

Designing and implementing incentives for engineering consultants: encouraging cooperation and innovation in a large infrastructure project

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In large infrastructure projects, important decisions are made in early design phases. For a client, a key issue is how to stimulate innovative joint performance within the design team. This paper investigates the process of designing and implementing bonuses for cooperation and innovation in a large urban railway tunnel project. Data were collected through non-participatory observations, documents, interviews and a survey. Previous research has shown that incentives influence performance positively or negatively depending on task contents and perceived intentions, but also that people tend to underestimate this complexity and over-emphasize the power of incentives. Based on case observations, effects of bonuses for engineering consultants are discussed in relation to client awareness and management resources. The case results suggest that there are low risks for negative effects on task motivation of design consultants if incentives are low-stakes and not tied to specified performance. However, for low-stake incentives to add value, symbolic roles and the communication processes generated by the incentive scheme need to be strategically and purposefully managed. We conclude that research is needed to guide clients in considering a wider range of measures for enabling innovation and collaboration in design teams.

Keywords: Consultancy contracts, design, financial incentives, innovation, motivation.

Introduction

Early design phases are vital in the development of large public infrastructure projects. Fundamental aspects, such as what kind of asset to build and its location, have generally been fixed in the preceding planning stages, but many important issues are still open. Other decisions may be preliminary and possible to reconsider and change at a relatively low cost. Accordingly, research has shown that increases in estimated costs tend to take place in planning and design phases more than in the construction phase (Hertogh *et al.*, 2008; Lundman, 2011). In the early design phase, the number of individuals and firms formally involved in internal project activities increases. The client organization grows and new external design consultants are procured. Inter-organizational teams with members

from multiple interdependent technical disciplines are formed (Sebastian, 2005).

There is a vast amount of research on how to establish innovative inter-organizational collaboration in later phases of construction projects when contractors are involved (for reviews, see e.g. Bygballe *et al.*, 2010; Chen *et al.*, 2012). The issue of how a client may act to spur innovation and collaboration in earlier design processes has, in comparison, received far less attention. Also, while there is much focus on payment principles and contractual incentives in relationships with contractors (Bresnen and Marshall, 2000; Rose and Manley, 2010a, 2010b), the literature on such aspects of consultancy contracts is scarce.

In this paper, we examine the process of developing and implementing bonuses to reward cooperation and innovation in the early design phase of a large urban

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railway tunnel project in Sweden. An important starting point is that managerial beliefs, or cognition, define the actual organizational capabilities and actions taken (Gulati *et al.*, 2012; Eggers and Kaplan, 2013; Looock and Hinnen, 2015). The purpose of the paper is to develop a better understanding of the factors, both practical and cognitive, that shape the design and implementation of incentives for consultants in early design stages. Observed and potential effects of low-stakes incentives in this context are discussed in relation to the client's awareness and available resources.

The paper is organized as follows: in the following section, a brief background on design contracts and professional governance is outlined. Next, literature on how financial incentives may affect motivation and behaviour is reviewed, followed by a summary of research on common-sense perceptions of the relationship between incentives and motivation. Further, previous studies of how incentives are designed and implemented in construction projects are summarized. Then follows a section describing the methodology of the study more in detail. Subsequently, the case findings are described and discussed. Finally, conclusions for research and practice are drawn.

Professional and contractual governance in design

Design contracts, especially in the early design phases, stand for a low share of total project costs and the outcome is open and uncertain. Accordingly, traditional ways of compensating consultants are based on hourly rates rather than on fixed prices for chunks of work (Sturts and Griffis, 2005). Also important for contracting practice is that the disciplines of architecture and engineering belong to the category of professions. Based on superior knowledge and internalized value systems, professional workers are entrusted autonomy and judgement in performing their work, the quality of which is hard for their clients to evaluate. To varying degrees in different countries, professional bodies maintain standards of practice and issue codes of conduct emphasizing an obligation of the professional practitioners to use their expertise for the benefit of society (Hill and Lorentz, 2011; Hill *et al.*, 2013). As noted by Hughes and Hughes (2013) and Hill *et al.* (2013) this discretion is in reality often highly limited, but the ethical value systems of design professionals are still more pronounced than those of, for example, construction managers (Brown and Phua, 2011) or valuation professionals (Hill and Lorentz, 2011).

This professional self-regulation system has many advantages but also some drawbacks and weaknesses. Professional values and control systems are not always

up to date with current industry demands (Hill *et al.*, 2013; Hughes and Hughes, 2013). Design professionals in the construction sector often lack both the construction competence and the incentives to make strong efforts to reduce overall project costs. Further, overspecification and overdesign, meaning that specification and design go beyond what is motivated by customer needs or requirements, is common in many engineering organizations (Coman and Ronen, 2010). For a design firm, it is a disadvantage that clients are not willing to pay a premium for high-quality and efficient designs but expect them to be included in the basic engineering service (Sturts and Griffis, 2005). Contractual measures to induce innovation and collaboration in design processes should be understood in relation to this wider institutional and cultural context.

Motivation and incentives

In general terms, to be motivated means to be *moved* to do something (Ryan and Deci, 2000a). Research in psychology (self-determination theory in particular), distinguishes between two types of motivation with different bases: intrinsic and extrinsic motivation (see Ryan and Deci, 2000a, 2000b; Deci *et al.*, 1999 for reviews). In the case of intrinsic motivation, the driver is related to the satisfaction of performing the activity in itself, because it is perceived as fun, meaningful or interesting. Feelings of competence combined with a sense of autonomy facilitate intrinsic motivation, while excessive control and non-optimal challenges tend to result in lack of initiative and responsibility. Extrinsic motivation, by contrast, refers to an external source of motivation, for example, financial rewards and career development, but to some extent also to social benefits such as public recognition. Naturally, extrinsic rewards are crucial for tasks for which people do not experience intrinsic interest. However, values and desired behaviour that originate from an external source can be adopted and internalized by an individual to varying degrees, thereby blurring the boundaries between intrinsic and extrinsic motivation (Ryan and Deci, 2000a, 2000b).

Salaries are generally taken for granted in employment relationships, regardless of whether intrinsic motivation is present or not. Sometimes, and more often in contractual relationships than in employment relationships, additional monetary incentives are introduced to spur performance in specified areas. However, it is often hard in practice to define incentives and performance targets that reflect all important organizational goals. Then, people may focus only on the areas rewarded and neglect other goals that are more difficult to specify and assess (Milgrom and Roberts, 1992;

Akerlof and Kranton, 2005). Research has also established that extrinsic incentives may act to crowd out intrinsic motivation (Deci *et al.*, 1999; Frey and Jegen, 2001). Specified performance targets and associated rewards may lead to an experienced loss of autonomy and control, and an incentive can be interpreted as a sign that management does not respect the agents' own motivation to try their best. The agent may then continue to perform the task solely for the reward and not because he or she wants to. Since intrinsically motivated people tend to have more interest, excitement and confidence, rewards and punishments may actually result in decreased performance, as shown by several studies by Gneezy and Rustichini (2000).

According to Frey and Jegen (2001) an extrinsic incentive may be effective if the management intervention is perceived as supportive, and the associated decision processes considered fair. Frey *et al.* (2013) discuss reward systems for public sector services, where tasks often are meaningful, ambiguous and complex, and state that neither output (performance) control nor process control are optimal in such cases. They further warn that employees may engage in resistance behaviours when professional norms and professional autonomy are undermined by control practices. Frey *et al.* (2013) therefore suggest input control, that is, to ensure beforehand that the appointed person or group is intrinsically dedicated to the task at hand, and also propose using non-monetary awards such as medals, titles and orders. Important is that rewards are given for overall performance and targets not specified upfront, thus avoiding that agents are tempted to suboptimize in order to receive the award. Darrington and Howell (2011) make similar recommendations for relational contracts in construction.

Another stream of research deals not with the actual effects of incentives on motivation, but with peoples' perceptions in this respect, or 'lay theories of motivation' (Heath, 1999). This research has observed a tendency to overestimate the influence of extrinsic rewards and self-interest more in general on other peoples' attitudes and behaviour (Miller and Ratner, 1998). Heath (1999) found an 'extrinsic incentive bias', meaning that people predict others to be more motivated than themselves by extrinsic incentives and less motivated than themselves by intrinsic incentives. Buckley *et al.* (2015) select the belief that money is the best way to motivate employees as one of 10 examples of 'management lore', that is, 'flawed management axioms, sayings, anecdotes or beliefs that are so pervasive in management thought that they erroneously achieved the status of immutable facts' (p. 69).

One conclusion that may be drawn from general motivation research is that incentives are likely to be overused, as the positive effects are over-estimated and

risks are disregarded. In the case of design consultants, one such risk should be that incentives are perceived to violate professional norms and autonomy.

Incentives in construction projects

In construction projects, it is rare to use incentive pricing strategies, in any form, in stages when only consultants are active. However, contractual incentives are frequently used in construction contracts, and often the same client representatives are responsible for decisions regarding both consultancy procurement and contractor procurement. Therefore, we review the literature on incentive design and implementation in contracts with construction contractors.

In the construction context, main incentive areas are cost, schedule, quality and safety (Ibbs, 1991; Arditi and Yasamis, 1998; Rose and Manley, 2010b). Positive incentives may also be combined with penalties (Pryke and Pearson, 2006; Meng and Gallagher, 2012). For cost incentives, it is also common to use target cost contracts, where gains and losses in relation to a target cost are shared between the client and the contractor according to an agreed formula (Perry and Barnes, 2000; Broome and Perry, 2002). Especially in collaborative projects, target cost contracts are often used to align goals and share risks (Broome and Perry, 2002; Kadefors and Badenfelt, 2009; Wamuziri, 2012). Other types of incentives include bonuses and prospects of future work (e.g. Rose and Manley, 2010b).

As observed by Bresnen and Marshall (2000), Kadefors and Badenfelt (2009), and Rose and Manley (2010b), the belief in the role of financial incentives in shaping supplier motivation is strong in the construction sector. However, in accordance with the general literature on incentives and individual motivation, the body of empirical evidence on the implementation and effects of incentives in contractual relationships shows that these have yielded mixed results.

Several studies report that incentive schemes are designed and implemented in a fragmented and inconsistent manner. Arditi and Yasamis (1998) found that the parties were generally ill informed of the basis and contents of schedule incentive arrangements. A survey performed by Back *et al.* (2013) of 94 US projects indicated that the effectiveness of similar incentives vary widely and that incentives often entailed unexpected and sometimes adverse consequences. Several studies of US government contracts in general have shown important discrepancies in incentive payment, sometimes due to a failure of accountants to fully understand the schemes that they were set to administer (GAO, 2005; NASA, 2013). Bresnen and Marshall (2000) found that target cost contracts in UK partnering

projects included only some of the key firms, did not reach the level of individuals, and were managed and assessed in a piecemeal manner. Using social network analysis, Pryke and Pearson (2006) made similar observations in both French and British projects. In case studies of four large construction projects, Rose and Manley (2010a, 2010b) saw small differences in collaborative performance between those included and those not included in incentive schemes. Further, underlying distrust between project participants sometimes resulted in negative perceptions of incentive intentions, suggesting that without high relationship quality the impact of financial incentives will be compromised.

Kadefors and Badenfelt (2009) identified three roles that incentives may have in construction project relationships: the first, and generally taken for granted, role is to induce extrinsic motivation, the second is related to symbolic and signalling effects, and the third results from the organizational processes generated by the incentives. In line with Frey and Jegen (2001), Kadefors and Badenfelt (2009) find that incentives in construction contract relationships may communicate, for example, client support and trust, that the task is important, or that innovation and initiative is desirable. Equally, incentives may have negative symbolic effects and signal control and distrust. The process-generating role, finally, is evident when new communication processes for designing reward schemes and assessing performance provide opportunities for developing shared knowledge and mutual trust. Process effects as well may be negative, such as recurring negotiations of target cost adjustments (Wamuziri, 2012).

In sum, research on financial incentives in construction contexts confirms a tendency to introduce incentives based on intuitive assumptions without fully considering risks and management needs.

Method

The study presented in this paper was conducted as a part of a larger ongoing longitudinal qualitative study of organizing processes in the early design phase of an urban railway tunnel project. We study practices on the micro-level (Blomquist *et al.*, 2010; O'Leary and Williams, 2013), aiming to understand how practitioners act and make sense of their situation (Eggers and Kaplan, 2013) and how such sense-making influences project governance. The study has a process perspective (Langley *et al.*, 2013) and focuses on organizational becoming (Tsoukas and Chia, 2002), or how management processes and routines emerge and develop over time. This paper describes and analyses the particular process of designing and implementing financial incentives to encourage cooperation and

innovation in the projects' early design phase, and covers the period between March 2012 and late 2014.

Data were collected by several methods. Interviews were conducted with central client project members: the former Assistant Project Director, the Technical Design Leader (DL), the Design Manager (DM) and the Project Director. The main data source in the overall case study has been non-participant observation of meetings and workshops. The meeting series in focus of this paper involved the Cooperation Group, a group of approximately a dozen client and consultant members responsible for developing the bonus system. In total, 10 group meetings and workshops were observed during approximately 55 hours from April 2012 until January 2013 (Table 1). During these observations, field notes were written on a notepad. The Cooperation Group meetings covered a range of organizational aspects and processes. For the purpose of this paper, field notes transcripts were reviewed and all instances mentioning the bonus system identified. Further, all bonus nominations, both successful and unsuccessful, were traced and their contents analysed (Table 2). To complement findings, project documentation, in the form of meeting documents and minutes, were used.

The meeting observations and documentation provided data on the process of developing the bonus system as well as on views of the client and those consultants who were part of the Cooperation Group. In order to gain a comprehensive view of the bonus nomination activities, as well as of the ex-post perceptions and experiences of representatives for all consultant assignments, a short (7 questions) email survey was sent out to the project managers of all consultancy assignments (including one former, thus there were 15 responses). Thirteen responded by email and two by phone. The survey covered the following areas: knowledge of the bonus process; nominations made by the assignment, who initiated these; reasons for not nominating; activities that should have been nominated; impact of bonuses on collaboration and innovation, and how the bonus money was spent. The survey results were presented at a meeting with the client top management group, and their reflections and comments are included in the case description.

The case study context—the RailTunnel project

The RailTunnel is a planned railway tunnel with three underground stations in one of the largest cities in Sweden with about half a million inhabitants. The total cost of the project, run by the Swedish Transport Administration (STA), is estimated to more than €2 bn. During 2011–2015, the project was in the phase when design

Table 1 Cooperation Group discussions about creating and implementing bonuses

Theme of bonus-related discussions	Meeting 1 2012 April	Meeting 2 April	Meeting 3 May	Meeting 4 June	Meeting 5 August	Meeting 6 September	Meeting 7 October	Meeting 8 November	Meeting 9 December	Meeting 10 2013 January
Defining/developing value words	X	X	X	X						
Values should be connected to bonus	X			X	X					
Developing nomination procedure	X	X			X					
Developing award ceremony				X		X				
Asking for cooperation examples	X				X			X		
Concern where money ends up	X			X	X					
Requesting more nominations						X	X		X	

Table 2 Bonus nominations in the RailTunnel project 2012–2014

Innovation awarded?	Nominator	Nominee	Nomination of
Aug 2012	Client	Station 2*	Merging contracts
Aug 2012	Client	Coordination*	Merging contracts
Sep 2012	Rock engineering	Rock engineering	Suggesting cost-saving deviations from standard specifications
Jun 2013	Client and Station 2	All designing and Safety*	Evacuation solution with stairs instead of an expensive standard parallel tunnel
No	Construction	Geotechnology	Proactive about water levels
No	Traffic	Traffic	Transport during construction using the tram system
No	Line shifts	Line shifts	Extensive 3Dmodel
Cooperation awarded?	Nominator	Nominee	Nomination of
Aug 2012	Safety	Safety*	Proactively setting boundaries with other assignments
Aug 2012	Coordination	Coordination*	Arranging seminar on systematic requirements management
Sep 2012	Client and Station 2	Station 2* and Station 3*	Showing cooperative spirit when delivering the first sketch memo
Mar 2014	Client	Coordination* and all designing*	Creating legal documents without involving the client
No	TE geotechnology	Geotechnology	Adjusting own time schedule and delivering more than one year early to support the design assignments
No	Safety	Traffic	Helping the safety assignment to acquire traffic information
No	Construction	Geotechnology	Proactive about creating zones for planning
No	Construction	Construction	Study visit to Citytunneln (a parallel project)
No	Central station	Central station*	Creating work breakdown structure
No	Rock engineering	Rock engineering	Creating document style for requirements used by other assignments
No	Geotechnology	Geotechnology	Sharing help and resources for field investigations
No	Geotechnology	Geotechnology	Initiative to a seminar for design assignments about requirements
No	Geotechnology	Geotechnology	'Living' the project culture

*Indicates that the nominee was a Cooperation Group member.

parameters and designs are developed after the preferred option has been selected.

The introduction of a bonus to consultants was related to the general development of client–consultant relationships within the STA. Traditionally, strong internal client functions in combination with detailed standard requirements have left little freedom to consultants to influence more fundamental aspects of design, also in earlier stages. Not many years ago, STA in-house technical experts (TEs) performed much of the actual design work. Today, large parts of these functions are outsourced, and the current STA policy is that the client experts should not influence design, only specify requirements and verify that the designs performed by external consultants fulfil them. This more restricted client role relies on a parallel and complementary development taking place in design firms, which are encouraged by STA to become more active and innovative in proposing design solutions.

In the RailTunnel project, project top and middle management consisted of STA employees while most design-related work was performed by 14 consultancy assignments (see Figure 1). Ten technical assignments were responsible for field work investigation and formulating design parameters and other requirements. Some of the tasks performed by these technical assignments are normally conducted in-house by the client. Further, there were three design assignments for the three stations and the railway line, and a coordinating assignment to integrate the output from all assignments into legal documents needed for government approval. Consultants were compensated through an hourly fee and for each assignment a preliminary budget was negotiated with the client. A partnering scheme, comprising workshops to develop joint goals and build trust, was also included.

All assignments had one or two client contacts in the project organization, either TEs (technical assignments)

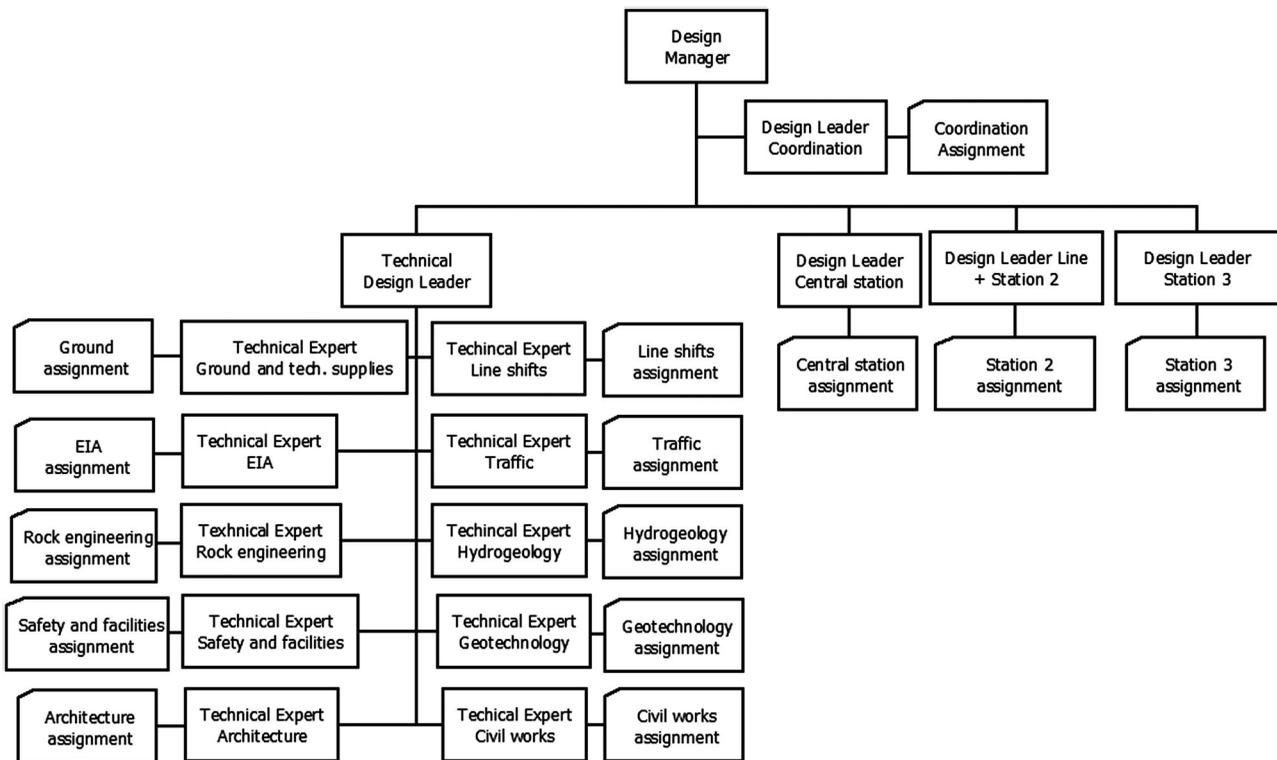


Figure 1 The Design Group in the RailTunnel project, technical assignments to the left and design assignments to the right (Boxes = Client representatives, Cropped boxes = Consultant assignments)

or Station DLs (design assignments). A Technical DL supervised all the TEs. These client employees were all headed by a DM who reported to the Project Director and attended the client's top management group meetings. Altogether, the organization of the design phase was both new and more complex than what is usual in the STA. There were several reasons for this, most importantly a need to match the size of the assignments to the competences on the market.

The bonus system

Initiating and formalizing the bonuses

The process of developing bonuses started while the procurement of consultancy assignments was being planned. The tendering documents described three bonuses: one for cooperation, one for innovation and one for retention of key personnel. There was also a penalty for delays in delivering design outputs. In this paper, the cooperation bonus and the innovation bonus are in focus. The staff retention bonus and schedule penalty were to be assessed by the client only at the completion of the contracts and had a less direct impact on project processes.

The current client Project Director and DM both joined the project after tenders were out and did not

participate in initiating the bonuses. The cooperation bonus was suggested by the head of procurement, and was inspired by a model that had previously been used for contractors in the STA maintenance division. The previous Project Directors saw it as an important means to support alignment of design outputs, since all the assignments' deliveries would eventually be integrated into a few all-embracing documents to be submitted for government approval. In the tendering documents, the cooperation bonus was presented as follows (author translation):

A bonus model shall be developed by the Cooperation Group, consisting of key personnel from client and consultants. The bonus model shall aim to achieve common goals concerning time, cost, quality and content, and include a method for measuring goal fulfilment.

The cooperation bonus could be split across several assignments but not be more than ~€40 000 in total each year. Who would award this bonus was not stated in the contracts.

The innovation bonus was originally suggested by the client Technical DL. This bonus aimed to promote initiatives that would lead to cost reductions in design or construction (author translation): 'The awarded

“innovation” need not be a “new technology” or an “invention”, but can be an innovative application of today’s technology or knowledge—the important issue is that it creates cost reductions.’ For each innovation the bonus could never be more than half the savings and the maximum amount that could be disbursed each year was ~€90 000. In the contract, it was explicitly stated that the client’s top management would award the innovation bonus and that it would be disbursed every other month.

In the interviews, the client Project Director and DM emphasized that the intentions and assessment of the two types of bonuses differed. The innovation bonus should have a tangible effect on final costs and be assessed based on data while the cooperation bonus was seen as a way to send signals and awarded based on qualitative judgements. Thus, the innovation bonus formally had no intention to reward innovations with a primary effect on other aspects than costs.

Developing and implementing the bonus system

As stated in the tendering document and contracts, a Cooperation Group was formed to develop the model for the cooperation bonus. In effect, the details of the innovation bonus were also elaborated by this group. The group consisted of a dozen members with an equal number of client and consultant representatives. Thus, less than half of the consultant assignments were directly represented. The general purpose of the group was to discuss and plan coordination needs, handle higher level administrative issues, and develop teambuilding and other formal activities to improve relationships in the project. The Cooperation Group further set joint goals and value statements for the project organization.

The development of the cooperation bonus and related procedures took place at the first six meetings during the course of five months, April–September 2012 (see Table 1). At the first Cooperation Group meeting a consultant suggested that the cooperation bonus should be connected to the Transport Administration’s and the project’s values: holistic approach, responsiveness, originality, speed, reliability and openness, which was accepted. Both bonuses were described as means to document and communicate good examples and best practice within the project. Early on (meetings 2 and 4), the DM and the Technical DL further stated that the aim of the cooperation bonus was to promote a culture where the assignments openly would share knowledge and resources, which was considered necessary to keep the tight time schedule. The bonus was seen as helpful in maintaining

focus on such collaborative practices: ‘We can ask follow up questions at the assignment meetings: Have we helped each other? Have they acted in the interest of the client?’ After some discussion (at meeting 4), it was agreed that the innovation bonus should be handled in the same way as the cooperation bonus.

One recurrent discussion in early stages (e.g. meetings 1 and 4) regarded how information about initiatives worthy of bonus should reach the client organization and the Cooperation Group. It was decided that the consultants should nominate themselves, partly because the client representatives did not think that they had enough insight in what was going on in all assignments. A self-nomination process would give all members equal opportunities. There was some worry that self-nomination could seem awkward to consultants and less compatible with Swedish mentality in general, but on meeting 6 the Technical DL concluded the discussion and said that people would simply have to learn to act American, which meant to start to boast about themselves. It was also expected that consultants should estimate the cost savings when nominating for the innovation bonus.

Another concern was that awarded money should ‘end up in the right place’ (discussed in meetings 1, 4, and 5). The intention was that the team responsible for the awarded nomination should receive the reward, and not their company. This was partly because the intention was to spur motivation on the level of teams and individuals, but the bonus sums were also considered too modest to make a difference on the company level.

Later in the process, a discussed issue was how to proceed if there would come in more nominations than the client top management group would be able to handle. During meeting 5 in August, it was decided that the Cooperation Group should always filter incoming nominations. First, consultants would nominate themselves to their client contact, who forwarded the nomination to the Cooperation Group. The Cooperation Group would then make a short list of nominations for the client top management to consider. Final approval would be decided by the client’s Project Director. By the end of 2012, the Cooperation Group had fulfilled its other tasks relating to implementing partnering elements, and in the beginning of 2013 the group was dissolved. From then, shortlisting of nominations was instead done by the client design management group consisting of the DM and all DLs. The final bonus process is illustrated in Figure 2.

How the first awarded bonuses should be announced was another debated topic. The client Technical DL frequently argued that the first time a bonus was awarded it should be something special, using

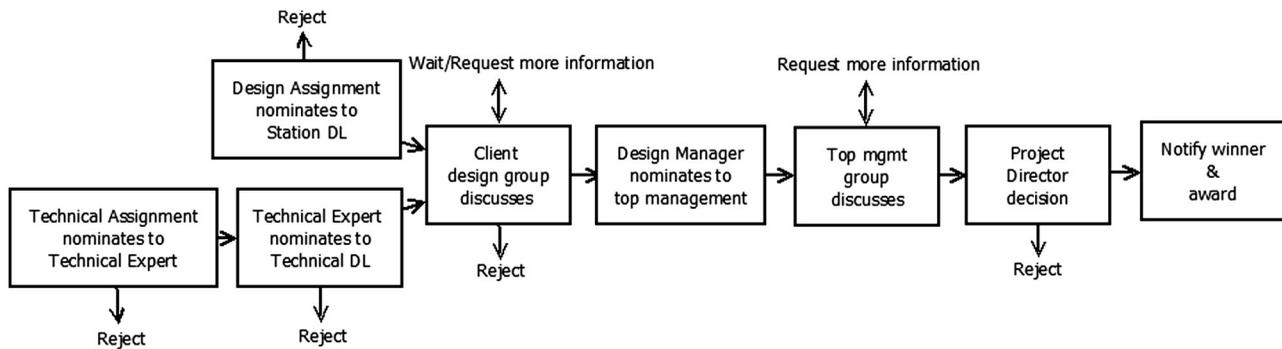


Figure 2 Bonus nomination and award process after dissolving the Cooperation Group

metaphors of ‘fireworks and fanfares’. It was decided that the first project kick-off for all client and consultant participants was a suitable occasion to announce the first bonuses.

Client members stressed that the aim was to disburse the bonus money. However, as will be further described below, a recurring theme from meeting 6 and on was that not enough nominations were submitted. Specifically for the cooperation bonus, both consultant and client Cooperation Group members on several occasions (both early on and later in the process) requested examples of what could be considered good cooperation, since formal guidance provided in contracts and value words was still perceived as vague.

Nominations and awards 2012–2014

The first four nominations, two for each bonus, were presented during the fifth meeting of the Cooperation Group in August 2012 (see Table 2 for an overview of all nominations 2012–2014). One nomination for the cooperation bonus originated from the Coordination assignment, promoting one person for arranging a knowledge exchange seminar. Further, the Safety and facilities assignment nominated themselves for being proactive in setting boundaries of responsibility with other assignments. The two innovation nominations were made by the client DM directly at the meeting. Both were for consultancy consortia that had agreed to merge their assignments, which was a different type of innovation than the bonus was primarily intended to reward. All these four nominations were forwarded, approved by the client top management and awarded at the first project kick-off day. Although actual fanfares were missing, there was a small award ceremony including oversized checks at the finale of the kick-off.

At the seventh meeting in September 2012 three nominations were presented, of which two were awarded. The Rock engineering assignment was awarded an innovation bonus for suggesting cost-

saving deviations from the standard specifications. Two design assignments, Station 2 and 3, were rewarded a cooperation bonus because they delivered the first sketch memo in time and in good cooperation. During spring 2013, one innovation bonus was awarded to the Safety and facilities assignment and the three design assignments for developing a tunnel evacuation solution that reduced construction costs considerably. This solution was new in Sweden but had been used by other projects in Europe.

In 2013 consultant activities were up and running full scale and most technical assignments delivered their main output in the autumn. During the second half of 2013 there were no new bonus nominations. The last awarded nomination emerged in spring 2014, as the client nominated and awarded the Coordination and all design assignments for cooperating in performing joint tasks without involving the client. In the interview, the DM said that by awarding this bonus he wanted to send a signal to the consultants that it was desirable for the assignments to sort out issues among themselves before contacting the client. Altogether, the client was involved in initiating five of the eight successful nominations.

A number of nominations were not awarded. From observations and the survey 12 unsuccessful nominations were identified, nine for cooperation and three for innovation (see Table 2 for details). Eight were self-nominations, three were consultants nominating other consultants, and on one occasion a client representative had nominated consultants. Thus, with one exception these unsuccessful nominations were made by consultants, and a majority for themselves as stipulated in the bonus model.

Despite that the criteria were considered fuzzy, most nominations, both successful and unsuccessful, were for cooperation. The actions nominated were quite tangible: early delivery of output, arranging a study visit and workshop, or creating documents for joint benefit. In effect, identifying results and activities to nominate

for the innovation bonus, including an estimation of cost savings, seemed to present more difficulties to consultants. Only two of the four awarded innovation bonuses were clearly related to cost savings due to technical solutions.

As already mentioned, the much-discussed risk of getting too many nominations never occurred. The shortlisting routine for prioritizing between worthy nominations was never implemented, nor was the routine to disburse an innovation bonus every second month. The Cooperation Group was hesitant to forward nominations in case there were too few, instead they agreed that it would be better to wait until a sufficient number of nominations were received (example meeting 7). In the end, however, the few nominations that made it to the Cooperation Group (and the succeeding client group) were continuously forwarded.

Outcomes and perceptions of the bonus system

The survey to the 15 consultant project managers showed that most respondents did not have a clear picture of the nomination process, especially when it came to what should happen after the initial nomination. Six respondents simply answered 'no' to the question 'Do you know about the bonus process from nomination to final decision by the Project Director, please summarize in your own words.' This uncertainty had also been noted during observations of meetings and in documented bonus communication.

Four consultancy assignments never sent in any nominations at all. These were technical assignments that had not been part of the Cooperation Group. As a response to why there had been no nominations during late 2013, consultants' answers were: 'no time', but also 'lacking response from previous nominations'. In effect, for most unsuccessful nominations no formal rejection decisions can be found in meeting minutes neither from the Cooperation Group, the design management group or the client top management group. According to the client interviews, rejection responses should simply have been conveyed as a 'not rewarded' message to the nominator. The survey however showed that five assignments had presented nominations without receiving any feedback. Quotes from responses are: 'Have not received any response to the suggestion', and 'We have made three nominations that we don't know what happened with (bonus wasn't paid anyway).' The survey also identified 11 nominations that never reached the Cooperation Group. One nomination was forwarded to the client top management group and was rejected there, but this was not formally documented in meeting minutes.

Other reasons stated for not nominating were related to negative views of the bonuses and financial incentives in general. In about half of the survey responses it was clearly implied that work pride was perceived to be a much more important driver than a bonus: 'we are innovative and try to be cooperative anyway', 'cooperation and innovation are important to fulfil a successful assignment' and 'doing a good job is part of the profession', and, more ironic, 'we are not driven by the bonus frenzy'. One response reflected a combination of barriers:

... haven't identified anything substantial enough and as mentioned, it isn't perceived as easy, like simply filling in some text somewhere. We think we are working as usual and that might make it more difficult to identify something we think should be nominated.

None of the consultant respondents reported that they had changed their way of working because of the bonuses, and one respondent remarked that bonus had been paid to another assignment for activities similar to their own standard practice. Five respondents however expressed that a bonus was or could be 'a positive injection' or perceived as a sign of appreciation, and a couple of the assignments had brought up the bonus in their internal group meetings, intending it to be a carrot. Six respondents stated firmly that bonuses did not affect their assignments' efforts in any way. This group consisted of respondents that were never part of the Cooperation Group.

The survey also showed that reward money was most often used for seminars related to project work or field visits to tunnel projects in combination with minor leisure or teambuilding activities. Also in cases, when the bonus was shared, these activities were performed separately by each assignment. Such activities took place outside work hours in participants' spare time.

From the interviews, it was clear that the client representatives as well had mixed views of the bonuses. The Project Director said that he was initially negative, but changed his mind with time. The DM remained slightly sceptical, and also said that not enough thought was put into the bonus system before tendering the consultants. When the results of the questionnaire were presented to the client top management group, they jointly acknowledged that they had paid too little attention to the bonus system, especially relating to issues of feedback and communication. Despite their doubts and recognized shortcomings, the client team was disappointed that they did not receive more nominations. In particular, the client had expected more suggestions for cost-saving solutions that questioned the STA standard

requirements such as the proposal by the Rock engineering assignment (which was rewarded an innovation bonus).

Discussion

In this section, we first identify practical and cognitive aspects that influenced the initial design of the bonuses and discuss how this bonus design conforms to theoretically based recommendations for successful financial incentives. Next, influences on how the bonuses were defined and implemented post-contract are identified, as well as effects on nomination activity and consultant perceptions. Based on motivation research, likely effects on task motivation and possibilities for improvements are discussed.

Initial incentive design

Regarding the design of the bonuses, it may be noted that the incentives operated only on the levels of teams and individuals and not on the company level, which is a difference from most incentive schemes for contractors (Rose and Manley, 2010a, 2010b; Back *et al.*, 2013). Further, the awarded sums were low for both types of bonuses.

Several practical factors may explain the chosen design of the bonus scheme. The early design phase in itself stands for a low share of total project costs and it is difficult to define clear performance criteria related to design performance or total project costs at this stage. Thus, the basis for substantial incentive schemes, discussed by for example Milgrom and Roberts (1992) and Akerlof and Kranton (2005), is not there. Further, incentives for consultants are novel and have to be reconciled with public procurement regulations. In the case study project, a limited budget allowed for a pilot approach where details of the scheme could be developed post-contract. By aiming directly at teams and individuals, and not at the firm level, there was a potential to influence behaviour also with a smaller amount of money.

However, the focus on operational level staff may also have a more implicit, cultural explanation. It is consistent with a view that consultancy firms, unlike contractors, have an organizational culture where employees operate as autonomous and professional knowledge workers (Sturts and Griffis, 2005; Hill *et al.*, 2013; Hughes and Hughes, 2013). In this context, it is natural to perceive ideas for improvements and team collaboration primarily as products of individual or team initiative and not as effects of managerial direction. Further indications that consultants were assumed to be intrinsically motivated and committed to professional development beyond formal obligations was that the reward money should

sponsor team activities expected to take place in the consultants' spare time, an arrangement which everyone seemed to take for granted.

The bonuses were designed so that they fulfilled many of the criteria, identified by Frey *et al.* (2013), for successful awards in public service organizations: they were announced upfront, not tied to specified performance, subjectively awarded and involved social recognition. The collaborative process, also announced upfront, to jointly develop the cooperation bonus model after the contract was signed should favour perceptions of fairness and communicate trust. Additionally, this process introduced a flexibility in the bonus scheme, an aspect which is stressed as important by Rose and Manley (2010a, 2010b). Altogether, these arrangements are likely to have reduced the risks for eliciting various kinds of unwanted behaviours, including motivational crowding out (Gneezy and Rustichini, 2000; Frey and Jegen, 2001).

The implementation process and effects

Previous studies of incentive schemes in construction projects have shown that incentives are readily introduced in the contracts, but that the process of implementing them in an organizational context often becomes more complex and demanding than previewed (Arditi and Yasamis, 1998; Bresnen and Marshall, 2000; Pryke and Pearson, 2006). This may reflect the general tendency to believe too much in the motivational power of incentives (Miller and Ratner, 1998; Heath, 1999; Buckley *et al.*, 2015), the other side of which should be that risks and difficulties are downplayed. Similar tendencies were observed in the case project. When the design consultants had been appointed and the bonus system was to be further developed and implemented by the Cooperation Group, a range of partly unexpected practical questions were raised and discussed, such as for how long a nomination would be valid and how often to award bonuses when nominations were few. Further, despite that doubts were raised regarding the value of incentives and also about the self-nomination process, the issues most discussed in the Cooperation Group related to how to prioritize and handle a scenario where there would be a lot of nominations. Still, however, the problem of how to give feedback to large numbers of both successful and unsuccessful nominations was not dealt with, and little feedback was actually provided to the relatively few nominations that were submitted and rejected.

It was clear that consultants varied in their attention to the bonuses and that their attitudes also differed. The perceptions of the bonuses were more positive among the members in the Cooperation Group and their nominations were also more successful (see Table 2). The

survey showed that consultants who were not members of the Cooperation Group were less informed about the bonus process and they also more often indicated that they perceived the idea that their performance would be influenced by a bonus as disrespectful. Such perceptions could potentially impact negatively on intrinsic motivation (Ryan and Deci, 2000a, 2000b; Frey and Jegen, 2001), but no findings point at any adverse effects on motivation relating to actual work performance, only on the motivation to nominate.

Positive effects on work performance of consultants are hard to assess, but both survey data and observations indicate that most actions nominated were not directly spurred by the bonus. There is no evidence that individuals were fighting for the price money or even the recognition. That a bonus could be used as a proof of being cooperative or innovative when tendering for new projects did not seem important either. Observations at meetings suggest that nominations by members of the Cooperation Group were motivated by a sense of loyalty towards the client and the general project goals more than by an ambition to achieve the recognition of a bonus. Still, it would be too much to say that the bonuses lacked any positive effects at all on behaviour. Some consultants expressed favourable views of the bonuses in their survey responses. Further, the bonuses were regularly discussed in the Cooperation Group and other client–consultant meetings, which implied that the participants first were required to establish a common understanding of project goals and work processes, and later were regularly reminded that the client wished to see collaboration and innovation. Thus, there were indications of the bonuses taking on both process-generating and symbolic roles (Kadefors and Badenfelt, 2009). This implies that especially the innovation bonus may have had a wider indirect impact on behaviour than the few nominations for cost-saving initiatives indicate.

However, as workloads increased the bonuses were forgotten in both client and consultant agendas, and the process-generating role of the bonuses had a declining trend. The symbolic role became more explicitly acknowledged by the client, and as the number of consultant-initiated nominations dropped, this signalling role was increasingly embraced. The DM and Project Director not only nominated but also occasionally actively encouraged and even initiated exemplary actions worthy of bonus.

The general perception is that the implementation process was inconsistent. One likely explanation was that the bonuses were decided by the previous Project Directors, and that the partly new client team was both less committed to the idea of bonuses and probably also had less developed ideas about the implementation process than the original initiators would have had.

Although the bonus system was taken seriously by the new team and care was taken to establish fair processes, it seemed to be perceived as an interesting experiment more than an important management tool. Presumably, a stronger and more persistent focus on the process-generating dimensions of the bonus system could have improved the positive effects, most importantly by involving a wider range of consultants in developing and reviewing the model. Consultants could for example have been engaged in discussing alternatives to the self-nomination process. On a more basic level, providing more feedback would have enhanced perceptions of fairness and also communicated respect for the consultants' intrinsic motivation to try their best. However, many such process effects could have been attained without bonuses, e.g. by organizing regular events to jointly share, revise and refine project practices regarding innovation and collaboration.

Conclusions

From the general literature, it is clear that incentives, and financial incentives in particular, is a genuinely complex matter. Their effects depend on a combination of existing motivation for a specific task and the message the incentives convey about what the rewarding party expects from the potential recipient (Frey and Jegen, 2001). In the case of design contracts in early project stages, measurable and relevant performance targets are often hard to define. The present study suggests that low-stakes incentives may have a role in this context, since they are less likely to crowd out existing intrinsic motivation arising from meaningful work content. Such incentives operate mainly by their symbolic roles and by the communication processes that they give rise to (Kadefors and Badenfelt, 2009). The relative emphasis on these roles may vary over time in a project, which may be especially valuable for lengthy projects.

However, releasing the full value of low-stakes incentives is likely to be fairly demanding. Clients need to possess strong commitment, explicit awareness of the different roles of incentives and resources to adequately support those roles. If this is the case, a carefully designed and implemented incentive system may assist the client in maintaining an active focus on innovation and cooperation within the design team. Based on the case study, we suggest that client teams can be expected to hold sufficient intuitive and experiential understanding of motivation factors to avoid high-risk incentive schemes and also to attain some upsides of low-stakes schemes, but that they more seldom have the higher awareness and resources required to obtain substantial returns of a low-stakes scheme. It is also a question of prioritization: a bonus system is only one of a range of

competing and potentially worthwhile activities for client project management to engage in.

We conclude that there is a need for research to develop more holistic models to assist clients in making more informed choices between alternative measures to spur cooperation and innovation in design processes, including, but not limited to, financial incentives. It is important that these models take account of psychological research and clearly envisage both opportunities and risks, and also the level of management and communication that is required. Future research should further study the combined effects of project level and firm level measures on individuals and teams.

The contribution of this paper to the existing body of knowledge is twofold: First, the focus is on financial incentives for design consultants in early projects stages, which is a context which has not been much studied. Initiatives to enhance cooperation and innovation in early planning and design phases have no less impact on project performance than corresponding models for later stages involving contractors have, and should merit matching attention by research. This study is however limited to a single case in a Swedish setting. Further studies are needed to more firmly establish the opportunities and risks related to incentives for design consultants, also in countries with other contractual practices and professional cultures. Second, while most studies focus on the effects of various incentive schemes, this paper contributes by adding an analysis of how client and consultant perceptions influence how such incentive schemes are designed, implemented and responded to. This is a novel perspective which is important to include if we wish to understand the actual role and potential of financial incentives in all types of project relationships.

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