

RECEPTIVENESS FOR CHANGE: THE CASE OF A PUBLIC CLIENT

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The construction industry needs to change to meet the needs for a more sustainable built environment. For industry change to happen, public clients have been suggested to play a key role as change agents because of their power to state requirements when procuring, and due to their role as long-term property owner. This makes receptiveness for change within public client organizations a vital issue for industry change. The aim of this paper is to explore receptiveness for change at a public client organisation by applying the framework of receptive contexts developed by Pettigrew *et al.*, (1994). Based on an empirical case study of a public client's implementation of Building Information Modelling (BIM) during the period between 2013 and 2017, findings indicate that there is a lack of a receptive context, which hamper the public client's ability to take on the role as change agent and drive industry change. The conclusion is that the idea of public client's as change agents also comes with challenges and that there is a need for more studies on how to develop receptiveness in large public organizations.

Keywords: change, client, receptive context, BIM

INTRODUCTION

The construction industry, which is a major contributor to environmental pollution and climate change, is in need of change to meet the needs for a more sustainable built environment. For industry change to happen, public clients have been suggested to act as key change agents (Porwal and Hewage, 2013). In particular, the implementation of new technology such as Building Information Modelling (BIM) is argued to play a vital role for this industry change process to take place (Azhar, 2011; Lee and Yu, 2015; Takim *et al* 2011). The arguments put forward are that public client organisations are in the power position to request BIM when procuring projects and thereby drive change among industry actors. Public client organisations are also, in their role as long-term property owners, argued to be the actors in the industry that will have the largest potential gain from BIM adoption in order to enable efficient facility management (Linderoth 2010, Smith 2014).

The combination of these two factors, of being in a power position to demand change when procuring, and of having long-term focus in change processes, put public clients in the change agent role (Wong *et al.*, 2010; Wong *et al.*, 2011). Recently, public clients in for example Sweden (SOU 2012:39), Hong Kong (HKCIC, 2014) and the US (GSA, 2007) have also initiated BIM implementation projects with the specific purpose to drive industry change. However, recent research from Sweden show that the implementation of

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BIM for industry change also pose intra- and inter-organizational challenges, which influence the public client's ability to drive industry change and there are recent research problematizing the public client's role as change agent (Bosch-Sijtsema *et al.*, 2017, Vass and Karrbom Gustavsson, 2017). There is, for example, a dis-match between the perceptions of project managers and BIM implementation managers within a public client organization with regard to what a public client's role and mission actually is in relation to the construction industry (Vass and Karrbom Gustavsson, 2017).

There is a small but growing critical stream of research on BIM as an uncontested rational 'problem solver'. This research shows that BIM has not yet reached its promised benefits in terms of increased productivity, efficiency or sustainability (Karrbom Gustavsson *et al.*, 2012; Miettinen and Paavola, 2014). Fox (2014) and Dainty *et al.*, (2015), for example, argue that there is hype around BIM promising change and creation of new opportunities while disregarding many of the social and human conditions that constrains and complicate a rational realization of the vision. Miettinen and Paavola (2014, p. 85) describe the current situation as "BIM Utopia". Hence, the public client's role as construction industry change agent needs to be studied and understood better, in particular in relation to the idea of public client's as change agents by implementing BIM for industry change.

Based on a longitudinal case study of a public client organisation's implementation of BIM and the application of Pettigrew *et al.*'s (1994) framework of receptive context the purpose here is to explore receptiveness for change within a public client organization. The findings have contributions for both industry and academia, developing knowledge about client organisation's role in leading inter-organisational change processes in general and supporting the current implementation of BIM in particular.

UNDERSTANDING CHANGE

Change always takes place within an organizational context and this context directly influences the change process. Pettigrew *et al.*, (1994) introduces the concepts of "receptive" or "non-receptive" contexts to explain differing results from strategic change initiatives. The following eight factors or symptoms, which have impact on the receptiveness of a particular context, are outlined (Pettigrew *et al.*, 1994):

- Quality and coherence of policy - Policies tailored towards the context with a clear link between goals, feasibility and implementation requirements.
- Availability of key people leading change - The availability of the key people, preferably a small group, with individuals from diverse constituencies with complementary assets and skills.
- Environmental pressure - The right level of environmental pressure in relation to the specific context.
- Supportive organisational culture - Establishing an organisational culture, supported by management that motivates and rewards change. This includes a focus on flexibility, risk-taking, openness and team building.
- Effective inter-professional relations - Ensure that individuals linked to the context are involved and not going into opposition of the policy.
- Co-operative inter-organisational networks - Create a network between the actors supposedly influenced by the policy and establish incentives and shared goals and ideologies in this network.
- Simplicity and clarity of goals and priorities - Ability to specify priorities in the change agenda in order to establish short term pressure.

- Fit between the change agenda and locale - How well the change agenda includes awareness of preconditions at the sight for change.

These factors should not be viewed as a checklist for successful change processes but rather as a set of factors that together provides receptiveness for change. The receptivity of a change context is to major extent influenced by both past events and local preconditions and enhancing receptiveness is not easily done only by minor changes. The receptivity or non-receptivity of a specific context is not stable over time, rather it changes and develops with environmental and policy changes (Pettigrew *et al.*, 1994). Thereby the actions (or non-actions) taken during a change initiative has a direct impact on the receptiveness of the context in which it takes place. This framework was developed when doing research on the healthcare industry (Pettigrew *et al.*, 1994) but many of the characteristics of healthcare can also be found in the construction industry. The fragmented process and ‘loosely coupled system’ of actors (Dubois and Gadde, 2002) in the construction industry bares many similarities to healthcare, for example that both are described as change resistant contexts, partly as a result of fragmentation.

METHOD

This is a qualitative and exploratory case study that aims at improving knowledge on the public client’s role as change agent when implementing BIM for industry change. The client organisation in focus in this case-study is the largest infrastructure client in Sweden. The study is longitudinal and covers a period of three years (2014-2017). During this time the BIM Initiation Project was studied by observing two meetings within the BIM Initiation Project's team and two meetings between the BIM Initiation Project and the rest of the client organisation. The case-study was supplemented by reading and reflecting on documents and by doing 11 semi-structured interviews. Five of the interviews were with representatives from the BIM Initiation Project organisation and six were with representatives from the Investment department organisation. The respondents had roles such as project managers, project engineers and BIM experts and the interview analysis was supplemented and contrasted by the document analysis.

The studied client organisation is complex and consists of several departments, sub-units and support-units, and also houses formal and informal networks. Based on the public client’s organizational structure, intra-organizational change may here also be viewed as inter-organizational change, i.e. change between different sub-units.

The public client organisation in focus in the case-study is a large infrastructure client. This organisation is assigned with the development, procurement and maintenance of road and railway projects. This organisation underwent a large reorganisation in 2010 when two percussing organisation were joined together. Currently this organisation is divided into several sub-units or departments. Large Projects and Investment are the two departments procuring and managing projects, where Large Projects are responsible for the largest and most complex and Investment are responsible for the main bulk of projects. Further, the maintenance of built infrastructure is under separate department.

In order to analyse the receptive context for a change towards BIM-usage at this organisation, an example of the actions taken in the change process is described. This example, a workshop aimed at improve BIM usage, reveals many aspects of the current receptive context at this client organisation. This workshop took place in Stockholm, May 2017.

RESULTS

Setting the Stage - The BIM Initiation Project

In 2013 the general director at the Swedish Transport Administration made a formal decision to implement BIM in the whole organisation. After this decision a BIM Initiation Project was initiated. This project involved 14 individuals from various departments and sub-units at this organisation. The project continued until late 2014 with the following project goals:

- All construction projects should use BIM in some extent from 2015 and onwards.
- Streamline the client organisations operation.
- Establish this client organisation as a clear procurer of BIM both in design and construction.

As a part of the project, a BIM strategy was developed in which the BIM concept was defined in relation to this organisation. This strategy also specifies different maturity levels of BIM-use and a base level to which BIM should be procured in all new projects. Further this strategy expresses the expected value of a change towards BIM centric work practices. This value is described as increased efficiency, both internally but also in work practices in construction projects. Several uses of BIM-enabled tools were presented, many of which are aimed at the design or construction in projects.

To influence the organisation towards BIM adoption, new guidance documents were devised and these constitute the main deliverable of this project. These guidance documents had their root in BIM pilot projects at Large Projects where BIM had been tried out on a relatively extensive level. In the documents, specifications on BIM use, aimed at new procurements, and guidance for internal work practices at the client organisation are described. The new guidance documents were sent out on a referral procedure, collecting feedback and comments from the rest of the organisation but primarily the Investment department.

At its conclusion, the BIM Initiation Project was reorganised and the BIM implementation continued in a similar form. In mid-2015 the guidance documents was reworked and was implemented into the management system for how construction projects are conducted at this organisation. Following this implementation, the guidance documents have been further developed to meet the critique and feedback continuously expressed within the organisation. Further, the main tasks of the continued BIM Initiation Project has been to acquire support for the BIM issue and promote the use of the new work practices expressed within the new guidance documents.

Two surveys were conducted alongside the BIM implementation process. These surveys had the main purpose of assessing the general perception of BIM-use in construction projects conducted by this organisation. The surveys were aimed at several project participants with varying professions within numerous projects conducted by this client organisation, not only in-house personnel. The surveys were conducted in 2015 and 2016 and the analysis of the results showed a slight downwards trend in the satisfaction of BIM use. The analysis was conducted by consultants procured by the BIM Initiation Project and further showed that this trend was more prominent among the client's project managers. Following this analysis, the BIM Initiation Project conducted a workshop with representatives from both Investment and Large Projects with the goal of uncovering the reasons behind this downward trend. This workshop was conducted in May 2017 with

expressed purpose of identifying potential improvement and to propose concrete actions for more efficient handling of digital information.

Observations from the BIM Workshop

The workshop started with a presentation from the consultant tasked by the BIM Initiation Project to conduct and analyse the survey. At the very beginning of the presentation the reason behind the declining satisfaction with BIM was tried to be explained. A discrepancy between the expected benefits presented throughout the BIM implementation process and the actual outcomes with implementation problems was presented as a main reason for this decline. Therefore the workshop was aimed at uncovering the problems in order to be able to address them.

The workshop participants were divided into groups depending on their profession with project managers, contractors and consultants/designers in different rooms. The task was to, from the perspective of the profession present; prioritise between different implementation problems revealed in the survey and to propose concrete actions of how they can be addressed.

In the project manager group individuals from the client organisations two different project conducting sub-units were present. Additionally, two representatives from the BIM Initiation Projects were present to moderate the discussion. The participants grouped themselves according to their respective department in the meeting room.

The discussion around the most common problems in this group was almost directly interrupted by a BIM-specialist from Investment. This individual questioned the results of the survey as many of the questions had been difficult for project managers to understand, "I don't know if this is suitable questions for project managers". Further he stated that many project managers had forwarded the survey to him as a BIM specialist as they did not have time or the skills to answer it themselves. This was speculated to be one part in the explanation of the negative answers.

In the discussion around the prioritisation of the most common BIM problems, comments regarding responsibility for model information in inter-organisational model use came up. The survey asked about problems with collaborative use of models. This prompted many comments from project managers at Investment: "we do not work that way" in regards to collaborative use of models. The issue of responsibility in regards to models are not relevant for Investment, models are delivered and thereby an actor is always responsible for specific problems or lacking information.

Later a discussion arose around project managers requirements on BIM. There was a difference of opinion in regards to how much contact project managers should have with the model. Some project managers stated that models are a useful tool on all meetings while others stated that project manager's main role is to lead the project team which in turn might have use of models. The main interest of project managers was stated to be the ability to follow the progress of the project. The model in itself is not important in this process, instead what the project managers gets out of the model is relevant. Representatives from Investment lifted problems with the use of models however: "due to software neutral procurement, we have to be able to use seven different viewer programs for models". This situation prompted a discussion about Large Projects and what that department can use models for but how these uses are not possible at Investment at this time.

This led to a discussion about the interests of this client organisation, with a person from Investment stating: "what is it that we want? Is it a good model or is it good work

practices?" With the follow-up from the BIM Initiation Project: "is it not the same?", with the response: "No, we can get a good model, encoded in a specific way, but this models might not ensure efficient work practices. All projects do not have the same preconditions to understand and use the models, in order for project managers to use models the work practice has to be very simple".

The question about the goals with model-use sparked further discussions with a BIM specialist from Investment commenting "what is supposed to be in the model? This question is raised in all projects. Currently we dither here and there, we need to take responsibility and tell contractors what is supposed to be in the model". The use of models is currently developed in the respective procurement documents and the project management are responsible for the definition of how BIM should be used already in the project specification. A representative from Large Projects commented: "But there is a need for acceptance for project conducted over long periods of time, demands are changing and sometimes fast". Therefore specific demands and standardised use of BIM can be limiting in large and complex projects.

The workshop concluded with a summary from the BIM Initiation Project and a statement:

It is important that we are clear now, the more similar we are naturally the better. We will try to clarify the guidance documents and procurement templates more.

DISCUSSION

Client organisations are argued to be needed change agents in the process of influencing the inter-organisational network that constitutes a construction project (Porwal and Hewage 2013). These actors are argued to possess the needed authority and influence and demand changes by other project participants. Client actors are also described as the actors with the most potential gains from implementation of new technologies such as BIM (Linderoth, 2010; Smith 2014) and should therefore have an incentive to take this role as change agents. However, client organisations are not homogenous entities. Rather, client organisations are a complex network of sub-units with individuals with differing agendas and interests. In order to influence the work practices in construction projects conducted by client organisations, the change process has to be accepted within the context of the client's representatives within these projects. In the case presented in this paper, these representatives are mainly the project managers employed in the two departments: Large Projects and Investment.

Analysis of the receptive or non-receptive context at this organisation indicates how the change process is being perceived by these project managers. Based on the eight factors of receptivity described by Pettigrew *et al.*, (1994), the context of BIM implementation as conducted by the BIM Initiation Project has been analysed. This analysis is presented in table 1.

This analysis shows several problems with establishing receptivity for the change process conducted by the BIM Initiation Project. However, it should be noted that there are large differences between the two departments: Large Projects and Investment. Large Projects have worked more closely with the BIM Initiation Project and have been more flexible in their application of BIM in their projects. Investment on the other hand has very different preconditions and there is a perception that the BIM Initiation Project does not take their issues into account. Thereby, Large Projects express a more receptive context for this change than Investment.

Table 1: features of receptivity relating to BIM implementation

Features for receptive context	BIM implementation context
Quality and coherence of policy	The BIM initiative and associated policies have been developed within the BIM Initiation Project with limited contribution from construction project managers. This has created frustration among project managers indicating a divergence between the vision at the BIM Initiation Project and the reality project managers find themselves in.
Availability of key people leading change	The BIM Initiation Project represents the leadership of the change process. However, this group's legitimacy is questioned by individuals in the rest of the organisation as policies devised within this project sometimes conflicts with other policies at this organisation.
Environmental pressure	Even though the BIM implementation issue has a formal decision from the general director, many project managers express that do not view BIM as a prioritised issue in their projects.
Supportive organisational culture	The referral process in which the guidance documents were revised and the workshop is examples of how the BIM Initiation Project tries to collect feedback. However, there is a view in the rest of the organisation that the BIM Initiation Project does are not connected with the work practices in actual construction projects.
Effective inter-professional relations	There are large differences between Large Projects and Investment in terms of complexity and size of projects. This has developed a situation where these two departments often have contradictory opinions regarding the change process.
Co-operative inter-organisational networks	Many of the initiatives and policies devised in the BIM Initiation Project have their roots in the Large Projects department. As there are much dissimilarity between the Investment department and Large Projects the acceptance of these policies at Investment has been problematic.
Simplicity and clarity of goals and priorities	The workshop reveals difficulties for project managers to understand the goal of the change process. Therefore, how to prioritise and support the change process within construction projects have been problematic.
Fit between the change agenda and locale	There are differences in complexities and preconditions between projects. Especially in Investment there is a frustration that their more constrained opportunities in smaller projects have not been understood by the BIM Initiation Project.

In the stream of critical research questioning BIM as an uncontested 'problem solver' it is argued that there is a hype around the concept (Fox, 2014). This hype can be one explanation to why it has been problematic to create a receptive context around the BIM issue. Even if the benefits have not been overestimated, the implementation problems might have been underemphasised. Especially the issue of environmental pressure might have been oversimplified as many project managers are expressing sceptical opinions regarding BIM and are therefore not taking any initiatives themselves. These issues are also linked to problems for project managers to understand the goals of the change process. For the BIM Initiation Project the goal of BIM implementation has been self-explanatory with the consequences that project managers have had difficulties with prioritisations relating to BIM use in their projects.

CONCLUSIONS

BIM is presented as a technology with potential to increase sustainability and productivity within the construction industry. To enhance the change towards BIM-usage, client organisations are presented as needed change agents. The case of BIM implementation presented in this paper is an example of how a public client organisation is implementing BIM in order to influence both its own organisation, but also the construction industry as a whole. Analysing this implementation from the perspective of receptive or non-

receptive contexts reveals complexities in this client organisation's role as a needed industry driver. In order for a client organisation to influence the inter-organisational network that is a construction project, the change process has to be accepted within the intra-organisation network of the client organisation itself. This paper shows that this intra-organisational acceptance is not trivial and it can be problematic to establish a receptive context around a change process. These results problematize the role of client organisations as change agents in the construction industry and show that this role is accompanied with challenges. More studies are needed to explore how receptiveness can be enhanced within the contexts of large public client organisations in their role as industry change agents.

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