THE ROLE OF KEY ACTORS IN THE EMERGENCE OF A STRATEGIC INNOVATION PROGRAMME: A TRANSLATION PROCESS PERSPECTIVE

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The ability to innovate and adapt to change is of central importance at all levels of society today. In this article, a strategic innovation programme (SIP) in the Swedish construction industry is addressed as a vehicle to facilitate system-wide innovation and change. Based on the need to further understand how to deliver industry-level innovation, and an identified scarcity of studies addressing the role key actors have in establishing a SIP, the aim is to analyse and describe how a strategic innovation programme is established and what role key actors play in this process. Theoretically, the study draws inspiration from actor-network theory (ANT) and especially the translation process, which previous studies have shown to be suitable to understand the challenges involved when mobilizing a network of heterogeneous actors. Empirically, the study is based on a qualitative approach and consists of 11 semi-structured interviews with individuals active in the early stages and the development of a SIP. In the article, a number of actor groups are identified and followed through what can be described as two cycles of translation, where one actor group is trying to make itself a 'legitimate spokesperson' for the emerging SIP. The analysis shows, for example, how the problematization of structural changes, digitalization, and industrialization enables the mentioned actor group to successfully translate the interests of other actors into an obligatory passage point (OPP). Apart from providing an understanding of the role that different actor groups play in the becoming of an innovation programme, the study also shows how it is not primarily the actors in the construction industry who are conservative; instead, there is an inertia in the system that complicates a collaborative development of innovations in the industry.

Keywords: strategic innovation; digital; sociology of translation; transformation

INTRODUCTION

The ability to innovate and adapt to change is of central importance at all levels of society today. During the last decade, so-called strategic innovation programmes (SIPs) have emerged as a vehicle to facilitate system-wide innovation and change on industry level. The underlying idea of these programmes is that research, innovation, and development should manifest itself through mobilization of collaborative and actor-driven networks involving industry, public sector, and academia with an overarching goal of meeting industrial, societal, and global needs (Grillitsch et al., 2019; Schot and Steinmueller, 2018). However, these programmes do not come without challenges. Ensuring the functionality of SIPs is, at the outset, quite an

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intricate task due to their vastness and the inherent necessity to engage a wide variety of actors. These actors do not only represent different organisations but are most often also heterogeneous in the sense that they have different goals and represent different organizing logics. Like all organized efforts, the mobilization of a functionate interrelatedness among involved actors is key to the success of these programmes.

Despite the vast amount of research on innovation programmes, the majority of such studies have targeted 'internally' driven programmes within large corporations (see, e.g., Martinsuo, 2019; Midler, 2019). Studies on innovation programmes as actor-driven networks that targets system-wide innovation and change, such as SIPs, are less common. The studies that exist on these system-wide initiatives have however provided novel and useful insights into the back end of the programmes, for example by addressing how SIPs operate, how they struggle to deliver system-wide innovation, and how they are faced with challenges of measuring performance (see, e.g., Grillitsch et al., 2019; Håkansson et al., 2021). Studies focusing on the front-end of SIPs, and the role that key actors play in the establishment of the programmes are however scarce. In their suggestions for future research, Grillitsch et al., (2019) highlighted the need to further study the role and involvement of key actor groups. Given this background, the present study focuses on the front-end, or 'the becoming' of a SIP. More precisely, the study aims to analyse and describe how a strategic innovation programme is established and what role key actors play in this process.

Empirically, the study is situated in the Swedish construction industry, where governmental initiatives have laid the grounds for the development of a SIP. With the objective of facilitating structural changes in the way that the construction industry operates, a particular focus of the programme is on digitalization and the need for digital transformation. The study is based on a qualitative approach and consists of 11 semi-structured interviews with individuals active in the early stages and the development of the SIP. Theoretically, the study draws inspiration from actor-network theory (ANT) and the translation process, as described by Callon (1984), which has previously been shown to be suitable for understanding the challenges involved with mobilizing a network of heterogeneous actors in the industry in question (Harty, 2008; Lindblad, 2019).

BACKGROUND

In 2012, the Swedish government initiated a call for 'Strategic Research and Innovation Agendas' as an attempt to find solutions to societal and global challenges, and to strengthen Sweden's international competitiveness (Vinnova, 2021). As a result of this call, over 100 agendas were formulated, three of which had a particular focus on the construction industry. With the construction industry's poor performance as a common denominator, their solutions in terms of technological scope, or focus, was different. The first agenda was developed with a particular focus on Building Information Modelling (BIM), the second on Geographical Information Systems (GIS), and the third focused on how to utilize and integrate industrial processes (IP) in the improvement of the industry. In 2013, the three agendas merged into one common agenda, creating the basis for the SIP in question (Håkansson *et al.,* 2021).

Unlike 'traditional' innovation programmes that focus on innovation within large corporations (see, e.g., Martinsuo, 2019; Midler, 2019), SIPs, like the one studied, are built around the idea that innovation is to be developed in collaboration among industry actors from different parts of the value chain (Grillitsch *et al.,* 2019). Thus,

innovation can be said to be a result of how successful networks of actors are mobilized. From a theoretical point of view, mobilizing these networks can be understood as a translation process (Callon and Latour, 1981; Callon, 1984) consisting of four moments of translation: *problematization*, *interessement*, *enrolment*, and *mobilization of allies* (Callon, 1984). These four moments will be used as a theoretical backbone for the present study to understand how the development happened.

The Four Moments of Translation

The first moment of translation is problematization, or how actors can become indispensable. According to Callon (1984), this moment comprises the way a focal actor identifies an idea as either a problem or an opportunity. Additionally, it involves the focal actors' identification of other actors who are seen as indispensable for solving the problem or reaping the benefits from the opportunity. As part of problematization, it is important for the focal actor to identify which roles and relationships other identified actors could have in the network to achieve the goals. If the network is heterogenous, the inherent goals and interests of the identified actors are not necessarily aligned with the interests of the focal actor. Therefore, Callon (1984) argued that the goal of problematization, from the focal actors' point of view, is to identify a question (or issue) whose answer is perceived as beneficial for all involved actors. This implies creating a so-called 'obligatory passage point' (OPP), which can be described as a funnel that forces actors to converge on a certain topic, issue, or question and become allies.

The second moment of translation is interessement, or how the allies are locked into place. Callon (1984:207f) described this second moment as "… the group of actions by which an entity (…) attempts to impose and stabilize the identity of the other actors it defines through its problematization". In other words, it implies that the focal actor tries to 'isolate' the identified actors from other influences that may affect their alliance with the intended network. Therefore, a key challenge, from the focal actors' perspective, is how to succeed in getting the identified actors to retain their interest in what is to be achieved within the network. Callon (1984: 208) wrote," … to interest other actors is to build devices which can be placed between them and all other entities who wants to define their identities otherwise."

In addition to problematization and interessement, the translation process consists of the moment enrolment, which relates to the way in which roles are defined and coordinated. With a network established there is, from the focal actors' point of view, a need to further stabilize the network by anchoring the actors in their positions. This is because interessement alone does not necessarily lead to the desired alliances (Callon, 1984). Motivation is key for enrolment. By infusing notions of more desirable states and how to reach them, the focal actors try to influence the other actors to accept their roles in the network (Holmström and Robey, 2002). The moment of enrolment neither entails nor excludes predefined roles. Rather, it can be described as a 'plan' in which a set of interconnected roles are defined and ascribed to the actors who accept them. However, these roles are not fixed. Callon (1984:211) stated that "… the group of multilateral negotiations, trials of strength and tricks that accompany the interessement and enable them to succeed". If the issue identified as an OPP during the problematization results in several satisfactory responses for the involved actors, the moment of enrolment is facilitated and the statements in the problematization are likely to be transformed into 'facts'.

The final moment of the translation process is the mobilization of allies, which relates to the question of whether the spokespersons are seen as representative. In previous moments, it is common for only a few individuals to be involved. These individuals are representatives for their respective actor groups and have spoken for their group during the translation process (Callon, 1984); that is, they act as spokespersons. Still, a key issue arises in terms of how representative these spokespersons really are for the actors they represent. Callon (1984) described this issue by asking, "… will the masses (…) follow their representatives?". In essence, for mobilization of allies to happen, the individuals involved must thus mobilize the group they have spoken for during the previous three moments. Table 1 provides a short summary of the key characteristics for each moment of the translation process.

Table 1: The four moments of the translation process

Moment	Characteristics
Problematization	A new idea (problem and/or opportunity) is identified by a focal actor that requires mobilization of a new actor-network to solve the problem and/or reap the benefits of the opportunity.
Interessement	The actions taken by a focal actor to interest, impose, and isolate actors who are identified as indispensable for the network to achieve its goals.
Enrolment	Further stabilization of the network is needed by anchoring the actors' position in the network. The focal actor tries to motivate the participating actors to accept their role in the network.
Mobilization of allies	Often, only a few individuals are involved as representatives for their respective group. It is now up to the spokesperson to ensure that the group it represents acts according to its interests.

METHOD

This article sets out to understand the establishment of SIPs. As described in the beginning of the background, a Swedish SIP, with a focus on digital transformation in the construction industry was used as the case. With the explanatory nature of the inquiry, a retrospective qualitative interview-based approach - designed to identify what has happened and why - was considered appropriate for data collection (see, e.g., Stake, 1978; Yin, 2018). Due to the limited number of individuals formally involved in the establishment, interviewees were identified primarily using a snow-ball technique, where the first respondents were asked to inform about other individuals involved, and whether the themes addressed during the interview could be further enlightened by additional individuals. A total of 12 people were identified as involved in the establishment. All 12 were invited to participate in the study and 11 chose to do so. Consequently, a total of 11 semi-structured interviews were conducted: two with individuals from the programme management of the SIP, four with individuals representing the research councils backing the initiative, and five with individuals who were deeply involved in the establishment process and at the same time representatives from the three agendas that formed the bases for the SIP. In the remainder of the article, these five individuals will be referred to as *the initiators*.

Interviews were designed to address the establishment process following the timeline outlined in Table 2 below. With the initiation starting almost 10 years ago, this process called for a retrospective approach which relied on the interviewee's memory of, and presence in, the events that led to the establishment of the SIP. The interviews were conducted between November 2020 and January 2021. The average duration of the interviews was approximately 70 minutes; all interviews were recorded, transcribed, and sent back to the respondents for validation and approval. With transcripts approved, the material was thematically analysed using the four moments

of translation as the backbone. The terminology and concepts of the translation process, as described by Callon (1984), enabled the analysis and understanding of how the network of actors were formed.

RESULTS

The results are presented in five consecutive parts. First, a short outline of the major events and history will be given. Second, the moment of problematization is described, where a focal actor is identified. Third, the moment of interessement is presented. It is shown how devices in terms of collaborative R&D projects are developed and used to interest and isolate actors. Fourth, the moment of enrolment is analysed, where actors' roles are to be defined and coordinated. Because not enough actors were enrolled in this moment, a second cycle of translation was needed. Fifth, and finally, the second cycle of translation is outlined, and it is shown how the initiators manage to enrol trustworthy spokespersons that represent important key actors in the construction industry, which leads to the development of a SIP.

Setting the Scene

As mentioned in the background, the establishment of the SIP in question started in 2012 with a governmental call for 'Strategic Research and Innovation Agendas'. Based on the proposal of more than 100 agendas, 17 SIPs were established, where one focused on digitalization and digital transformation within the construction industry (that is, the case of use in this study). In the sections to come, the process of how a formulated agenda became an established SIP will be described as a translation process inspired by Callon (1984). Table 2 outlines the major events in this process.

Table 2: Timeline of the creation of the SIP

Timeline	Event/happening
April 2012	The call for strategic research and innovation agendas were announced
July 2012	The three agendas (focus on BIM, GIS, and IP) were developed separately
July 2013	A focal actor, the initiators, was formed due to a merger of the three agendas
July 2013-February 2014	The idea of a SIP within the construction industry emerged through the first cycle of translation
February 2014	First application submitted to develop a SIP in the construction industry
May 2014	First application denied by the funding agencies
August 2014	Second cycle of translation initiated
February 2015	Second application submitted to develop a SIP in the construction industry
April 2015	Application approved by the funding agencies
January 2016	SIP officially launched

Problematization: Everyone Sees the Problem and a Solution is Offered

The performance problems of the construction industry - such as poor quality and low productivity - have been debated for more than 20 years. These problems are often attributed to the industry actors who, for a long time, have been accused of being conservative and unwilling to change. However, while the critique of the industry's poor performance might hold true, the initiators argue that it is an inertia in the construction production system rather than the industry actors' resistance to change that causes this problem. As described by Marge, one of the initiators:

> …this is what many calls conservatism, what I choose to call inertia in the system. Because it is not the actors that are conservative, it is built into the system that it becomes an extreme inertia when trying to change.

During the interviews, it was explained that the changes that need to be made to address the performance problem in the construction industry often lie in-between the traditional roles, processes, and responsibilities of individual organisations. Due to the fragmented construction process (no actor is responsible for the entire process), the short-term-oriented way of doing business (the project-way of organizing), and the downpipe thinking (improvement of internal and/or existing processes), it becomes extremely difficult for any individual organization to engage and/or change something outside their normal part/place in the construction process. With these problems as a foundation, and the awareness of what kind of challenges the Swedish government aimed to address with the SIPs, a solution focusing on facilitating collaboration between organisations from different part of the value chain emerged. However, for the initiators to reap the benefit of this opportunity, more actors needed to recognize the problem and engage in the suggested solution (Callon, 1984).

Identification of actors
Through the analysis, it was possible to identify three actor groups that were indispensable for the initiators to succeed: the actors of change, academia, and the funding agencies.

The actors of change are represented by a selection of industrial actors in terms of companies, organisations, and/or authorities in the construction industry. To ensure that the solutions that originate from the SIP is orchestrated in a bottom-up way, the initiators needed to identify those who either want to change (and know where the problems lie), are market leaders (based on size, competence, or innovativeness), or could influence large parts of the process (e.g., the municipalities and their monopoly of land-use).

Academia is represented by universities and research institutes. Collaborative development between industrial actors and academia is not as common in construction as it is in other manufacturing industries. Even if the emerging SIP is intended to be an actor-driven programme, the relationship between the actors of change and academia has been highlighted as a crucial building block to develop sustainable solutions that fits the industry.

The funding agencies are represented by three research councils that have been assigned responsibility over the agendas that were developed and, in the initial stage of the process, have the authority to approve/deny the SIP its funding. They are the outpost, the last actor to be enrolled. If the initiators can show that the problem the SIP has set out to solve is solid, and that the idea has a strong support by both the actors of change and the academia, it is more likely that the funding agencies supports the SIP as well.

Defining the obligatory passage point
The goal of the problematization is to identify a question, or an issue, called an obligatory passage point (OPP) in which the answer, or solution, is beneficial for the participating actors (Callon, 1984). So far, the idea of developing a SIP to address the performance problem of the construction industry has been the sole work of the initiators. By involving the identified actors, the initiators wish to show that the suggested SIP creates an opportunity to collaborate outside the roles, processes, and responsibilities of traditional construction activities. The SIP represents a new collaborative and actor-driven change initiative where the actors of change, academia and funding agencies are given the opportunity to address the long-lasting problems of the construction industry and structurally change how to collaborate and do business

within the industry. However, for this to happen, the identified actors need to understand their role, as well as the other actors' roles, and that their alliance around this SIP can be beneficial for them all.

Interessement: What's in It for Us?

While the performance problem in the construction industry was relevant and recognizable for many of the identified actors, a solution in the form of a SIP was somewhat hard to understand; specifically, the intended roles and relationships between the involved actors and how they were supposed to collaborate within the SIP. The idea of the SIP was also perceived by some as a way to outcompete existing initiatives. For example, existing 'interest organisations' (for example, BIM Alliance) with specific technological focus, smaller development programmes (for example, Bygginnovationen; in English: Programme for construction innovation) that already supported the actors of change with their innovative ideas, and some representatives from academia did not really understand the idea of mixing research with construction practise. As a result of all of this, a question was raised: Who will benefit from this SIP and how is this different from what already exists?

To strengthen the identified actors' interest, the initiators needed to impose the SIP in such a way that the actors understood that the fulfilment of their internal goals depends on their engagement in the SIP. Callon (1984) described this as building devices that can be put between the identified actors and other conflicting network that defines their identity/interests otherwise. While investments in R&D within the construction industry are low compared to other manufacturing industries, the R&D that exists focuses more on intra-organizational development - that is, working in downpipes and improvement of internal processes - as explained by Abraham from the programme management:

> In traditional construction activities, the focus is very much on the interfaces between the actors involved, and not on the parts that needs to be solved in collaboration (…) and what you do, when for example implementing change in terms of new digital tools, is that you develop a small part of the entire process. But it has no major effect on the construction process as a whole.

Even if this development is important for the individual organization's competitiveness, its impact on the industry's performance problems is negligible. By introducing the use of collaborative R&D projects, the initiators intended to position the SIP as the industry's collaborative platform for change and digital transformation. Many of the industry's problems are either too large for one actor to address alone or have been overlooked in traditional construction activities. By enabling, and funding, these collaborative R&D projects all actors who gets involved are now given a form where problems that lie in between the traditional roles, processes, and relationships in the construction industry could be addressed in new inter-organizational and collaborative forms outside the traditional construction activities. Abraham from programme management continues:

> … this kind of programme can be seen as an opportunity to apply for money that might be the difference between if you dare to change or not (...) this money could be seen as stimulation to actually go through with your idea.

Enrolment: Time to Make a Stand

To further stabilize the situation, the initiators needed to anchor the other actors' position in the SIP and motivate them to accept the roles and relationships that was given to them. This is what Callon (1984) described as the moment of enrolment in

which multilateral negotiations, trials, and tricks are needed. While this is one of the most crucial moments in the establishment of the SIP, it comes down to the engagement of both the actors of change and academia. The whole idea of the SIP builds on a bottom-up approach where these key actors are supposed to collaborate in new forms to be able to influence how to do business and collaborate over the traditional interfaces of construction activities. For this to happen, the SIP required a wide support from actors of change in terms of companies and organisations that are spread throughout the value chain. It ranges from governmental authorities and municipalities in the early stages, to facility and operations management at the other end of the construction process. However, due to the problem of downpipe-think and intra-organizational development of construction activities, the engagement of academia is crucial for the SIP to produce sustainable solutions that are beneficial for the construction industry, and not only the sole actors involved in the programme.

In 2014, the initiators submitted their first application to develop a SIP targeted at the Swedish construction industry but were denied funding from the funding agencies. The initiators did not manage to enrol enough key actors to support the SIP and could not show a united front for the funding agencies. Even if this was not the only reason for the application to be rejected, it became clear that the actors involved in the earlier moments of the process did not fully understand their roles in the SIP and how they were supposed to engage. As described by Bart, one of the initiators:

> …'but how are we supposed to engage?' That is what I felt was the resistance from the actors. The fear, or maybe not the fear, but they wanted to stand next to the side-line for a while and be like - 'well, let's see what happens with this.' You know, they sat with their arms crossed and 'well, run this for a while and we will see if we engage or not'.

Mobilization of Allies: The Importance of Reliable Spokespersons

While both the actors of change and academia struggled to understand their intended role in the SIP, the funding agencies though that the scope of structurally changing the construction industry was a little too broad. In what we have chosen to call the second cycle of translation, the programme scope needed to be modified. Among many things, this included a modification of the problematization where the importance for structural changes was placed in relation to both the global, national, and societal development goals. The focus on digitalization and digital transformation - that is, the integration of the three previous agendas relating to BIM, GIS, and IP - was put forward as the centre of the programme. Now, the short-term focus was to strengthen the industry's digital competence while the scope of structurally changing the construction industry, by facilitating inter-organizational collaboration outside traditional construction activities, was emphasised as a more long-term goal.

Finally, to increase the reliability of the SIP, more actors needed to be enrolled in the programme. So far, the actors involved in the previous moments of this translation process had only been represented by a few individuals. In this moment of the translation process, it became important that these individuals were representative and trustworthy spokespersons for the group they represented, for them to mobilize their allies (Callon, 1984). In the second cycle of translation, more actors were enrolled, were CEOs from some of the larger organisations in the construction industry showed their support and willingness to participate. Now, the SIP had strong enough support with representative spokespersons from both the actors of change and academia, which led to the enrolment of the funding agencies and approval of the SIP.

DISCUSSION

In this article, we set out to analyse and describe how a strategic innovation programme (SIP) was established and what role key actors play in this process. By using the translation process as an analytical frame, it is shown how the immediate role of the key actors - that is, the actors of change and academia - is to represent a stable network for the funding agencies to be able to fulfil their role of funding the SIP, and thereby support the development of the industry. However, since the initiators did not fully manage to get the key actors to accept their roles, because they did not really see the benefits that the SIP was offering, the mobilization of allies (key actors) was untimely. When the initiators tried to mobilize the funding agencies, by sending the application the first time, the key actors had not yet accepted their roles in the network. Even if the actors of change saw the need for digitalization, they were still more aligned with existing industry initiatives for R&D projects, and therefore hesitant regarding the proposed SIP. However, this moment of 'wait and see', or reactive stance among actors is well known in the industry (see, e.g., Löwstedt and Räisänen, 2012). Thus, it can be argued that the first cycle of translation, and the initiators original idea of using the SIP as something that should facilitate structural changes of the industry, was too abstract and not appealing enough for the key actors.

When the initiators revisited the problematization, the focus changed from structurally changing the industry to digital transformation and how to make use of digitalization. Thus, the short-term focus was on strengthening the industry's digital competence, whereas the structural transformation became a more long-term goal. Therefore, it can be claimed that this translation was more recognized by the actors of change because they have a tendency to look more at short-term benefits than long-term goals (see also Jacobsson et al., 2017). Thus, the initiators managed to create a sense of urgency by comparing the level of digitalization with other industries, at the same time as the SIP became an OPP to solve the more immediate problem with lacking digital competencies. This reframing of the problematization facilitated the enrolment of CEOs for larger firms, which implies that the initiators became more representative as spokesperson for the industry's interests when the revised application was sent to the funding agencies. However, getting the SIP approved was just the first step towards the long-term goal of a structural change of the industry. The devices, in terms of collaborative R&D projects, are what holds the key actors in place due to the opportunities to get funding for collaborative activities outside traditional construction activities. If the more long-term goals would be reached, the next challenge in the proceeding translation process is that the collaborative R&D-projects would, in some sense, contribute to the long-term goals.

CONCLUSION

In this article, an SIP in the Swedish construction industry is addressed as a vehicle to facilitate system-wide innovation and change. However, this paper has shown how the emergence of a SIP is not a linear process, and how it includes the involvement of both initiators, key actors, and funding agencies. By drawing on the translation process (Callon, 1984) as a perspective for analysing the emergence of the SIP, it can be concluded that the immediate role of key actors is to represent a stable network of heterogeneous actors for the funding agencies to support and fund the SIP. While this is the immediate role in the emergence of the SIP, this is still just the first step towards structurally changing the construction industry. Future challenges lie in how the key actors can become more proactive, learn how to collaborate outside traditional

construction activities, and engage in collaborative R&D projects to ultimately achieve the SIPs long-term goal of using digitalization to structurally change the way the construction industry collaborates and does business.

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