# Developing and implementing 'sustainable' work practices within inter- organisational projects

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## Abstract

The paper proposed here focuses on how ongoing interaction practices in infrastructure projects between a supplier and a key customer are impacted by attempts at "*becoming sustainable*". We direct the paper towards recent attempts by B2B scholars to address the 'practice turn' in social sciences (Tidström and Rajala, 2016; Peters and Pressey, 2016; Carter et al, 2017; Pedersen et al, 2018) by using practice theory and the IMP business interaction approach (Harrison, 2007; La Rocca et al, 2017). The empirical setting, a 27 kilometre sub-sea road tunnel named 'E39 Rogfast Pluss', which without any mitigation will produce 500,000 tonnes of CO2, is the first time the two actors have 'tried out' making a large infrastructure project sustainable.

**Key words: interaction, practices, construction, sustainability, objects**

## 1.0    Introduction

Current empirical studies of sustainability practice in networks highlights the role of the consumer in sustainable consumption (e.g. Connolly and Prothero, 2003; Kjellberg and Stigzelius, 2014) and the valuation of green products (e.g. Reijonen and Tryggestad, 2012; Fuentes, 2013), the development of green products in network settings (Waluszewski, 1997; Håkansson and Waluszewski, 2002a), how networks respond to external environmental regulation (Harrison, 1999; Veal and Mouzas, 2012); how 'green markets' can be made governable via regulation (d'Antone and Spencer, 2014; Harrison, 2014; Mattsson, 2016) and how market arrangements for trading carbon are designed and operated (e.g. Callon, 2009; MacKenzie, 2009). The paper proposed here focuses on how ongoing interaction practices in infrastructure projects between a supplier and a key customer are impacted by attempts at "*becoming sustainable*". The empirical setting, a 27 kilometre sub-sea road tunnel named 'E39 Rogfast Pluss', is the first time the two actors have 'tried out' making a large infrastructure project sustainable.

The 'E39 Rogfast pluss' tunnel will become both the world's longest and deepest sub-sea tunnel. It is located along the west coast of Norway. It will be 27 km long and will reach 392 metres below sea level, with an approximate cost of 16.8 billion Norwegian kroner (1.9 billion euro). After several years of planning and design work, the Norwegian Parliament approved the Rogfast project in May 2017. Construction is starting in February 2018, with opening for traffic in late 2025. However, the construction and maintenance of the project will generate greenhouse gas emissions exceeding 500,000 tonnes of $CO_2$. This is equivalent to 1% of Norway's total annual emissions. The supplier, the engineering consultancy 'ECC' and the customer, 'Client', wanted to try and make the project sustainable.

The purpose of this paper is therefore to discuss how inter-organisational engineering practices were challenged and changed in order to reduce the carbon footprint of a large infrastructure project. In other words, how to create 'sustainable engineering practices' by developing and attempting to change existing interaction practices using one key project. In so doing, the paper addresses recent attempts by B2B scholars to address the 'practice turn' (Schatzki et al, 2001) in social sciences (Tidström and Rajala, 2016; Peters and Pressey, 2016; Carter et al, 2017; Pedersen et al, 2018) by using practice theory and the IMP business interaction approach (Harrison, 2007; La Rocca et al, 2017). We take a specific look at a theme that has emerged during the data collection and analysis process: how attempts to change interaction practices are impacted by the existing objects operating within the practices.

## 2.0 Theoretical perspectives

Interaction between customers and suppliers incorporates the various business activities that are performed on a day-to-day basis (Håkansson and Waluszewski, 2013), including both on-going current relational challenges and future potential business solutions. This interaction is made up of sets of interaction practices. In any particular inter-organisational practice, at least some objects are contributing to forming the practices, as they are constitutive elements of the same (Sandberg and Tsoukas 2011:343). In other words, some objects contribute to steer the practices towards attainment of certain goals. Objects can be considered as a form of 'inter-cognitive representation' in business networks (Mouzas and Henneberg, 2015). In this paper we focus specifically on boundary objects.

Recent studies of practices and objects in the Strategy as Practice approach provide a fine-grained analysis of the multiplicity of objects and tools involved in coordination and scoping practices, e.g. in Kaplan's (2011) Powerpoint case. Research investigating their actual rather

than theoretically prescribed role of objects and tools has emphasized their role in knowledge sharing (Jarzabkowski and Spee, 2009). Contemporary studies have also borrowed concepts from organisation studies in developing understandings of the role of objects.

In brief, we can distinguish three main types of objects; boundary, epistemic and technical (Ewenstein and Whyte, 2009). Star and Griesemer's (1989, p.393) well-known definition of boundary objects requires these to be, "…*both plastic enough to adapt to local needs and the constraints of several parties employing them, yet robust enough to maintain a common identity across sites*". They operate at the boundaries, are relatively stable and facilitate collaboration. *Technical objects* serve as stable infrastructure in the 'background' (Ewenstein and Whyte, 2009). Objects such as prototypes (Carlile, 2002; Bechky, 2003), engineering sketches (Henderson, 1991) and standardized reporting forms (Star and Griesemer, 1989) enable interaction and the coordination of practices and knowledge (Carlile, 2002).

Moreover, objects can shift in status over time within inter-organisational settings. For example, McGivern and Dopson (2010) discuss how objects become transformed and re-transformed across the lifecycle of a network established for radical innovation via the relative power of different network actors. Analysing the relations between multiple objects when attempting something new emphasizes how the bundling of artefacts helps managers to reinforce patterns of action, extend control efforts and handle conflict (Cacciatori, 2012; Scarbrough et al, 2014). How do multiple objects, related to one another as a "system of artefacts" (Cacciatori, 2012:1599) enable and constrain attempts to change existing interaction practices in incorporating sustainability?


**3.0 Research design**

The paper is underpinned by a qualitative research strategy. Specifically, we have selected the case study research methodology. Case studies embed an object in context, and allow depth, detail, and richness of data (Yin, 2009). The selection of the case was based on a combination of ongoing research connections, empirical access and theoretical interests (Eisenhardt and Graebner, 2007).

Carefully designed case study data collection and data analysis processes take into account validity concerns and enable theory building (Eisenhardt and Graebner, 2007; Yin, 2009) via "*observing patterns within systematically collected empirical data*" (Eisenhardt and Graebner, 2007: p. 30). The paper is part of a larger empirical research project that has been running from January 2015. It is an ongoing real-time study over 2 years with a mixture of qualitative methods, including participant observation, observation and interviewing. Specifically, the

paper will be based on a data set of 40 interviews conducted with various members of the project team during 2017 (data collection is ongoing), supplemented with both meeting observations and participation during 2015-2016, and extensive secondary material (1GB), such as reports, spreadsheets, etc.

The case is a 'polar type' case; it has an extreme or unusual nature which should reveal interesting patterns in the data (Eisenhardt and Graebner, 2007: p. 27). We have used multiple interviewers and interviewees in the data collection process. The data has been summarized into readable visual formats, underpinned by case narratives. The authors are currently still conducting a careful analysis of patterns within the case. At the start of the project, interaction practices were the specific focus. Specifically, how sustainable engineering practices were developed and stabilised over time.

Over time, a theme emerged in the data in terms of how practices and objects meet and clash. For example, an idea could in the end be judged as being 'too different' from the norm, and clashing with the normal 'ways of doing things'. Sustainability ideas often conflict with the traditional solutions as documented within the client's handbooks, national or European codes.


**4.0 Case summary**

The two actors, ECC (engineering consultant) and Client (the customer/owner), wished to "*try out*" making the Rogfast tunnel 'sustainable'. It was against a background of national and international political actions, such as the Norwegian Parliamentary statements on Climate Change (2015) and the Paris Accord of 2015. No clear targets were yet in place, but it was assumed that some legal framework for action would be agreed. Moreover, neither actor had any experience in sustainability for a project of this magnitude. The initial idea was to investigate if the project could become energy and carbon neutral, hence the name 'Rogfast Pluss'.

In 2014, ECC were awarded the engineering design contract for assisting Client in preparing bid documents [contracts] for the Rogfast tunnel. At this time, no special efforts regarding sustainability were required. But there was a requirement with regard to "aesthetics". The aesthetics requirement was viewed as "*the project should be modern...fresh, new, state of the art...*" When the engineering design work started, the project team organised an 'art group'. They were asking questions such as "*how do we treat the terrain, the landscape, how do we design the bridges to all have the same look, the quality in the aesthetics...[involving] architects, structural people, environmental issues people...*".

The ECC team defined "*sustainability*" as a factor within aesthetic quality. Initial ideas included whether the project could be CO2 neutral and "*Pluss...that we would harvest more energy than we used...*" Over time it became clear that this was too ambitious. Nevertheless, ECC engaged in idea selling towards Client. "*Super-early in the process, in the second meeting with the client...they accepted it...it was sold in 'just like that'...*". There was an important role for the Project Manager here: "*He is very experienced...He has seen everything... [the attitude was]...it could be fun to do something new...the concept was decided then, the possibilities to become a 'Pluss project', and the process has evolved*". The question was how to interact together in a different way to make sustainability a reality.

As neither actor had any experience in sustainability for a project of this magnitude, a special process was designed in order to find, evaluate, and implement ideas to reduce the carbon footprint. An innovation process, consisting of 10 workshops and involving more than 100 people from both organisations was conducted. More than 500 ideas were collected, which was later reduced to 33 key ideas to be implemented in the contract. The focus was to generate sustainable engineering design solutions by using the in-house Innovation Programme. "*The framework we set out for ourselves was to ask 'is it possible to have a Pluss project' for Rogfast... we were looking at technology, at clean energy....the [important] balance was ideas around (i) generating energy and (ii) reducing the use of energy* [materials and the actual use of the tunnel]…"

At the same time, a working 'Climate Budget' was devised using Life Cycle Analysis (LCA) costing of greenhouse gas emissions. The work was based on the multiple, conflicting guidelines and calculators – objects - available for making emission calculations for infrastructure projects. There were no standard methodologies available. The resulting estimates were incomplete, but sufficient to identify the main contributors to emissions. ECC performed this activity in-house, and then took the resulting documentation and spreadsheets into discussions with Client.

The sustainable engineering design solutions were then quantified in terms of potential emissions reductions against the baselines for the 'business as usual' solutions (ways of working, materials used, etc.) within the Climate Budget. This was new: such a budget would normally be produced at the end of a project process, without consequences or requiring actions. This was performed in iterations, such as making calculations at ECC, discussing these with Client, revising the initial versions, or rejecting possible solutions, etc. The anchoring needed in both organisations, in terms of demonstrating (often conflicting) cost-benefit trade-offs, were ongoing. Ideas for sustainable solutions often conflicted with

the traditional solutions documented within the client's handbooks, national or European codes (standard technical requirements). Nevertheless, it was possible to discuss "*how much are we willing to pay for a low-emission tunnel?*".

Over time the efforts were materialized into the contracts underpinning the project. Again an iterative process took place, in which new ideas were proposed, calculated and discussed between ECC and Client. The latter agreed to some changed standard contract requirements and introduced a new way to evaluate bids. Both were attempts by the Client to incentivise contractors and sub-contractors to act differently. For example, the two actors have worked through where in the contract to place specific requirements for emissions-saving solutions, such as low carbon concrete and 70% recycled steel, alongside research efforts to be able to write in the new requirements. Savings due to these two materials alone amounts to 24% on the entire projects carbon emissions.

In the building phase of the tunnel (from February 2018), the new contract and new design – manifestations of the engineering practices - are to be materialized. At least there is a hope for this; in this implementation phase, the engineering practices performed by other actors also have to change in order to claim that 'sustainable engineering practices' have been developed. In other words, other network relationships will be impacted in coping with the consequences of a sustainability-friendly contract. As such, changes to the interaction practices between ECC and Client will require changes to the practices of other actors in the network that is formed to build the Rogfast tunnel.

**5.0 Discussion**

This brief outline hints at many objects within the interaction practices between ECC and Client as the Rogfast Pluss project works through numerous iterations within and across the two organisations. These include technical drawings, technical standards at a national and European level, a Climate Budget, Norwegian Parliamentary statements on Climate Change, multiple contracts, and Client's handbooks.

Objects such as Client's handbooks set the minimum quality requirements and embed maintenance norms. In this way, they both establish a lower boundary that cannot be challenged without running the risk of 'illegal' solutions, but also enable possibilities for sustainable design solutions by establishing a baseline by which alternatives can be assessed. New ideas can be effectively stopped because of clashes with the handbooks; it can be a means for actors to use to block new ideas, especially if a lack of anchoring of the ideas is

perceived by those involved. In other words, attempts to develop existing practices in numerous iterations can be negated by such heavily stabilised and powerful existing objects. The multiple contracts under discussion are potential enablers; they are the means by which Client can require contractors to enact sustainable practices. It is a way to 'define the new rules of the network game' – a requirement for sustainability – which also enables the enactment of network practices.

The Climate Budget is effectively a work-in-progress measurement system. It plays an essential role as it summarises and calculates both the sustainable solutions and their consequences. It provides documentation of the same. It underpins changes to both existing practices and objects by being essential to discussions between Client and ECC. Moreover, trade-offs between 'sustainability' and existing criteria such as 'cost', 'technical safety' and 'time' can be represented. Part of the issue here is how to make 'sustainability' a "normal" criterion. Objects such as technical drawings and CAD simulations underpin the work between the two organisations.

Overall, the empirical material exemplifies multiple, related objects that can be epistemic, boundary, and technical respectively (Ewenstein and Whyte, 2009) that are a "*system of artefacts*" (Cacciatori, 2012:1559). The objects can variously (i) '*set the scope*' by defining the acceptable technical boundaries and ambition level (e.g. Client handbooks), (ii) '*enable/disable sustainable practices*' (e.g. contracts with sustainability requirements), and (iii) '*facilitate monitoring*' of the impact of sustainable practices (e.g. Climate Budget).

## References

Bechky, B. A. (2003). Talking about machines, thick description, and knowledge work. *Organization Studies,* **27**, 1757-1768.

Cacciatori, E. (2012). Resolving conflict in problem-solving: Systems of artefacts in the development of new routines. *Journal of Management Studies*, **49**, 1559-1585.

Callon, M. (2009), Civilizing markets: Carbon trading between in vitro and in vivo experiments. *Accounting, Organizations and Society* 34/3-4: 535-548.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science,* **13**, 442-455.

Carter, C.R., Kosmol, T. and Kaufmann, L. (2017). Toward a supply chain practice view. *Journal of Supply Chain Management*, 53(1), 114-122.

Connolly, J. and Prothero, A. (2003). Sustainable consumption: Consumption, consumers and the commodity discourse. *Consumption Markets & Culture* 6/4: 275-291.

d'Antone, S., and Spencer, R. (2014). Concerns and marketization: the case of sustainable palm oil. In Geiger, S., Harrison, D., Kjellberg, H., and Mallard, A. (2014). *Concerned Markets*. Edward Elgar Ltd, UK.

Eisenhardt, K. M., Graebner, M. E., (2007). Theory Building from Cases: Opportunities and Challenges. *Academy of Management Journal* 50(1), 25-32.

Ewenstein, B. and Whyte, J. (2009). Knowledge practices in design: The role of visual representations as `epistemic objects'. *Organization Studies*, **30**, 7-30.

Fuentes, C. (2013). Green Materialities: Marketing and the Socio-material Construction of Green Products. *Business Strategy and the Environment*, online.

Harrison, D. (1998) Strategic Responses to Predicted Events: The Case of the Banning of CFCs, *unpublished PhD dissertation*, University of Lancaster, UK.

Harrison, D. (2007). Strategy as Practice across Firm Boundaries. *Paper presented at the 3rd IMP Journal Workshop,* Trondheim, Norway, May.

Henderson, K. (1991). Flexible sketches and inflexible data bases: Visual communication, devices, and boundary conscription objects in design engineering. *Design Engineering, 16*, 448-473.

Håkansson, H. and Waluszewski, A. (2002a). *Managing Technological Development: IKEA, the Environment and Technology*. London: Routledge.

Håkansson, H., and Waluszewski, A. (2013). 'A never ending story - Interaction patterns and economic development'. *Industrial Marketing Management, 42*(3), 443-454.

Jarzabkowski, P. and Spee, A. P. (2009). Strategy tools as boundary objects. *Strategic Organization*, **7**, 223-232.

Kaplan, S. (2011). Strategy and Powerpoint: An inquiry into the epistemic culture and machinery of strategy making. *Organisation Science*, **22,** 320-346.

Kjellberg, H., and Stigzelius, I. (2014). Doing green: environmental concerns and the realization of green values in everyday food practices. In Geiger, S., Harrison, D., Kjellberg, H., and Mallard, A. (2014). *Concerned Markets*. Edward Elgar Ltd, UK.

La Rocca, A. Hoholm, T. and Mørk, B. E. (2017). Practice theory and the study of interaction in business relationships: Some methodological implications, *Industrial Marketing Management* 60: 187-195.

MacKenzie, D. (2009) Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society* 34: 440-455.

Mouzas, S. and Henneberg, S. C. (2015). 'Inter-cognitive representations in business networks'. *Industrial Marketing Management*, **48**, 61-67.

Pedersen, J. H., Ellegaard, C. and Kragh, H. (2018). The Praxis of Studying Interorganizational Practices in B2B Marketing – A Critical Literature Review. Work-in-progress paper, Skagen Seminar, Middelfart, Denmark, University of Southern Denmark.

Peters, L. D. and Pressey, A. D. (2016) 'The co-ordinative practices of temporary organisations', *Journal of Business & Industrial Marketing*, 31(2), 301–311.

Reijonen, S. and Tryggestad, K. (2012). The dynamic signification of product qualities: on the possibility of "greening" markets. *Consumption Markets & Culture* 15/2: 213-234

Sandberg, J. and Tsoukas, H. (2011). Grasping the logic of practice: Theorizing through practical rationality. *Academy of Management Review*, **36**, 338-360.

Schatzki, T. R., Knorr-Cetina, K. and Savigny, E. von (2001) *The practice turn in contemporary theory*, *Rassegna Italiana di Sociologia.*.

Star, S. L. and Griesmer, J. R. (1989). Institutional ecology, translations and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, **19**, 387-420.

Tidström, A. and Rajala, A. (2016) 'Coopetition strategy as interrelated praxis and practices on multiple levels', *Industrial Marketing Management*. Elsevier Inc., 58, 35–44.

Veal, G. and Mouzas, S. (2012). Market-based responses to climate change: CO2 market design versus operation. *Organization Studies*, 33 (11): 1589-1616.

Yin, R. K., (2009). *Case Study Research: Design and Methods*. 4th edition. Sage.

Zeiss, R. and Groenewegen, P. (2009). Engaging boundary objects in OMS and STS? Exploring the subtleties of layered engagement. *Organization*, **16**, 81-100.