a customer and a supplier, and that the value created by them is a fundamental factor in the project's success (e.g. Love *et al.* 2000). Because the performance of each participant in the construction project coalition is interdependent, other participants should assess their performance. In other words, when evaluating co-operation between parties in the construction supply chain, it is essential to exploit mutual feedback. It is also well known that the poor performance of one party will affect the performance of the next party (Kanji and Wong, 1998).

3. PROPAL-PROJECT FEEDBACK SYSTEM

Data for this study were gathered by ProPal-project feedback system, which was recently developed in Finland to improve customer orientation and quality in the construction industry. ProPal project feedback system is a technically developed and versatile feedback system serving the whole industry and it is operated by Finnish Construction Quality Association (RALA). RALA is a joint association representing clients, contractors, and consultants in Finland. Its aim is to improve the prerequisites of construction quality.

Companies need versatile information yielded by the feedback system in order to be able to utilise the feedback given in enhancing their own operations. The system has a Web-based interface that facilitates use. The feedback system offers clear, real time reports which can be targeted at the company's products and processes. By comparing various background variables, the company can compare its own performance with the similar ones in the market. Therefore, the project feedback system is a cost-effective tool for the company's internal and external benchmark. Further, the system adapts to the needs of different companies since the structure and processes of business in the industry are very heterogenic, so it can be utilised in, *e.g.*, various forms of procurement methods.

With the help of the feedback system, the various parties can observe the essential needs for development and target the necessary actions. Objective of using the system is that through openness and mutual learning, cooperation between parties will develop and the customer orientation of the entire industry is improved.

Using the customer feedback system, the owner would establish goals in terms of performance quality. By monitoring the project team's progress in reaching these goals, team members can re-evaluate the quality of the processes necessary to reach them. A multifaceted feedback system also denotes the areas needing improvement in the whole branch of industry and gives opportunities for setting the benchmarks of customer satisfaction. In addition, a standard feedback system may be considered more objective than a contractor's own feedback survey because social interaction components do not exist in the standard system. Thus, the project feedback system enables using 15 different questionnaires in where various actors assess the operations of each other.

Figure 1 illustrates the feedback flows between parties in the system. Each arrow represents the direction of the feedback and one questionnaire. All feedback flows between parties were bidirectional except for the customer as his/her operations are not assessed here.

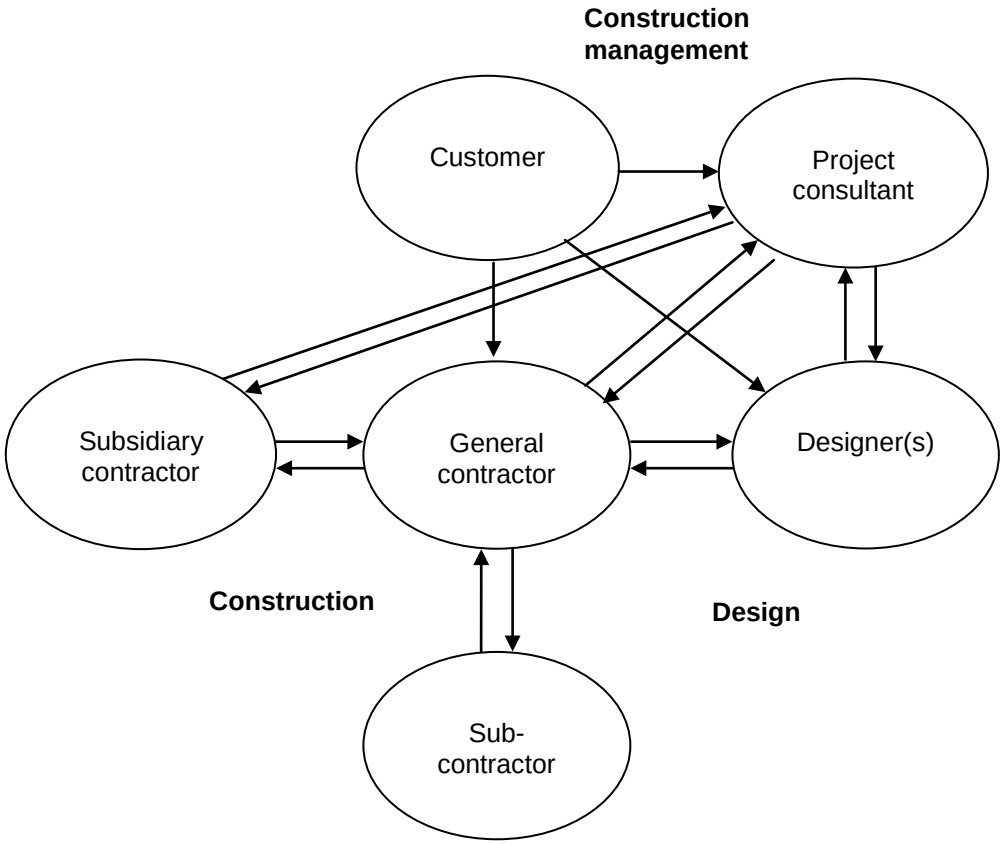

Figure 1. Feedback flows in the system.

In the feedback system, the questions are formed as statements and connected to a scale where answer (1) describes the operations very inaccurately and, correspondingly, (5) very accurately. No opinion (N/A) could also be chosen as an answer. With the open comment field, the feedback giver can specify their answers. The questionnaire is answered electronically using an Internet form which displays the project and company being evaluated. The basis for the contents of the questions was formed by the various tasks in construction and the requirements they set for a construction project. The feedback questions concentrate on the matters each party considers important, and, on the other hand, those which each party can assess. The tasks and requirements of

various parties in construction were grouped into fields which are similar with each other although the contents of the questions are determined by the role and task of the actor. The evaluation areas common to all parties were these:

- Project management
- Cooperation
- Staff
- Accomplishing goals

Project management refers to general factors related to project management which have traditionally been measured through quality, costs, and schedule. Project management should be systematic and premeditated, and it should cover risk management and, for general contractors, effective guidance of subcontractors. Factors for measuring cooperation are, for instance, the functionality of the cooperation, and factors related to information flow and problem solving capabilities. The staff is strongly connected to skills and expertise and resource-related questions. Accomplishing goals naturally refers to the assessment of attainment of various goals, which usually takes place after the project has been completed. The system also enables a question that can be modified for each company.

The ProPal-feedback system and its use in the construction process consist of three processes:

1. Agreeing on the feedback rules where the central parties agree on the rules for the feedback use and determine the level of openness of the project's feedback reports. This may take place, for instance, during the first site meeting.
2. Drawing up a feedback plan in which project information and participants are entered and the feedback rounds are determined and started. In the initial stages of a project, all participants are not necessarily known, so it is important that the feedback plan can be complemented and multiple feedback rounds can be started within one project.
3. Reporting the project feedback where the feedback is reported to the project parties in the level of openness agreed upon. Static feedback stands for standard, immediate feedback for the various parties of the project. In the system, the users can also form dynamic reports based on the feedback database. Using dynamic reports, companies can perform various comparisons with the feedback given and received. The feedback is saved in a feedback database in which company level feedback with various categorizations can be produced. Figure 2 depicts the operational operations model of the feedback system.

Figure 2. Operational model of the feedback system.

4. THE STUDY AND RESULTS

The objective of the study was to examine project success assessed by major parties in the construction. This was done by examining dissatisfaction factors in 2153 feedbacks in the ProPal system. In the Figure 3, first number depicts the total amount of feedbacks in that particular feedback flow and percentage (%) tells the percentual distribution of evaluations, which have had grades 1 and 2. Basically, this number depicts the level of dissatisfaction and poor performance directed by the arrow.

In general, low rates could be found in feedback from the project consultant to the architect and designers (14.3%) and in contrast, architect and designers evaluations to the project consultant is in the rather low level (7.4%). Also, general contractors feedback to the architect and designers was relatively low level (8.8%). Especially, the poor level was found in the relationship between general contractors and subsidiary contractor. Over 40% of general contractors feedback to subsidiary contractors were found to be negative. The main dissatisfaction factors are presented in the table 1.

All in all, project consultant´s and subsidiary contractor´s relationship, got the best feedback comparing to all feedback flows in the study and also customers feedback to architect and designers were rather positive comparing to other feedback flows. In general good performance was found in all relationship items related to staff and skills: staff and management were assessed reliable, skilled and professional.

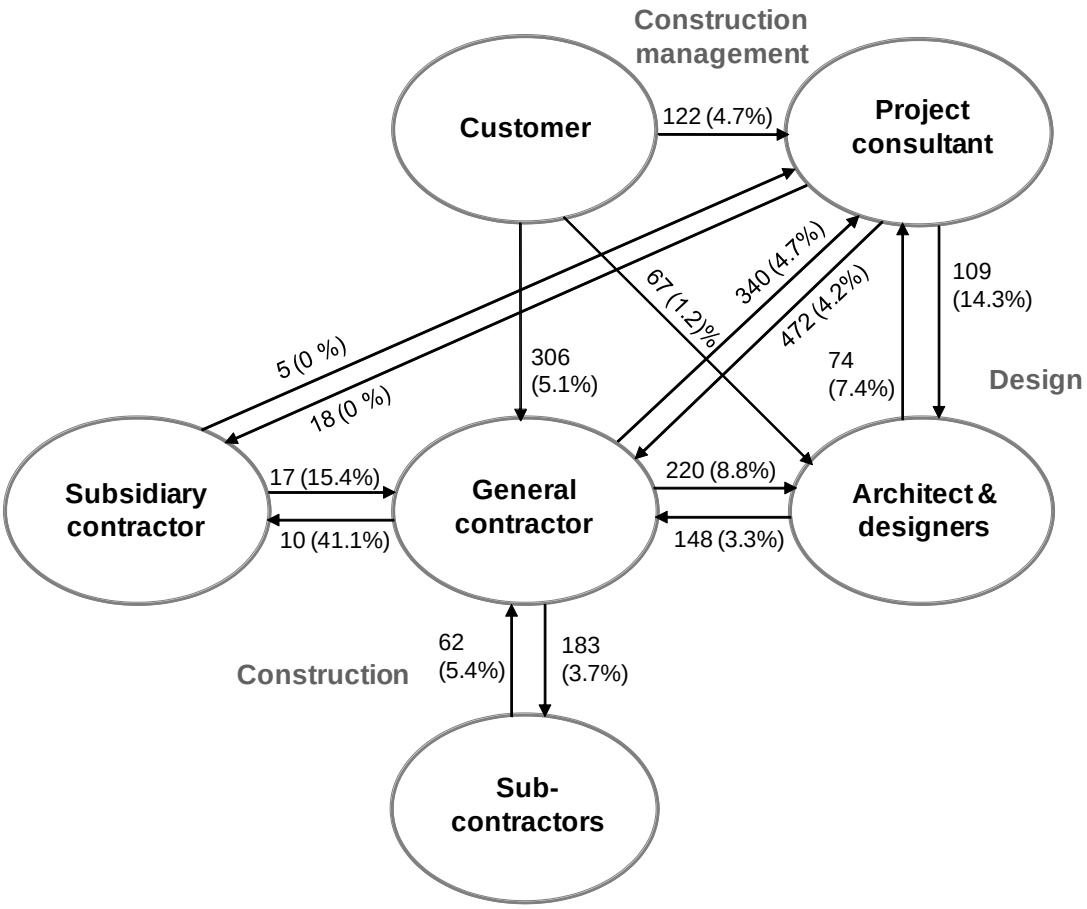

Figure 3. Feedback flows and the results of the study.

Table 1. The main dissatisfaction factors and feedback flows.

Feedback flow	Dissatisfaction factors
Project consultant -> Architect & designers	• Accuracy of the plans and specifications • Cooperation was functioning well and flexibly • Adequasy of the resources
General contractor -> Architect & designers	• Management of the schedule • Accuracy of the plans and spesifications • Adequasy of the resources
Subsidiary contractor -> General contractor	• Orderliness and systematic of the project management duties • Management of the schedule • Management of the obligation issues • Communication and information flow
General contractor -> Subsidiary contractor	• Staff is dimensioned properly • Cooperation was functioning well and flexibly • Repair of defects and deficiencies

5. CONCLUSIONS AND IMPLICATIONS

This study has examined the results of the mutual feedback system, which has been developed to improve quality and cooperation in the construction project. Growing competition and enhancing customer orientation emphasise the significance of customer relationship management in the project-like business environment of construction as well as in other industries. As regards developing the entire construction industry, the common benefits of a feedback system involve improving cooperation between parties through openness and mutual learning as well as development of customer orientation in the project level. In addition, in the company level project feedback system produces information to serve its´ user companies strategic and tactical level management for example providing initial data for the customer relations management and for the company's standards.

The main point of the paper is that in the complex and dynamic construction business, feedback from the customer alone is not enough but it should be expanded to the entire supply chain and be bidirectional. This ProPal project feedback system is a technically developed and versatile feedback system for the entire business. With the help of a simple Web interface, the various parties in the construction project can give and receive feedback in the different stages of the project. Additionally, the reporting tool of the project feedback system enables versatile benchmark comparisons between different projects and companies. With the help of the feedback system, the various parties can observe the essential needs for development and target the necessary actions. The project feedback system enables using 15 different questionnaires where various parties assess the performance of each other.

In the construction, the quality of the end product and, thus, customer and end-user satisfaction is highly influenced through independent work done by the parties involved in the construction project and the cooperation between parties. As the system benefits the company's development operations directly, it also creates indirect potential for development for other actors. In this way, the quality in the entire industry improves, customer satisfaction increases, and a win-win situation beneficial for the entire industry has been created. On one hand the feedback can be understood as information which can be transferred into knowledge. The assessment is not only about gathering the feedback in the construction project but it is also a process of developing construction processes and quality.

According to results, general contractors have been very unsatisfied with subsidiary contractor´s performance. One reason for this result might be that, subsidiary contractors are in the contractual relationship with the customer or owner, not with the general contractor. Hence, general contractor have no decent steering possibilities to the performance of the subsidiary contractors. In addition, subsidiary contractors are also selected by the owner or customer, therefore general contractor is not able to contribute, which companies are the subsidiary contractors in the particular project.

Both, project consultants and general contractors were unsatisfied with the performance of the designers. The main problem is that designers have not enough resources to manage project properly, and they might take too many projects at the same time depending on business cycle. This reflects contractors dissatisfaction with the adequacy of the resources and poor management of the schedules, in which case plans are not completed in accordance to schedules.

This study is also part of the ProPal-evaluation program, where the feedback system is examined regularly in order to improve its features to better serve the Finnish construction industry and it is not without limitations - more statistical analysis is needed to capture above mentioned phenomenon. When soft performance measures become more general, more proper information about the KPI´s is needed.

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