Learning in Planning: how knowledge is generated and acquired in planning large transport projects

(Work in progress, please do not cite)

Introduction

During the long process of decision-making on large transport projects, there are many moments of change and non-change; of adaptation or non-adaptation to changing circumstances and ideas. These moments of adaptation reflect moments of learning and different types of adaptation can be seen as different types of learning. This article explores the adaptive capacity in the decision-making process on large transport projects using organizational learning theory. Characteristic of these large transport projects, and why they are so interesting to research, is that they enter the decision-making process as solutions (Priemus, 2008) and have a large impact on budgets and livelihoods. Although these projects are meant as answers to certain problems, they are usually not the product of a comprehensive problem driven search. And if the main goal is getting the plan through decision-making with as few changes as possible, then it becomes difficult to organize a proper learning cycle within the decision-making. The adaptive capacity of the process is severely reduced. As key hypothesis, we argue that if this learning process is not properly organized and the adaptive capacity is too restricted, the decision-making process provides unbalanced decisions and looses important strategic value.

Large transport projects are typical examples of complex projects dealing with many interests and conflicts. In addition, these projects have long decision-making processes and planners and decision-makers are under continuous pressure of speeding the process up. For these reasons, many countries have special laws for such projects. As mentioned these transport projects usually enter the decision-making process as solutions and therefore the focus lies on getting the project through the process with as less changes as possible. Often this also means they have strong and powerful advocates who have a lot of vested interest in the main project proposal. Although there are many different actors involved in the planning of large transport projects, the process of decision-making can be seen as one loose organizational structure that is able or not to learn; that is able or unable to adapt. Large transport projects are special, but at the same time they are archetypical examples of complex large projects. Therefore they are very suitable for case study research into the organization of the learning process in large projects in general.

This paper attempts to bring the fields of organizational learning and mega projects together in order to create the concept of adaptive capacity in decision-making. First, there are two specific elements that are at the core of the organizational learning literature (Miner & Mezias, 1996) that we will discuss: incremental versus radical learning, and simplification and specialization strategies. Generally learning

takes place in small incremental steps that are designed to improve day to day routines. However, sometimes more radical shift is crucial for creative solutions or even organizational survival and therefore institutional practices and objectives need to be changed. Currently, there is a consensus that both types of learning are important depending on the context. These two types of learning or change will be supplemented with two other types: zero learning and triple loop learning. The second element of simplification and specialization is the type of strategy chosen to deal with new experiences learned from interaction with the environment. The organizational adaptation strategy to new input from its environment typically falls into either the category of simplification or specialization or both (Levinthal & March, 1993). Simplification refers to the reduction of the complexity of the experience into elements that are similar to the organizational structure. Specialization refers to the learning that takes place in selected parts within the organization. Learning takes place in those parts of the organization where the problems occur most dominantly.

Although mega projects, or large transport projects differ from one to another, a conventional approach to the planning of transport projects can be distilled (Bruzelius, Flyvbjerg, & Rothengatter, 2002; Flyvbjerg, 2007; Flyvbjerg, Bruzelius, & Rothengatter, 2003). It is still strongly determined by rational planning within a positivistic framework. Decisions are to be made on the basis of numbers and these numbers are considered value-free. A project is often researched, designed and appraised by the same organization and information often becomes contested. Decision-making becomes a 'yes-no' game instead of process in which learning takes place. Although literature on infrastructure projects is still mainly focused on cost and time overruns, and public-private partnerships there is an increasing focus on knowledge and the role it plays in planning projects. However, a focus on the adaptive capacity of the decision-making process on large transport projects is still to be done.

In the first section, the literature on learning processes is reviewed. The second focuses large transport projects and how the ideas developed in the first section apply to these projects in general. To illustrate the ideas developed in this section, the third part will provide one projects as example and provides the empirical analysis. The final section synthesizes the findings and identifies possible improvements.

Organizational Learning and Adaptive Capacity

In the study of learning and knowledge within organizations, four fields can be indentified (Easterby-Smith & Lyles, 2005): organizational learning, the learning organization, organizational knowledge and knowledge management. In figure 1, the fields are mapped on the dimensions of process-content and theory-practice. The learning organization literature focuses on the practical improvement of an organization's learning capabilities. The more abstract and theory driven counterpart is the organizational learning literature. The organizational knowledge literature concentrates on which knowledge is necessary for a good functioning organization. Its practical counterpart is the knowledge management literature that aims to let organizations deal and manage with information streams. Because the decision-making process

as a loose organization of study is of an abstract level, this article will concentrate on the organizational learning theory.

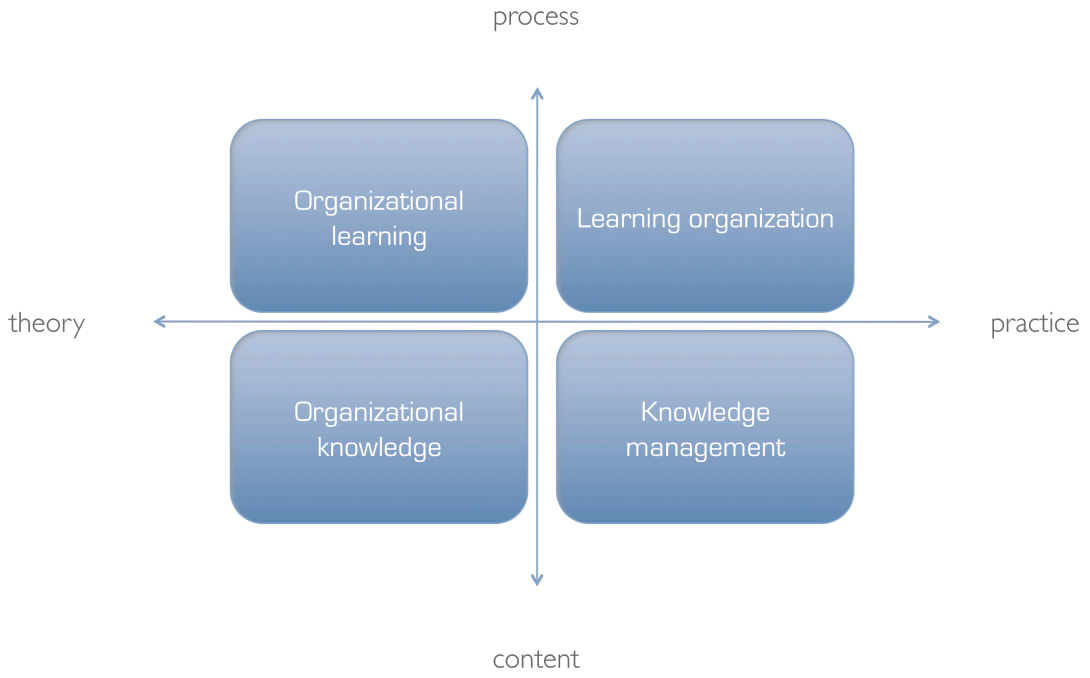

Figure 1: mapping studies in learning and knowledge within organizations (Easterby-Smith & Lyles, 2005)

Over the last forty years, roughly two main streams can be distinguished in the literature on organizational learning (Miner & Mezias, 1996). The first field perceives learning as an incremental process and has evolved out of the behavioral science. The second stream argues that this incremental learning process is not enough and that more radical learning is essential to not loose out to the competition. In other words, making radical changes at the right time is crucial for organizations to not become outdated or out of touch with a changed environment.

Incremental learning is based on the observation that organizations usually operate on the basis of standard procedures. When performance is unsatisfactory, a search for problem-solution combination is initiated. Thus an organization evolves in small steps (Cyert & March, 1963). However, an organization, including the people within the organization, is limited in its access to information, time and cognitive abilities (March & Simon, 1958; Simon, 1991). It is therefore bounded in its ability to rationally respond to complex problems. This is a modification on the paradigm of rational choice: human beings always make rational choices on the basis of full information. Building forth on this idea, and transferring it to decision-making, Lindblom argues that governmental decision and policy making is done in an incremental manner. Because of the limitations, organizations choose a Successive Limited Comparison approach as the main way to organize policy change. Only a limited amount of alternatives are selected and analyzed, neglecting possible outcomes, potential policies and affected values (Lindblom, 1959). However, as "poor as it is, incremental politics ordinarily offers the best chance of introducing into the political system those changes and those change-producing intermediate changes that a discontented

citizen might desire" (Lindblom, 1979: 521). This idea of incremental changes that might not be the best or most rational, is a break from the at that time traditional Rational Comprehensive approach that assumes a comprehensive analysis of all the options and thus enables people make the best, rational choice.

The second stream of literature on organizational learning revolves around a concept generally characterized as radical learning (Miner & Mezias, 1996). Key to this approach is that organizations need to reinvent themselves in order to survive strong changes in the society and economy. The start for thinking about radical thinking was given by Argyris and Schön (1978), who identified two types of learning. Single-loop learning related to of the incremental learning mentioned above in the sense that it is based on detecting and correcting errors, while continuing present policies and within the present objectives. Double-loop learning, or radical learning, involves an adjustment of the organization's policies, objectives and institutional practices. Argyris and Schön argued that for many problems organizations face, double-loop learning is essential. The Apple company might be a good example of an organization that double-loop learned at just the right time. Being a forefront runner during the beginning of the digital age, it became marginalized by Microsoft during the beginning of the nineties; this was partly because its inability to renew itself (Crossan, Lane, & White, 1999). However, it made the change from being a company that was mainly producing high-end personal computers to a design company that makes digital lifestyle products. It was a second-order learning that was crucial for the survival of the firm.

In addition to the first and second-loop learning, the concept of triple-loop learning has been developed in which the "organization's mission, vision, market position and cultures are challenged" (Sun & Scott 2003: 203). This means that it is not only the present context that is questioned, but also the historical and social context in which the practices of the organization came about. A proper example might be the banks that have recently been saved by their national governments. They will, hopefully, not only look at future opportunities, but also how the problems came about. For instance, this could mean refuting the bonus cultures and limiting or banishing high-risk bearing loans. Following Kenny (2006), it may well be that triple-loop learning will have consequences at higher levels in the organization, and that it will cause a rupture in the existing political and power structure.

Similar to these loops in learning, Kemmis and McTaggart (2000) speak of three forms of inquiry for individual learning: technical, practical and critical (Kenny 2006). Technical inquiry looks at increasing efficiency in an incremental manner and is therefore similar to the first order learning. It is concerned with improving current practices. It is interested the means but not the objectives. In contrast, practical inquiry is interested in challenging the means and the objectives. It searches for a reflection on different perspectives of the process and the ends. It challenges the objectives and practices, and therefore related to not only first but also partly to second order learning. Critical inquiry, the third form, is related to second and thirds order learning as it challenges not only the means and the objectives but also the rationale behind the mission and strategy of the organization. It addresses the basic assumptions, and asks: why are we doing what we are doing and is it still appropriate to take these actions. It takes into

consideration the context and environment in which the organization exists and whether the ideas about this environment are still correct.

As Kenny (2006) points out, these forms of enquiry or these learning loops correspond well to the three cultures within a learning organization: incremental learning, adaptive learning and generative learning (Table 1). An incremental learning culture aims to improve the efficiency within the organizational structure. This is of course incremental or first loop learning. An adaptive learning culture aims to adapt practices to changing circumstances in the context. It is related in part to the double-loop learning, although it does not necessarily mean that the objectives of an organization are challenged. A generative learning culture means that an organization is truly focused on renewal and researches ways to improve the organizational practices with a willingness to change them. This can also be considered second order learning, although if it also leads to reflection on the historical and social context, it also concerns triple-loop learning.

<table>
<tr><th>Organizational Learning</th><th>Learning Culture</th></tr>
<tr><td rowspan="2">single loop</td><td>incremental</td></tr>
<tr><td rowspan="2">practical</td></tr>
<tr><td>double loop</td></tr>
<tr><td>triple loop</td><td>critical</td></tr>
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Table 1: Organizational learning loops and learning cultures

In general, organizations prefer enhancing performance by incremental changes. And many incremental steps might be the fastest way for bringing about very significant transformations (Lindblom, 1979). However, the bounded path of small modifications can also create a blind spot for important changes in the marketplace or in society in general. Incremental changes lead to improvements that further specialize sections of the organization, enabling a higher productivity. However, it also means leaving other types of knowledge and experience behind and perhaps even creating a path dependent lock-in; the chosen path of specialization constrains an organization's ability to adapt to changing environmental circumstances (Nelson & Winter, 1982). In addition, the organization starts to create a bubble in which it functions. Processes that were first accepted as normal are now seen as exogenous to the functioning of the organizational unit. They are less equipped to deal with these exogenous processes and thus become less adaptive to changes. Again they have locked themselves in. For instance, a project organization can become very engineering focused in an attempt to reduce and deal with technological risk. This specialization could mean however, that the social environment is seen as an exogenous threat to successful management of the project. It is no longer a integral part of project planning but an external threat.

Three levels and cultures of learning have been discussed. However, one prominent level remains to be considered: zero learning. This occurs when "fresh imperatives arise, yet members fail to take corrective action" (Romme & van Witteloostuijn, 1999: 440). This type of learning occurs often in organizations, but in most cases has no severe observable consequences. Zero learning also includes institutional routines (Bateson, 1973) in which new information is routinely acquired or there is an automatic response to a stimulus. An example is the closing of the eyelids when an object suddenly comes very close by. However, our interest is in zero learning as the moments where adjustment should be possible, perhaps even desirable, but that no corrective action is taken. Continuing on the eyes example, I it would be the same as taking lenses but being unable to correct the automatic response of the eyes. Effectively, the inability to adjust this routine excludes the possibility of wearing lenses.

In essence, learning takes place between the organization and its environment. Can an organization adapt to an environment; can it change its environment; or is it so isolated from its environment that it sets its own boundaries. In our definition for the analysis of large transport projects, learning is choosing to adapt to changes in the environment in which the organization operates and responding to new opportunities and threats. In one way, our definition is close the interpretation used when analyzing absorptive (Cohen & Levinthal, 1990) and adaptive capacity (Folke et al., 2002; Folke, Hahn, Olsson, & Norberg, 2005; Hagmann & Chuma, 2002; Shrivastava, 1983). Although the adaptive capacity terminology is often related to topics of ecology, it is nevertheless very relevant to the topic of the paper. "Systems with a high adaptive capacity are able to reconfigure themselves when subject to change without significant declines in crucial functions" (Folke, Hahn, Olsson, & Norberg, 2005: 452). This paper introduces the adaptive capacity concept to link theory of organizational learning to that of decision-making in general and on large transport projects in particular. Table 2 provides an overview of organizational learning terminology and its relation to the terminology developed to discuss the adaptive capacity of decision-making. Single loop learning means that the process can deal with incremental adaptations. Double loop learning stands for radical adaptations in the process. Triple loop learning indicates that the adaptive capacity makes socio-historical changes. Zero learning means that the adaptive capacity of the decision-making process has reached a lock-in where the system is unable to make adaptations to changing circumstances or new opportunities.

Above organizational learning theory has been discussed and developed into the idea of the adaptive capacity of the decision-making process. The next section will delve deeper into the literature on large transport projects.

Organizational Learning	Adaptive Capacity
single loop	incremental
double loop	radical
triple loop	socio-historical
zero	lock-in

Decision-making on large transport projects

In agreement with Priemus, it seems that most research on decision-making about large projects "tends to be dominated by the problem of cost overruns and disappointing operating results" (Priemus, 2008: 105). However, there are many more elements that are being researched. Next to the prominent books of this first decade by Altshuler and Luberoff (2003), and Flyvbjerg et al. (2003), other aspects have been analyzed, such as: contested information and shared knowledge creation ((De Bruijn & Leijten, 2007), risk management (Miller & Lessard, 2001), public-private partnerships (Koppenjan, 2005), and the role of aesthetics in decision-making (Frick, 2008)..

In one way, large infrastructure projects are still planed in a manner that is similar to the

Table 2: Organizational learning and adaptive capacity

approach from what Altshuler and Luberoff (2003) call the great mega-project era. In this post-war period, projects were mainly seen as engineering problems and thus most decisions could be left to engineers. Large projects are reduced to problems and solutions that are of a technical nature. For this reason, solutions, in the form of transport projects, come before a well constructed problem definition (Priemus, 2008). In agreement with the analysis of Altshuler and Luberoff (2003), it does seem that the decision-making on mega-projects has moved into the 'do no harm era', in which significant disruptions are avoided or mitigated. However, for successful decision-making, from the perspective of the project advocates, marginal adaptations are often necessary for creating consensus with oppositional forces such as the environmental movement.

Pivotal to the planning of mega-projects is the usage of information in the decision-making process. As has been shown for large transport projects (Altshuler & Luberoff, 2003; Flyvbjerg, 2007; Flyvbjerg et al., 2003), traffic and costs forecasts for large transport projects have been structurally over- and underestimated respectively. And although the techniques for forecasting have increased, this has not led to reduced underestimation of the cost. Reviewing projects over the last century, Flyvbjerg et al. (2002) come to the conclusion that there is no significant support for the hypothesis that some sort of collective learning takes place of time. They conclude that: "Strong incentives and weak disincentives for underestimation may have taught project promoters what there is to learn, namely, that cost underestimation pays off" (Flyvbjerg et al., 2002: 286). A similar story is told about the overestimation of traffic (Flyvbjerg, Holm, & Buhl, 2006). On the basis of these wrong forecasts, projects are presented as adequate solutions for problems that they cannot solve once constructed. As Wachs (1990) points out: "All three sets of actors – technical forecasting experts, advocates for a particular point of view, and politicians – gain by pretending that a forecast is an objective scientific statement, and gain even more if it is also an effective statement of advocacy in a contest over resources". Creating quasi-objective numbers is thus an important element of the arsenal advocates of a mega-project.

Example: High Speed Straight Line

This section of the paper will discuss a case study that will provide some empirical body to the theoretical discussion above. The HSL Zuid is a high speed train line that will run from Amsterdam to Brussels. The decision-making is very well documented in both political and professional reports as well as academic literature (Priemus, 2007; TCI, 2004b). The HSL first enters the public domain with the AmRoBel study report from 1977. This study explores the possibility of a high speed train connection between Amsterdam, Rotterdam and Belgium. And for a decade or so it remained on the agenda through the PCBA working group that was exploring the possibilities of high speed train connections between Paris, Cologne, Brussels and Amsterdam. In 1988 it is incorporated in the Dutch governmental structure plan about traffic and transport SVV2. And as a large project, the HSL Zuid was brought under the Spatial Core Decision procedure (PKB procedure). This procedure arranges the whole process of decision-making and ends with a definite spatial core decision on the route to be taken. In 1991, the starting report was presented as the start of the procedure. However, the report was found insufficient and not well enough thought through. That is why the government decided to withdraw the report. The new starting report was presented in 1994. The SCD procedure was finished with ratification by parliament in 1997. This ratification did not come without a fight as the political parties were split by different alternative routes and a power play by the prime minister was needed to get the politicians and his ministers in line with the official governmental preferred route. More will be discussed further below. After some difficulties with the tender for exploitation, it was eventually won by the consortium High Speed Alliance consisting of KLM (Royal Dutch Airline) and NS (Dutch Railways). An interesting note of thought here is that by the merger of KLM with Air France, the company has an almost monopolistic position on air and train travel to Paris. The tender for the infrastructure was also problematic with the tenders being a lot more expensive than the ministry was expecting. Eventually the project was cut up into several pieces, and it was clear from the outset that the project would cost a lot more than the original forecasts. The current state is that the project infrastructure has been finished in 2007, but there is a delay in exploitation because of the unavailability of trains and problems with the safety system. During the decision-making process the choice was made to use the new European ERMTS standard for safety system. This standard did not exist at that time. The late specifications of the standard led to the late delivery of the trains. Currently (01-March-2010), exploitation has commenced on a speed of 160 km/hr.

The plethora of problems with this and the other large projects in the nineties, led into the parliamentary inquiry (TCI, 2004a). This has become a major source for researchers. The paragraph will now continue with several important moments of learning during the decision-making process on the HSL Zuid.

Green Heart tunnel

Ever since the AmRoBel report from 1977, there has been a strong advocacy for the straight between Amsterdam Airport and Rotterdam as the crow flies. This route goes right through the Green Heart area, an open cultural landscape in between the large for cities of the Netherlands. During the debates in the nineties, when the idea of a high speed line became prominent again, an unexpected alternative gain

support among non-profit organizations and politicians. It was developed by a civil servant from the Ministry of Education, Willem Bos, who proposed a route next to existing infrastructure. An addition to this alternative, strongly supported by the municipality and chamber of commerce of the Hague was a stop in this city, where the Parliament and most ministries are located. While the Ministry of Transport remained a strong proponent of the first route, the Ministry of Housing, Spatial Development and Environment turned into a supporter of the second. The minister of VROM, Margreeth de Boer (PvdA/Labour party), had invested a lot of effort in policy for the protection of the Green Heart. It was also a personal motive as one respondent says: "It should have been obvious that it would be like this. It should have been obvious that because Jorritsma had won with the Betuweroute, and had won with Schiphol, Margreeth de Boer and the PvdA would have to do something" (Interview P19 HU Proefschrift). As several respondents stated, the tunnel was an element that saved the project. It was a second best solution that was acceptable to most parties. It gave both ministers what they wanted. The minister of Transport got her preferred route, the minister of VROM got to save her precious Green Heart, and the prime-minister got his prestige project with his cabinet intact.

Realizing that radical learning was problematic for the transport ministry, The Ministry of Spatial Development presented another alternative which was the preferred route, only with a tunnel underneath the Green Heart. This was a costly change to the plan. But money did not matter as much at that time. As one respondent notes: "they never worried about money, there was never any debate over the financing. It was mainly about the environmental impact." He goes on by concluding that: " The fact that there was never any talk about the financing, indicates the attitude of 'we have to do this project'" In addition, the finance was also in the hands of the main proponent of the direct line, the Ministry of Transport. This gave them a great levying power, which ensured that they could stick to the original plan. There was little incentive to change the project. There was thus little incentive for such radical learning to change the route and thus the goals and principles behind the project. Because the tunnel was an incremental change that did not change the route, it turned out to be acceptable for the Minister of Transport. There was thus an unwillingness to for double-loop learning, for radical change.

Minimal maximum speed

Another important factor, blocking the ability to adapt was the idée fixe of a design speed of 300km/hour. During the whole decision-making process, there was a rigid requirement that the train should be able to travel 300km/hour on the whole route. This had severe consequences for the alternatives because of the necessary radius of turns. It left very options for alternatives. As one respondent argued: "concerning the integration [of the project] , then you have to ask yourself: ok, do you have to travel 300 km an hour till the last station, or should you think about in a strategic manner. And we were thinking, between Brussels and Rotterdam 300 km/hour is fine, but between Rotterdam and Schiphol [Amsterdam airport] is such a short distance. When you would be able to reach three hundred you will already have to break. So that is bullocks anyway" (P12 HU Proefschrift). The 300 km/hr requirement was a political tool to limit the possible alternatives in the decision-making process. As Priemus concludes: "by rigidly maintaining the design speed requirement of 300 km/h, and by

including the preferred alternative in the 1994 Coalition Agreement, the cabinet was able to pass this choice through the political and social decision-making procedures without any serious problems" (Priemus, 2007: 639). Thus fact that the HSL enters the decision-making process as a solution leaves very little opportunity for radical learning and the main goal becomes to get a favorable decision about the project.

Financial compensation

An interesting moment of double loop or radical learning happened during the negotiations with Belgian partners. The Netherlands had a preferred root that went past the city of the of Breda and entered Antwerp from the north-eastern direction going straight through the environmental forest of Peerdsbos. This is a area where the Flemish environmental movement started and also a location for large houses where also a quite a few politicians lived. Thus, there was a large emotional factor. An additional problem was that other projects such as the Westerschelde or the IJzeren Rijn were also introduced in the discussion. There were old sentiments about older projects creating a lot of distrust between the partners. However, the biggest problem was a financial one. The preferred Dutch route would be relatively short within Dutch territory and a long distance on the Belgium territory. The preferred route by Belgium past Roosendaal would be the opposite. And the rule for international train projects is that the costs of the infrastructure and the exploitation are calculated by the kilometers that are travelled within each country. Ever a period of time a deadlock formed that had to be broken. There were two crucial moments creating the opportunity for a compromise. The first was an institutional change. As one respondent summarizes:

"And it was around that period [of deadlock] that Belgium federalized, creating a Flemish government that was now responsible for the spatial development and that was allowed to have international contacts and agreements on its own. There was a department of transport and mobility created in Antwerp, which had a minister and five people, so it had no bureaucratically structure. And they were smart people that were more inclined to look at the Netherlands and see what they could learn. They were understaffed and thus willing to use the work of our engineers as the basis of negotiations" (P19 HU Proefschrift).

The institutional change, with new people, was a key mechanism for reopening the negotiations in a manner that would allow a creative change. Another respondent explains how the negotiations continued:

"And the important breakthrough came when we said: we will look at the route Rotterdam-Antwerp and put all alternatives on the table. The main alternative that was preferred by the Belgians, through the harbor of Antwerp, and the route via Breda and along the highway through Peerdsbos. We will compare them like there is no border. So on all aspects: traffic, cost, economic, spatial development, and environment. We will act like there is no border and will determine which one is the best. And possibly we will talk about the distribution of the costs, because the route near Bergen op Zoom was jult a little bit of Belgium and a very large part of the Netherlands. And that one near Breda was a large part of Belgium

and a relatively small part of the Netherlands. It turned out, and that was our preference, that this last route was the cheapest option overall. So then we said: well then we are prepared to pay a certain amount to Belgium because we will get the best solution and it will not be more expensive for Belgium. But it will be better. And for the Netherlands it is a bit more expensive that our strictly our route, but it is still cheaper than the route preferred by the Belgians. So it was also a good deal for the Netherlands. And that is why the deal was then made so easily." (P24 HU Proefschrift).
The deadlock in the negotiations between Belgium and the Netherlands was thus solved by a change in the institutional structure of one of the partners and the radical innovation, double loop learning by shared knowledge creation and the innovation of compensating Belgium. So there were two specific enabling mechanisms at work to create double-loop learning: a conflict and a change in institutional context.

Blocking mechanisms for the adaptive capacity in planning large transport projects

A project starting as a solution already has some strong advocates. With transport projects specifically, the governmental body concerned with transport is very often a strong advocate. And in the HSL this was no exception. There is little incentive to look for problems that do not point into the direction of this solution. Alternative options or alternatives for a transport project will be perceived as a threat rather than another good option for the same investment of resources. Small changes can be adopted as they pose little threat to the project as a whole. This is why incremental or single loop learning often happen during the decision-making process. In the case of the HSL, the tunnel brought about an incremental change to the project that was sufficient to reduce political opposition to the project. The decision is often criticized as a waste of money. However from a process perspective it was necessary to move on. Radical changes, such as another route, were not possible and thus an incremental change was the only option in this case. In the 'do no harm, era', the incremental change is often a preferred one. The fact that there are very strong advocates, with strong political power, from the outset of the project is an important blocking mechanism for a more radical adaptive capacity of the decision-making process.

Another blocking mechanism is the selection of decision-making constraints. Careful selection of these criteria can be a very good excluding mechanism that blocks the adaptive capacity of the decision making process. In the case of the HSL, the criterion that the trains should be able to travel 300km/hr over the track was poured in concrete. Although there were attempts to discuss this criterion, that 250 km/hr might be enough; it was something that was fixed. However, this meant that a lot of alternative routes became impossible because of the restrictions that 300 km/hr places on the construction of the tracks and the turning radius. It created a lock-in supporting the preferred route, which basically was the straightest line possible. Thus the selection of demands or criteria is an important blocking mechanism of the adaptive capacity.

The problem of restricted learning is augmented by a lack of checks and balances. If the main advocates are also the principal decision-makers and the main financiers, than there is less incentive to consider other alternatives. So a non-complex organizational situation that is often seen as an ideal

planning situation can have severe perverse effects: an incomplete appraisal of alternatives, a tendency to construct favorable forecasts and loosing the possibility of double or triple loop learning or radical and socio-cultural changes. In short, the reduction of complexity, often the main goal of infrastructure planning laws, at the same time narrows the adaptive capacity of the decision-making process. A restricted adaptive capacity can lead to issues such as limited survey of alternatives, a focus on the project instead of the problem-solution relation, and a generally unbalanced decision-making process. Because these projects often start the decision-making process almost completely developed and already have the backing of important actors, the issue is no longer creating the best solutions for common problems. It is a matter of getting the project through the decision-making process with a little modification as possible. The best way to do this is to simplify the decision-making process and reduce the complex interactions with the environment. This translates into a limited participation of external actors and governmental bodies. This again further limits the adaptive capacity of the decision-making process.

Taking the opposite perspective, what are the main enabling mechanisms identified in the HSL. A crucial mechanism seems to be that there should be a deadlock or strong conflict between parties that are relatively equal: a minister versus another minister, a country versus another country. Thus the checks and balances must be in place. However, a deadlock is something that does not seem to be very adaptive. And thus something must happen that can break this deadlock (for another discussion see Vries, J. d. ,2008). In the case of the tunnel, it was a power intervention by the Prime Minister and an incremental alternative in the form of that tunnel. In the negotiations with the Belgian government, the federalization relieved the decision-making process of a lot of old tensions. Furthermore, the shared knowledge creation fostered trust and provided a neutral basis from which a decision could be made.

Conclusion and discussion

Although this is an explorative paper, with a short case description, it does seem that organizational learning with the decision-making on mega projects can make a contribution both to the field of planning as to the field of organizational learning.

For this paper, the organizational learning theory was reduced to the types of learning: zero, single, double and triple loop learning. Notwithstanding the rich and diverse amount of literature out there, this proved to be a fruitful demarcation for two reasons. Firstly, it suited the level of abstraction sought in this analysis. We were not looking for all the individuals or even coalitions that were active during the decision-making. It is the moments of learning that are of interest in this paper. Secondly, it is a new way of looking at large transport projects that has received little attention in the literature on mega projects. It shows that there is a benefit of not seeing the decision-making on a project as a manner of getting the project financed, but as a process that offers multiple opportunities for learning that could have a lot of benefit for the project.

The paper discusses the case of the Dutch high-speed train line HSL Zuid that connects Amsterdam to Brussels with several intermediate stops. The moments of learning are discussed to show moments of

(zero) learning and to explore some of the mechanisms enabling of blocking the different types of learning. The example of the route choice shows how two opposing ministers reached a compromise in the form of an incremental adjustment to the route. A more fundamental change of the project, by choosing for the other alternative, was impossible. There were two mechanisms blocking this double loop learning. The first is that the advocate of the preferred route, the Ministry of Transport, was also the actor that was financing the project. As one of the respondents notes, this creates a problem because there is to much decision-making power in the hands of one actor. And because financing the project was not a problem, there is also very little incentive to make an adjustment to the original project. The second is that the main advocate of the project has invested a lot of time to enter the project into the decision-making process. And whether this project is the best solution to the problems society has does not matter to them any more. It is getting the project through that is important. This was also shown in the zero learning moment of the minimum maximum speed of 300 km/hour. It was an idée fixe that proved to be very effective in minimizing the arguments for other alternatives to the preferred route. It was a political tool in that sense. This last blocking mechanism supports the arguments brought forward by Priemus (2008) that a big problem with mega or large projects is that they do not start with the problems but with the solution, namely the project.

The third moment of learning showed two enabling mechanisms at work. The first is an institutional change that morphs the context more favorable to learning. It creates an opportunity to have a fresh look at things. And similar to the route selection there was a conflict that forced the parties to consider alternatives. The reason why only incremental learning was possible in the first moment, but radical learning was possible in the second, can be find in the separation of power. In the case of the international negotiations, the Dutch actors had a lot of financial power and had a large interest in reaching a compromise. Their Belgian counterparts could however argue that they did not need the project. But without them, the HSL Zuid would lead to nowhere. So they were also a very powerful actor. Powers were in balance and to solve the conflict an innovation had to be made that went beyond an incremental adjustment. The combination of shared knowledge creation and the unusual compensation paid proved to be the radical adjustment needed.

To end this conclusion with a discussion, this article is only a exploration into the possibility to use theories from organizational learning for analyzing the decision-making process on large transport projects. Although several blocking and enabling mechanisms were identified, we will apply a more systematic analysis to our data by coding software. With an increase in cases for analysis, more mechanisms at work can be uncovered and the arguments here can be further supported or falsified. An international comparison should also provide a more in depth analysis of the mechanisms at work. To conclude, it seems a interesting and challenging direction that we hope to explore further and that will make its contribution to both the fields of planning as that of organizational learning.

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