Orchestrating Multi-Actor Collaborative Innovation Across Organizational Boundaries

Pernilla Gluch
Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, Sweden

Anna Kadefors
School of Architecture and Built Environment, KTH Royal Institute of Technology, Stockholm, Sweden

Kamilla Kohn Rådberg
Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, Sweden

Abstract

Purpose – The aim of this research is to increase the understanding of how strategic and long-term innovation efforts can be organised, operated and co-created within a project-based organisational setting.

Design/Methodology/Approach – A case study with a qualitative approach was chosen, showing a critical case with powerful examples rather than representative samples, to draw conclusions from. The analysis builds on the concept of absorptive capacity, which provides a multidimensional perspective on innovation activities in organisations.

Findings – The difficulties in orchestrating an interplay between innovation processes and the construction process in itself is presented. The study identifies effects from introducing new "innovation roles" as well as comprehending implications of collaborative contract forms for innovation.

Research Limitations/Implications – Based on a single case study, and being an in-depth empirical study, a rich description of innovation processes is provided which contributes to generalisation on processes rather than outcomes. The use of the absorptive capacity construct also contributes to a theoretically informed research on innovation in construction.

Practical Implications – The study provides valuable insights regarding how to conduct collaborative innovation in within the frame of construction projects.

Originality/Value – The study of a novel organisational setup, where multiple innovation processes is integrated in a construction project with a partnering contract, provides an understanding on how a construction client can manage the interplay between innovation processes and the construction process in itself. Furthermore, flows of knowledge and effects from introducing new innovation roles are unfolded.

Keywords Collaborative innovation, Innovation process, Construction project, Absorptive capacity, Dynamic capabilities, Case study

Emerald Reach Proceedings Series
Vol. 2
pp. 371–379
Emerald Publishing Limited
2516-2853
DOI 10.1108/S2516-285320190000002009

All papers within this proceedings volume have been peer reviewed by the scientific committee of the 10th Nordic Conference on Construction Economics and Organization (CEO 2019).

1. Introduction

The pressure on the building sector to innovate has increased significantly in recent years, and sustainability objectives and management of project complexity are main drivers together with an adaption to a digitalised world (Ozerhon and Oral 2016). Many builders today have experience in conducting pilot and demonstration projects to test new technologies. However, it has proved difficult to get a broader organisational spread of experience generated in these projects (Bossink, 2009), much because lack of organisational structures for pursuing long-term and systematic development work. This means that neither individual companies nor the construction sector as a whole get the fullest exchange of funds invested in developing and testing new technical solutions, service concepts and working methods. When a strategic perspective on innovation is lacking, individual champions with high motivation and technical competence often get an important role in initiating and running development projects (Hartmann *et al.*, 2008), while corporate management often is more passive and reactive. On a general level, information dissemination and retrieval in the construction industry has also been found to be strongly linked to individuals and their networks, using face-to-face communication (Gluch and Räisänen, 2009). Owing to increased demands for social and ecological sustainability and to cope with the on-going digitalisation of business, many construction clients today see a need to improve their innovation capabilities. The construction clients are central actors as they set the requirements, select suppliers and shape the incentives for the supply chain to invest in knowledge and innovation (Brandon and Lu, 2008).

The aim of this research is to increase the understanding of how strategic innovation efforts can be organised, operated and co-created within a project-based organisational setting. Based on the concept absorptive capacity (Cohen and Levinthal, 1990) as theoretical framework, this paper provides a descriptive account on how a major Swedish construction client mobilises for multiple innovation processes within a construction project. The paper displays the flow of external knowledge in terms of collaborative actions taken between multiple parties involved in the construction project. It also examines how the organizational setup and leadership support knowledge acquisition and assimilation as well as the transformation of this knowledge into innovations. The challenge of integrating a multi-actor collaborative innovation process with a likewise multi-actor collaborative construction process is specifically addressed. This complexity requires new ways of organizing, multiple forms of expertise within the project team and new platforms for collective knowledge creation.

The results from the study provide an increased understanding of how the client orchestrates the interplay between innovation processes and the construction process in itself. Furthermore, the case study provides an opportunity to identify effects from introducing new "innovation roles" as well as comprehending implications of collaborative contract forms for innovation.

2. Theoretical framework

2.1. Research on innovation in construction

Construction is generally seen as a traditional industry where innovation is problematic. On a general level, the rates of innovation and R&D expenditure are low compared to other industries (Reichstein *et al.*, 2005). The image of construction as rigid, conservative and traditional is however not entirely fair. Winch (2003), for example, has argued that industry statistics give a misleading picture of an industry where product design is performed by

architectural and engineering firms and not by internal R&D departments of construction firms. Moreover, buildings are more or less unique prototypes and produced by temporary multi-organisations. Innovations that require changes in many interrelated parts of this system are considerably more difficult to implement than innovations, which take place within a single module, without altering interfaces with other modules (Kadefors, 1995).

In construction, the client's choice of procurement route strongly influences other parties' incentives for innovation and knowledge development, placing the client in a key position to shape the context for learning and innovation (Kulatunga *et al.*, 2011). That suppliers have to continuously adapt to different clients with varying requirements is one of the prime obstacles for contractors and consultants to invest in innovation and learning (Eriksson, 2013). In this sense, clients are less constrained compared to their suppliers. However, clients are far from always important drivers and champions of innovation. On the contrary, they are often risk averse, seeing few benefits of innovation (Hartmann *et al.*, 2008; Engström and Hedgren, 2012). Accordingly, structures for driving innovation on the organizational level are seldom highly elaborated in project-based organisations (Blindenbach-Driessen and van den Ende, 2006). When Toole *et al.* (2013) assessed the innovation maturity of construction industry firms, they found that the main shortcomings were related to a lack of resources allocated to innovation and a lack of processes to support innovation.

2.2. Absorptive capacity

For the construction industry to become more sustainable and viable, companies and other organisations need to be better at promoting and benefiting from the development of innovative products, services and methods (Keast and Hampson, 2007). Innovation research emphasizes that the innovative ability of an organisation depends strongly on the resources and procedures available to systematically acquire and apply new skills (Zollo and Winter, 2002). When examining innovation skills in an organisation, it is important not only to limit the study to internal knowledge management processes, but also to consider external knowledge exchange.

A theoretical explanation involving a multidimensional perspective on innovation activities in companies/organisations is absorptive capacity (Cohen and Levinthal, 1990). Predicting innovative activity, the concept emphasises the knowledge that an organisation and its employees acquire through performing research and development. This knowledge, in turn, enables them to identify new knowledge in the environment to act upon in the process of conceiving and designing new products or services. Absorptive capacity signifies the ability of the unit analysed, for example an organisation, to value new information, assimilate it and then apply it to their own context. A mutual interaction between existing internal knowledge/experiences and external knowledge, for example by inter-organisational relationships such as R&D consortia and cooperation projects, is of great importance. However, to stimulate collaboration there is a need for effective social integration mechanisms to facilitate information exchange across organizational units. Thus, Cohen and Levinthal (1990) identify three essential aspects of absorptive capacity: (1) flow of external knowledge, (2) organisational set up for acquisition/assimilation/transformation and (3) leadership for acquisition/assimilation /transformation. The theory's key points are today often expressed in the term of dynamic capability (Easterby-Smith *et al.*, 2009), defined as "the capacity of an organization to purposefully create, extend, or modify its resource base" (Helfat *et al.*, 2007, p. 4).

3. Method and case description

This paper is based on a case study where the object is a construction project that also involves multiple innovation projects. With the intention to gain deeper insight in how

strategic innovation efforts can be organised operated and co-created within a project organisation, a qualitative approach was further chosen. A case study can function as a critical case), which is considered to constitute a powerful example rather than a representative sample to draw conclusions from (Siggelkow, 2007).

Data have been collected through multiple sources, where recorded semi-structured in-depth interviews (Kvale, 2008) has been the primary source, supported with observations of meetings and project documentation, as well as data from a digital log book of reflections from a set of collaborative participants in the construction project.

In analysing the data, the concept of absorptive capacity by Cohen and Levinthal (1990), and its essential aspects of (1) flow of external knowledge, (2) organisational set up for acquisition/assimilation/transformation and (3) leadership for acquisition/assimilation/transformation, have been used to thematically cluster identified managerial challenges.

Information about data collection and data sources is presented in Table 1, along with a list of the key characteristics of the construction project studied, here called INNO.

The owner and construction client of the INNO project is a major Swedish property company with specific focus on university campus buildings. The property company had prior to the study developed an innovation strategy, but struggled with how to operationalize it. In the early planning of the INNO project, the idea came up to load it with a number of innovation projects related to the strategic directions set, to "get out of the starting blocks", as a manager expressed it. The construction project is a partnering project with a contractor specialized in construction partnership projects.

The final building provides mainly office spaces aimed for tenants that are particular interested in pursuing innovation projects in collaboration with others. Therefore, the building is designed to serve as an innovation arena for test and demonstration also during the operational phase. The construction project includes 11 innovation projects, with high ambitions not only regarding innovation push but also on gaining knowledge, abilities and

Case characteristics	
Type of construction project	*Appr 10,000 m^2 office building within a Science Park on a university campus in Sweden*
No of collaborative innovation projects within the construction project	*11 innovation projects, e. g. Energy storage, Heat and cool systems, BIM in the facility management phase, and Wood construction frames*
No of strategic partners for the innovation projects	*7*
No of innovation projects with external project leader / internal project leader	*5 / 6*
Data collection	
Time of data collection	*2017-2018*
Interviews	*26 1,5 h Semi-structured interviews (14 in 2017, 12 in 2018)*
Reflective log-book	*8 project participants writing every 2nd week a short reflective log-book based on a digital platform*
Participatory observation	*35h of observations from meetings (15 h strategic meetings, 15h innovation project meetings, 5h construction project meetings)*
Documents	*Project specific documents and corporate*

Table 1. Characteristics of the INNO Case and Sources of Empirical Data

learnings to be used for further development within the client organization. The innovation projects were selected through an internal selection process, however with support and input from external collaborative parties. The organizations selected for collaboration were ones that the client organisation had prior relations to, and ones that became engaged and strategic partners through the innovation projects. Several of the strategic partners involved in the innovation projects under the construction process will continue to be innovation partners and located in the office building as tenants.

4. Findings

Based on the concept absorptive capacity (Cohen and Levinthal, 1990), findings presented concerns the flow of external knowledge in terms of collaborative actions taken between multiple parties involved in the construction project as well as the organisational setup and leadership to support knowledge acquisition and assimilation as well as the transformation of this knowledge into innovations.

4.1. External knowledge flow

The areas chosen for the innovation projects initially came from different technical departments within the client organisation, which saw major innovation possibilities in their areas. As already mentioned, the construction client invited several external strategic partners to participate in identifying and selecting innovation projects. Already early it became clear to the client organization that other resources than financial ones were needed, and that the internal knowledge became even more essential when adding external partners. As the project ideas started to evolve into technical solutions, more external experts, such as researchers and highly specialized technical consultants was involved, and the access to new knowledge became apparent as well as the challenge on how to manage collaborative innovation projects across organizational boundaries, especially in relation to the design process of the major construction project they all were supposed to be realized within.

When the construction project moved on from a conceptual and early development phase to the detailed design phase, many of the innovation projects were still in their infancy. This mismatch in timing kept several of the innovation projects detached from the construction project in terms of sharing knowledge and solutions but also decision making. Nevertheless, in some innovation projects, the connection to the construction project had to come earlier, since the addressed problems to be developed and solved, were in the interface between the innovation project and the construction project. In managing this, expert consultants were involved in both the construction project and in the particular innovation projects.

About half of the innovation projects started off with external project leaders, either because of lack of available internal staff with the right competence or because of a need to acquire new knowledge within a specific competence area. This need was not considered beforehand, but recognised and handled as it came up during the project. Relying on external project leaders were discussed from the perspective of the risk of not having the capacity to make wider use of the knowledge gained from the project as an external project leader inevitably would not have the close connection to the rest of the client organisation and neither to the construction client's other construction projects. On the other hand, it opened up for greater access to new knowledge from external sources.

With regards to external knowledge, the initial main focus was on technical knowledge, but as the collaborative partners started to design and develop the innovation projects, the need for learning and how to make better use of and internalise new knowledge became a

focal point for discussion. This was particularly articulated in the construction project, where it became clear that the several innovation projects brought in new knowledge and technical solutions that the client's construction project leader saw as strategically important also for other of the client's projects.

4.2. Organizational setup

The partnering approach for the construction project, involving an increased openness, flexibility and intensified communication between construction project partners, created a good organizational setup environment for adding innovation projects to the construction project. As some participants in the construction project emphasised,

> "If we had not had the common meeting place and structured meetings that the partnering concept offers, we would not have been able to share problems, develop solutions and keep the schedule as sufficiently as we did."

However, at the same time, even if the partnering setup did not create barriers it did not offer a tailored support for the accomplishment of the innovation projects attached to a construction project.

As the construction project came closer to construction start, the need for the innovation projects to be integrated with the construction process increased, which they were not all prepared for. The expectation that the partnering concept would offer the necessary support to enable coupling of the innovation projects to the construction process was overrated and could only partly fulfil the task. Work practices and routines for managing the innovation projects in close relation to the construction project were not in place and not possible to develop at hindsight since the construction project organization was too rigid. As boundary spanners, a specific innovation task force connected to the construction project was set up by the client, which held joint meetings focusing on the coordination between the innovation projects and the construction process, but this was not sufficient enough. Nevertheless, increased collaboration for solving issues or dilemmas that appeared during the process was established on a common ground between the construction project and individual innovation projects, in particular in cases where such contacts had been made in an early stage.

At one point in the midst of the detailed design phase, a shift of client construction project manager took place. The new construction project manager, that had been involved in the innovation projects from an early stage, in addition to managing the construction project also took the role to enable and widen the integration process, he stated: "I want this to work, but even more I want the knowledge to be spread not only between the involved actors [in the construction project], but also in all levels of our [client] organization, so that we really could learn from this [project]". This statement leads us to the importance of leadership for innovation.

4.3. Leadership

The initiative to set up a high number of innovation projects in collaboration with external partners connected to this specific construction project, was driven by a set of managers in the client organization. These innovation projects were seen as well related to the client's internal strategy process and to selected external partners involved in the construction project.

From early on, internal processes and management tools were developed within the client organisation for how to organise and manage innovation projects and to assist the specific innovation projects with their different partners. This included how ideas and innovation projects were to be developed and selected, how business cases for investment decisions should be built, and how the projects should be designed, organised and reported.

Yet, as the innovation projects were defined, decided upon and started up, with either internal or external project leaders, the gap between the construction project and the innovation projects became apparent and thus repeatedly highlighted by the project leader of the construction project as a problem. However, the client organisation did neither have the experience nor knowledge to sufficiently assist the construction project in an operative manner and could not easily connect the relevant managerial functions to support it. It became evident that the innovation projects would have benefitted from starting earlier to be ready at this point as well as a process for how to integrate the different innovation projects to the major building project.

Lack of time, resources and capabilities within the client organisation to manage and support the integration between the construction project and the innovation projects, created tensions in various relationships, such as within the construction project, between the different units and layers within the client organisation, and the relationship with the involved strategic partners. A strong need for support on different levels in the organisation to carry out innovation projects within a construction project in collaboration with multiple partners, was articulated both by the interviewees and in documentation from internal strategic discussions, already in early stages of the project. In spite of this recognition, this need was not fully accomplished.

5. Conclusions

This case gives us insight to how a client organisation sets up and attempts to integrate a range of innovation projects into a larger office building project, as a way to orchestrate and operationalise their internal innovation strategy. There are some learning to be made from this case.

Firstly, to enable a greater flow of external knowledge the client organisation needs to, besides the traditional project management team, involve experts and specialists early in the construction process. However, seen from the case, there is also a need for new managerial roles and processes to connect multiple innovation projects to the overall construction project. In the case of INNO, the client chose to set up the innovation projects as collaborative open innovation projects where strategic partners, e.g. suppliers, researchers, technical consultants, were involved from early start to the end. Several innovation projects were led by external project leaders, which opened a window for external knowledge to be acquired. However, having external project leaders were also seen as a hinder for new external knowledge to be assimilated in the client organisation and thus hampering a continuous learning process. A balance act that need to be considered. Furthermore, in focus was the end-result of the innovation projects, and not so much on how to actually manage and integrate those projects with managing the construction project.

Secondly, timing and continuity are identified as important factors. The innovation projects need to be on a similar maturity level, in terms of design, routines and teams, as the construction project to avoid being down prioritised in decisions. From the beginning, the focus in the INNO project was not only to create innovative technical solutions in the building, but also to give several of them an afterlife in terms of being test facilities for the future and serve as mechanisms for continuous collaboration and learning between involved parties. This idea enabled a higher outcome, but also increased the demands on the involved organisations' commitment into the innovation projects. However, the dynamic relationship between involved partners and the lack of structures and processes over time shows on the need for high attention from all aspects to be able to use shared learnings and internalise it to the different parts and practices of the organisations involved, i.e. the need for a high absorptive capacity (Cohen and Levinthal 1990).

Thirdly, the organisational set up has consequences for assimilation and transformation of knowledge. With experience from previous efforts, INNO's client organization put emphasis on the administrative and processual aspects of driving innovation in terms of establishing an innovation strategy. In addition, a structure of meetings and processes internally to connect the top management team, lower management, innovation projects, strategic partners and construction project was set up and the construction project itself was chosen to be managed as a partnering project. Partnering enabled a collaborative environment for different actors to engage in but the innovation work did not happen just thereof; joint meetings, routines and rules still need to be established. Moreover, interrelated innovation projects and the construction project need to be on an equal footing to avoid competition for resources and create tensions in the relationships between involved parties.

Fourthly, even though supporting organisational structures and processes were shown to be of great value, the complex relationships between involved partners, individuals and departments points out for a greater need of leadership support in the different stages. However, our study shows that it is difficult to predict the need for leadership and support on beforehand. It is therefore important to learn from experiences made in several projects and to address the leadership issue continually to adapt it to current situation.

References

Blindenbach-Driessen, F. and van den Ende, J. (2006), "Innovation in project-based firms: The context dependency of success factors", *Research Policy*, Vol. 35 No. 4, pp. 545–561.

Bossink, A.G. (2009), "Assessment of a national system of sustainable innovation in residential construction: a case study from the Netherlands", *International Journal of Environmental Technology and Management*, Vol. 10 No. 3/4, pp. 371–381.

Brandon, P. and Lu, S.-L. Eds. (2008), *Clients Driving Innovation*, Chichester: Wiley-Blackwell.

Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive capacity: A new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 128–152.

Easterby-Smith, M., Lyles, M.A. and Peteraf, M.A. (2009), "Dynamic Capabilities, Current Debates and Future Directions", *British Journal of Management*, Vol. 20, pp 1–8.

Engström, S. and Hedgren, E. (2012), "Sustaining inertia? Construction clients' decision-making and information-processing approach to industrialized building innovations", *Construction Innovation*, Vol. 12 No. 4, pp. 393–413.

Eriksson, P.E. (2013), "Exploration and exploitation in project-based organizations: Development and diffusion of knowledge at different organizational levels in construction companies", *International Journal of Project Management*, Vol. 31 No. 3, pp. 333–341.

Gluch, P. and Räisänen, C. (2009), "Interactional perspective on environmental communication in construction projects", *Building Research & Information*, Vol. 37 No. 2, pp. 164–175.

Hartmann, A., Reymen, I. and van Oosterom, G. (2008), "Factors constituting the innovation adoption environment of public clients", *Building Research & Information*, Vol. 36 No. 5, pp. 436–449.

Helfat, C.E., Finkelstein, S, Mitchell, W., Peteraf, M.A., Singh, H., Teece, D. J. and Winter, S.G. (2007), *Dynamic capabilities. Understanding Strategic Change in Organizations*. Malden, MA: Blackwell.

Kadefors, A. (1995), "Institutions in building projects: Implications for flexibility and change", *Scandinavian Journal of Management*, Vol. 11 No. 4, pp. 395–408.

Keast, R. and Hampson, K. (2007) "Building constructive innovation networks: Role of relationship management", *Journal of Construction Engineering and Management*, Vol. 133 No. 5, pp.364–373.

Kulatunga, K., Kulatunga, U., Amaratunga, D. and Haigh, R. (2011), "Client's championing characteristics that promote construction innovation", *Construction Innovation*, Vol. 11 No. 4, pp. 380–398.

Kvale, S. (2008), *Doing Interviews*. SAGE Publications Ltd., Thousand Oaks.

Ozorhon, B. and Oral, K. (2016), "Drivers of innovation in construction projects", *Journal of Construction Engineering and Management*, Vol. 143 No. 4, pp. 04015052.

Reichstein, T., Salter, A.J. and Gann, D.M. (2005), "Last among equals: a comparison of innovation in construction, services and manufacturing in the UK", *Construction Management and Economics*, Vol. 23 No. 6, pp. 631–644.

Siggelkow, N. (2007), "Persuasion with case studies", *Academy of Management Journal*, Vol. 50, pp. 20–24.

Toole, T.M., Hallowell, M. and Chinowsky, P. (2013), "A tool for enhancing innovation in construction organizations", *The Engineering Project Organization Journal*, Vol. 3 No. 1, pp. 32–50.

Winch, G. (2003), "How innovative is construction? Comparing aggregated data on construction innovation and other sectors – a case of apples and pears", *Construction Management and Economics*, Vol. 21 No. 6, pp. 651–654.

Yin, R.K. (2014), *Case study research: Design and methods*, Sage publications, Thousand Oaks, CA.

Zollo, M. and Winter, S.G. (2002), "Deliberate learning and the evolution of dynamic capabilities", *Organization Science*, Vol. 13 No. 3, pp. 339–351.