EJTIR

Issue 15(2), 2015
pp. 163-183
ISSN: 1567-7141
tlo.tbm.tudelft.nl/ejtir

Improving project delivery; Programmes as the silver bullet?

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Transport and land use planning are in a state of flux. Projects face increased technical, social, financial, political and legal complexities while the conventional project planning approach is struggling to deal with these complexities. As a result, many projects fail to be completed in time and on budget. To deal with this issue, alternative planning approaches are developed in planning theory and literature. On the one hand, a more communicative project planning approach has been developed. On the other, a more programme-oriented planning approach has been suggested. While the former trend has inspired many empirical studies, the latter trend has received less research attention. Therefore, in this article, we focus on the trend towards a more programme-oriented planning approach. The objective of this article is to gain insight into how programmes impact project performance in light of project complexities. To this end, we conducted a case study research into how two different programmes – the Urgent Approach Programme and the National Collaboration Programme on Air Quality – impact the delivery of the national highway project A4 between Burgerveen-Leiden in the Netherlands. We used desk research and conducted 20 semi-structured interviews on project and programme level with various stakeholders. Our analysis reveals that programmes do not really influence technical and social complexities. These are predominantly affected by the introduction of a communicative project planning approach. Through restructuring project-specific political discussions and providing solutions to legal issues by explicitly connecting multiple projects to each other, programmes can be an effective means to deal with political and legal complexities.

Keywords: *infrastructure planning, infrastructure projects, project management, programme management, planning delays, planning costs.*

1. Introduction

Transport and land use planning are in a state of flux. The traditional planning approach focuses on narrowly defined transport infrastructure projects and limited stakeholder participation (see,

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e.g. Van der Heijden, 1996; Wilson, 2001; Alderman et al., 2013). In line with project management theory, an infrastructure project is usually regarded as a single intervention in the infrastructure network, characterized by a fixed time schedule and dedicated budget. In planning practice, however, infrastructure projects are prompted by multiple and diverse interests, dynamism and complexity. As a consequence, transport infrastructure projects are characterized by systematic budget and time overruns, and many projects fail to meet expectations (see, e.g. Flyvbjerg et al., 2003; Cantarelli et al., 2010; De Jong et al., 2013).

According to Ennis (1997), it has become essential for infrastructure provision to recognize that project implementation involves actors with different objectives. For transport infrastructure projects to proceed, "the key actors must negotiate and bargain in order to produce a compromise which is acceptable to all parties" (p. 1944). Thus, projects need to focus also on the external context, which challenges the traditional approach where project management predominantly focuses on internal project control and less on continuous interaction with the environment. Bickerstaff and Walker (2001) and Wilson (2001) emphasize that transport land use planning should embrace communicative approaches, to allow for inter-subjective interaction and consensus to develop. Consensus in this respect can be seen as a means to overcome possible stakeholder dispute and enable swift project delivery.

Another important trend in planning literature concentrates on advancing project delivery by focusing on more holistic planning methods (see, e.g. Sussman, 2002; Sussman et al., 2005; Hansman et al., 2006). Following Keck et al. (2010), this often results in proposals for improved programme management. That is, projects in transport and land use planning are no longer considered to be undertaken in 'splendid isolation'. Instead, these projects are assumed to be strongly interrelated on a network level (Leendertse et al., 2012). Programmes are proposed as a governance mechanism to align these interrelated projects in order to achieve a certain outcome on network level. For example, programmes may focus on goals as improving the overall transport network performance in a specific area (Kuroda et al., 2008). In the USA, the AASHTO (2007), in this respect, calls for a focus on these 'macro goals', for government organizations can "focus efforts on achieving overall programme goals, rather than on endless individual project scrutiny" (p. 1).

Whereas the trend towards context-sensitive projects initiated a boom of academic studies and publications (see, e.g. Woltjer, 2000; Wilson, 2001; Walter and Scholtz, 2007; Heeres et al., 2012), the emerging trend towards programmes and outcome-oriented planning has received less attention in (planning) literature. However, in planning practice this trend is clearly noticeable as publications in several countries illustrate. Examples are AASHTO (2007) and Keck et al. (2010) reporting on programmes in the United States, the OGC (2010) in the United Kingdom, and the VROM-raad (2007) and Groothuijse et al. (2011) in the Netherlands. According to programme management literature (see, e.g. Artto et al., 2009; PMI, 2013) programmes allow for top-down management and create additional oversight, which leads to improved project delivery. Nevertheless, to date limited empirical insight is available on how a programme, as a governance mechanism, affects project performance. Therefore, the objective of this article is to gain insight into how programmes impact project performance in light of project complexities that are experienced in planning practice. On the basis of a literature review we distinguish five types of complexity that influence project performance. These are (i) technical complexities, (ii) social complexities, (iii) financial complexities, (iv) political complexities, and (v) legal complexities. In this study we aim to gain greater insight into how programmes respond to these complexities on project level. To this end, we have conducted an in-depth case study into the national highway project A4, connecting the Dutch cities of Burgerveen and Leiden, and two related programmes: the Urgent Approach Programme (*Programma Spoedaanpak*, [PS]) and the National Collaboration Programme on Air Quality (*Nationaal Samenwerkingsprogramma Luchtkwaliteit* [NSL]). Both programmes were focused towards improving project delivery. We have undertaken desk research and conducted 20 interviews with participants both on project and programme level.

In the next section, we will outline the complexities in transport and land use planning on project level in more detail. In addition, we elaborate on trends in planning theory and practice. In section three we explain our methodological framework and case selection. In section four we describe our case on the basis of these project complexities and developments in transport and land use planning, and in section five, we assess how programmes influence the complexities on project level. Finally, in section six we present our conclusions.

2. Developments in transport and land use planning

Banister et al. (2011) contend that transport and land use planning has been largely concentrated on road-based transport. According to Banister et al. (2011), the policy domain is 'locked' into an automobile based transport system. As transport policy has long focused on matching demand with supply by significantly extending the road infrastructure network, the sunk costs of abandoning or replacing this system using alternatives are considered to be disproportionately high. This results in a transport and land use planning that is still largely focused on road infrastructure development.

2.1 Conventional infrastructure projects

Classically, additional road infrastructure is to be developed based on a specific and extensive problem definition developed entirely within government. As Olumide et al. (2010) describe, through the focus on measurable and quantitative input data, the tendency exists to either ignore basic uncertainties or make rigorous assumptions about the distribution of uncertainties (compare Leijten et al., 2010). As a result, the complexities of the project are reduced to technical engineering problems that can be solved by following a detailed action plan. Ideally, as Engwall (2002) explains, "projects should be so thoroughly planned that the objectives are stipulated in detail and frozen, before any practical action is undertaken" (p. 266). The stipulated output should be explicit, consistent and stable over time and specified in three interrelated dimensions: (i) *scope,* what should the project achieve; (ii) *time,* when should it be finished; and (iii) *cost*, what resources should be spent (cf. Kerzner, 2009). In practice, this results in narrowly defined projects where spatial and functional relationships to other infrastructure elements are not well taken into account. "What is more, due to the focus on a single solution, the opportunities to engage in a dialogue or to arrive at a situation of mutual understanding among actors are limited. Alternatives tend to be ignored, or even considered as a threat" (Romein et al., 2003, p. 211). Furthermore, it becomes clear that project implementation is considered to be mainly making sure that a predefined input of the project will lead to a predefined output. Risks are to be avoided and developments have to be controlled. Project management has an internal focus: ensuring compliance to the predefined project lifecycle.

2.2 Infrastructure project policies

The focus on ensuring compliance to a predefined project lifecycle also means that this approach is experiencing difficulties in responding to complexity and change (Jafaari, 2003). This, while, as for example Hertogh and Westerveld (2010) show, nowadays infrastructure projects are confronted with increasing complexities. *Social complexities,* for example, arise from the fact that involved government agencies do no longer always allow construction of the infrastructure project on their territory without prior consultation and permission. In addition, citizens, businesses, and civic organizations also want to be consulted. Otherwise they frequently resort to litigation, often pointing towards environmental externalities, introducing *legal complexities* into the project. As Mostashari and Sussman (2005) record, although only a small amount of the litigations actually results in court injunctions, "many result in delays for the project, as well as continued bitterness and resistance towards implementation expressed in different forms by marginalised stakeholders" (p. 357). In addition, on the basis of amongst others Jafaari (2003) and

Hertogh and Westerveld (2010) three additional complexities in infrastructure projects can be identified: *technical complexities*, *financial complexities* and *political complexities*. Both technical and financial complexities share close relationships with social complexity. Discussion among stakeholders often concerns technical characteristics, i.e. necessary scope changes that again put pressure on established financial forecasts. This is also shown by for instance the FHWA (2000) in the United States and the Committee Elverding (2008) in the Netherlands. The FHWA report, for example, identifies lack of (additional) funding, local controversy and low political attention (i.e. political complexity) as major sources of delay, while the Committee Elverding points towards the erratic political decision-making process that characterize many infrastructure projects, and indicates that this also influences technical characteristics and financial forecasts. In this article, we distinguish social, legal, technical, financial and political complexities, which impact project performance.

2.3 Infrastructure project policies

Largely in response to increasing social complexities, the concepts of negotiation, mutual gains, and consensus (see, e.g. Fisher and Ury, 1983; Susskind and Cruickshank, 1987) have been discussed intensively in planning literature as part of the 'communicative turn in planning'. This relates to concepts such as collaborative planning (Healey, 1997), consensus planning (Woltjer, 2000) and process management (De Bruijn and Ten Heuvelhof, 2002; Edelenbos and Klijn, 2009). The traditional infrastructure approach was characterized by developing a detailed course of action at the outset of the project based on rational models and expert knowledge. Subsequently, project implementation was seen as a matter of constructing the infrastructure project according to the predefined scope and defending the original ideas to outsiders. In contrast, the communicative approach is much more sensitive to both public and private stakeholder interests by aiming at a widely supported, integrative and participative process. Following a communicative project planning approach in infrastructure planning implies a shift from more internal control towards responsiveness of external developments. In theory, stakeholder participation supposedly leads to a smoother decision making process and more inclusive project design (De Bruijn and Ten Heuvelhof, 2002; Committee Elverding, 2008). However, this does not always show in planning practice. Bickerstaff and Walker (2001) conclude that by and large, stakeholder participation is grounded in "political expediency" and is mainly applied as a planning instrument. In addition, Woltjer (2000) concludes that projects provided rather limited attention to the enrichment and empowerment of the planning process. Rather, the participatory processes functioned as a management tool to advance the implementation of particular projects.

Another development in planning literature emerging from the field of engineering systems is the focus on more holistic planning methods. As mentioned above, the conventional infrastructure project approach is focused on delivering a predefined 'output' specified in terms of scope, time and costs. Infrastructure projects are considered to be independent, resulting in individual project scrutiny. Instead, Sussman et al. (2005) emphasize that infrastructure projects are interlinked and interdependent because they are part of a wider transportation system and also need to be managed as such. Although theoretically this means that both technological and societal aspects are taken into account, system based management seems to be predominantly focused on 'hard' technological aspects. This entails not only a focus on management and operations, the regional scale and different modalities, but also, when it comes to systems based governance of interrelated projects, a focus on improved programme management (Keck et al., 2010). A programme-oriented planning approach, i.e., simultaneous management of interrelated projects, is expected to deliver synergetic benefits that are not obtained if the projects are implemented independently. In planning practice, coordination and overall control of projects is considered to improve, which is expected to positively impact project implementation and to improve efficiency and effectiveness. As Pellegrinelli (2011) explains, projects focus on outputs or specified deliverables, whereas programmes focus on outcomes or desired end states, for example of a transport system.

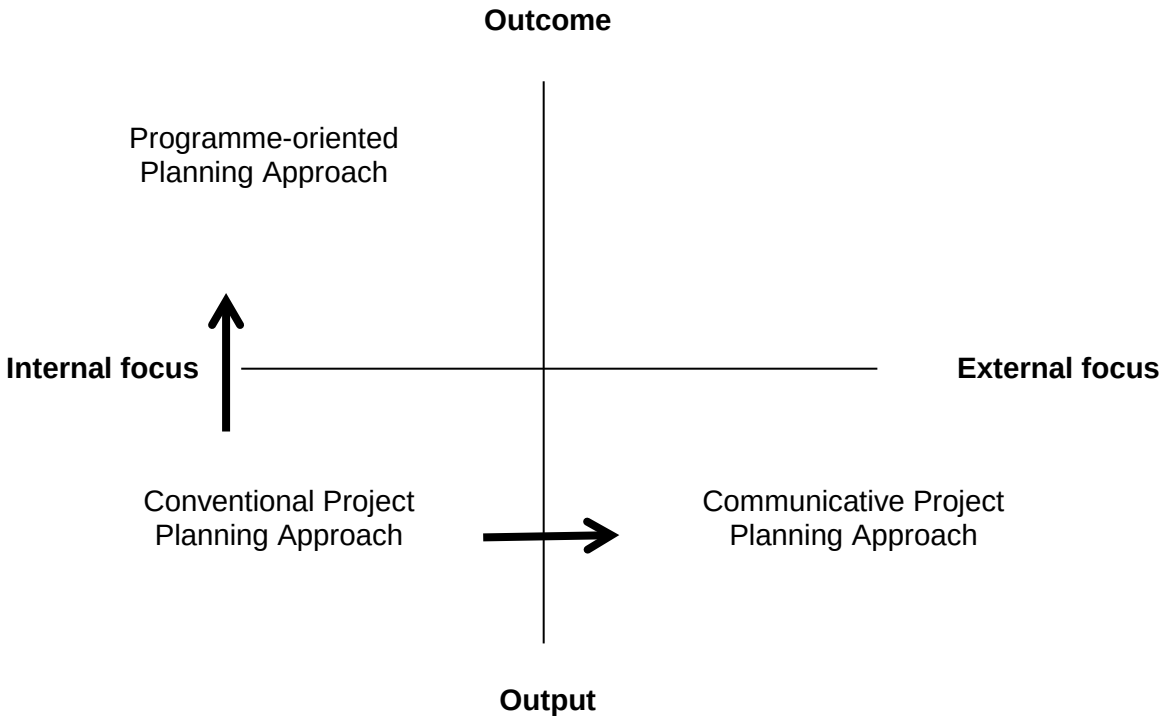

Figure 1. Alternative planning approaches

Figure 1 depicts the two types of approaches that are mentioned in literature to deal with complexity and enable infrastructure development. The first type, on project level, implies a shift from conventional towards communicative project planning approaches; the second type of approach implies a shift from project oriented planning focused on output towards programme-oriented planning focused at realizing an outcome or obtaining a desired end state.

As noticed by Lycett et al. (2004), programme management is often regarded as a scaled-up version of project management (see also Pellegrinelli, 2011). On programme level, project interdependencies can be identified and managed, thereby reducing the incidence of work backlogs, reworks and delays, and enabling efficient (re)distribution of shared resources to projects which deliver most value for money or return on investment. Typically, this implies that projects are initiated within the scope of the programme. In other words, first the programme, programme goal and lifecycle are established, which is followed by the initiation of several projects (Lycett et al., 2004; OGC, 2007; PMI, 2013). Infrastructure planning, however, shows frequent examples of projects that are initiated on the principles of the conventional project planning approach, are subsequently confronted with complexities, and in turn experience delays and cost overruns (see, e.g. Morris, 1990; Williams et al., 2009; Hertogh and Westerveld, 2010). While there is already extensive literature on how communicative approaches might aid project delivery under these circumstances, insights in how a programme-oriented planning approach might impact project performance are limited. The notion that programmes are often developed in the context of projects, and in this way, structure and possibly restructure the context in which projects have to be implemented is rather new. Moreover, literature that does take account of this perspective traditionally focuses on how the projects that were already undertaken influence the development and character of these programmes that are developed in the context of these projects (see, for example Vereecke et al., 2004; Van Buuren et al., 2010). In comparison to these

publications, this article aims to provide more insight into how such programmes impact project performance, rather than the other way around.

In the next section, we will outline the case study and the methodology we used to gain greater insight into how programmes impact the complexities we identified on project level. These include social, legal, technical, financial and political complexities.

3. Methodology and case selection

To gain insight into how programmes in transport and land use planning affect complexities on project level we used a case study methodology. This is a relevant approach when posing "how" or "why" questions concerning "contemporary" phenomena over which investigators have little control (Yin, 2009; Hennink et al., 2011).

We chose a Dutch case study which would entail the different complexities. The Netherlands is well-known for its advanced planning system (Hajer and Zonneveld, 2001; Van der Valk, 2002). Hajer and Zonneveld (2001) show that against a strong legal background, consultation between government parties and between the government and the public functions as the backbone of this planning system. In the Netherlands, consultation between government parties is especially important as both central as well as decentralized governments are provided with planning instruments that can severely influence decision making on infrastructure projects. For example, national infrastructure planning projects that are initiated by central government are still dependent on environmental permits that are issued on the local level by the municipalities the infrastructure projects crosses.

These environmental permits are especially important as the Dutch legislative system assumes a direct link between planning consent and environmental permits. This means that every infrastructure project has to take environmental standards into account, or else it will be annulled. As Zonneveld et al. (2008) show, where other countries still have room for negotiation, in the Netherlands a sharp boundary exists between plans that meet and plans that fail to meet the environmental standards. As a consequence, infrastructure projects are faced with severe legal complexities. In addition, consultation is cumbersome (Committee Elverding, 2008; Arts, 2010). In their review the OECD (2007) mentions that the Netherlands suffers from 'political overload'. Many areas of administration are involved in decision-making, in particular in infrastructure projects.

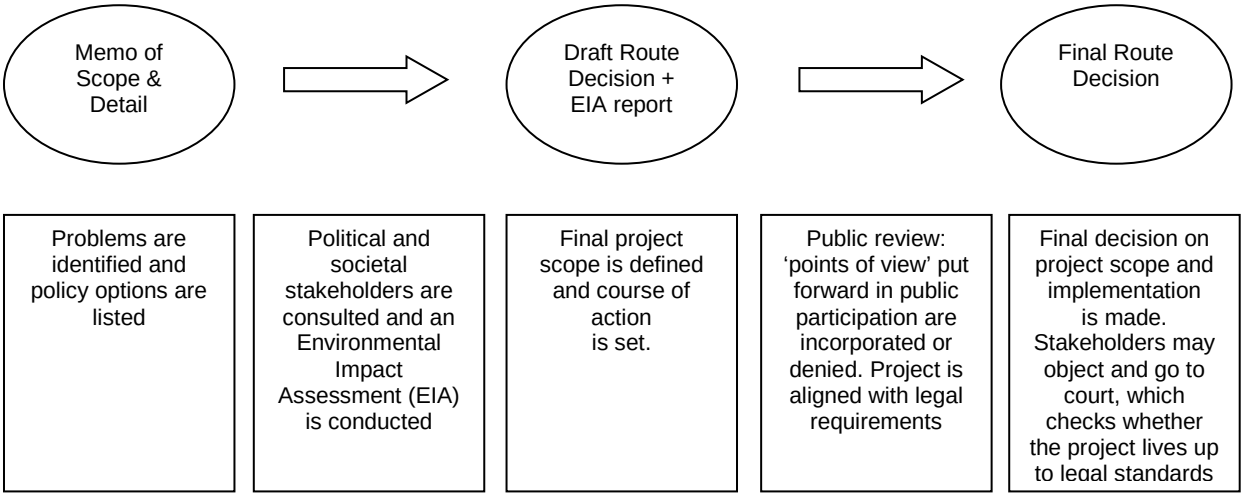

Figure 2. Overview of steps in Dutch transport infrastructure planning

In our case selection we focused on the 58 national highway infrastructure projects that had to be finalized in the Netherlands in the period 2010 – 2020. Some of which are still in the planning stage, others are meanwhile being constructed. We first focused on the throughput time for each project between the moment the project was approved by national politics and a Memo on Scope & Detail was issued and the moment the Draft Route Decision was issued by the Ministry. As outlined in Figure 2, this Draft Route Decision is then translated into the Final Route Decision, which is also the legal document used in court in case of litigation (see Arts, 2004 and 2010 for a complete overview of Dutch planning procedures). The time from the Memo on Scope & Detail to the Draft Route Decision is the time allocated for consultation in the Dutch planning system. We established the throughput time for each project. We found that, in extreme cases, consultation can take up to over 80 months (6.5 years). We assumed that the longer the consultation, the more political and social complexities the project would encounter. We further studied whether the project was litigated and whether this would actually result in court injunction issues. We assumed that litigation followed by injunction would show that the project encountered legal complexities.

Out of 58 infrastructure projects, 5 consultation cases took longer than 60 months (5 years). Another 5 projects ended up in court injunction. The only case to show a long consultation time (76 months), finally resulting in court injunction, was the widening between Burgerveen and Leiden of national highway A4 from a two-lane dual carriageway to a three-lane dual carriageway. Other sections of the A4 were already widened, and, as outlined in Figure 3, this project concerned the last 20 km stretch, which proved to be very difficult. It had taken from September 1997 until January 2004 to come to a fully supported Draft Route Decision that was eventually translated into a Final Route Decision in February 2006. This Final Route Decision was litigated, which ended up in injunction by court in July 2007.

In the case analysis below, we first focus on the issues that caused this project's long consultation time and the reason for the court injunction (period until July 2007). To this end, we have conducted a desk study of court readings by the Dutch Administrative Court of the Council of State (Raad van State), studied available scientific accounts of developments in policy domains, and analysed policy documents such as formal project documents and EIA-reports. In addition, we conducted 5 in-depth interviews with stakeholders directly involved in this project. The interviews were semi-structured and consisted of thematic open-ended questions. We focused particularly on which complexities could be identified on project level and how these complexities were experienced by the interviewees over the project lifecycle. We have held interviews with project management, parent organisations and local politicians. Furthermore, in our study we have specifically focused on developments at programme level from 2007 onwards in response to the difficult project delivery, particularly in two programmes considered essential in enabling project delivery in the case of the A4 Burgerveen - Leiden. These are the Urgent Approach Programme (Programma Spoedaanpak, [PS]), and the National Collaboration Programme on Air Quality (Nationaal Samenwerkingsprogramma Luchtkwaliteit, [NSL]). Both programmes aim to improve project delivery. To gain insight in the effects of these programmes we also conducted document analysis into formal programme documents and programme evaluations. In addition, we conducted 15 in-depth interviews with stakeholders involved in the two different programmemes. A large part of the interviews were with people from the Ministry of Transport who were involved in one of the programmes. However, in order to gain information from all programme participants, we have also conducted interviews with stakeholders at lower levels of government. Similar to the interviews on project level, these interviews were also semi-structured and consisted of open-ended questions. The topics, however, were different. In the interviews on programme level we focused on programme management, the interaction between programmes and projects, the impact of contextual developments and the possibilities on programme level to mitigate the impact of these developments.

4. Complexities in an infrastructure project: the case of the national highway A4

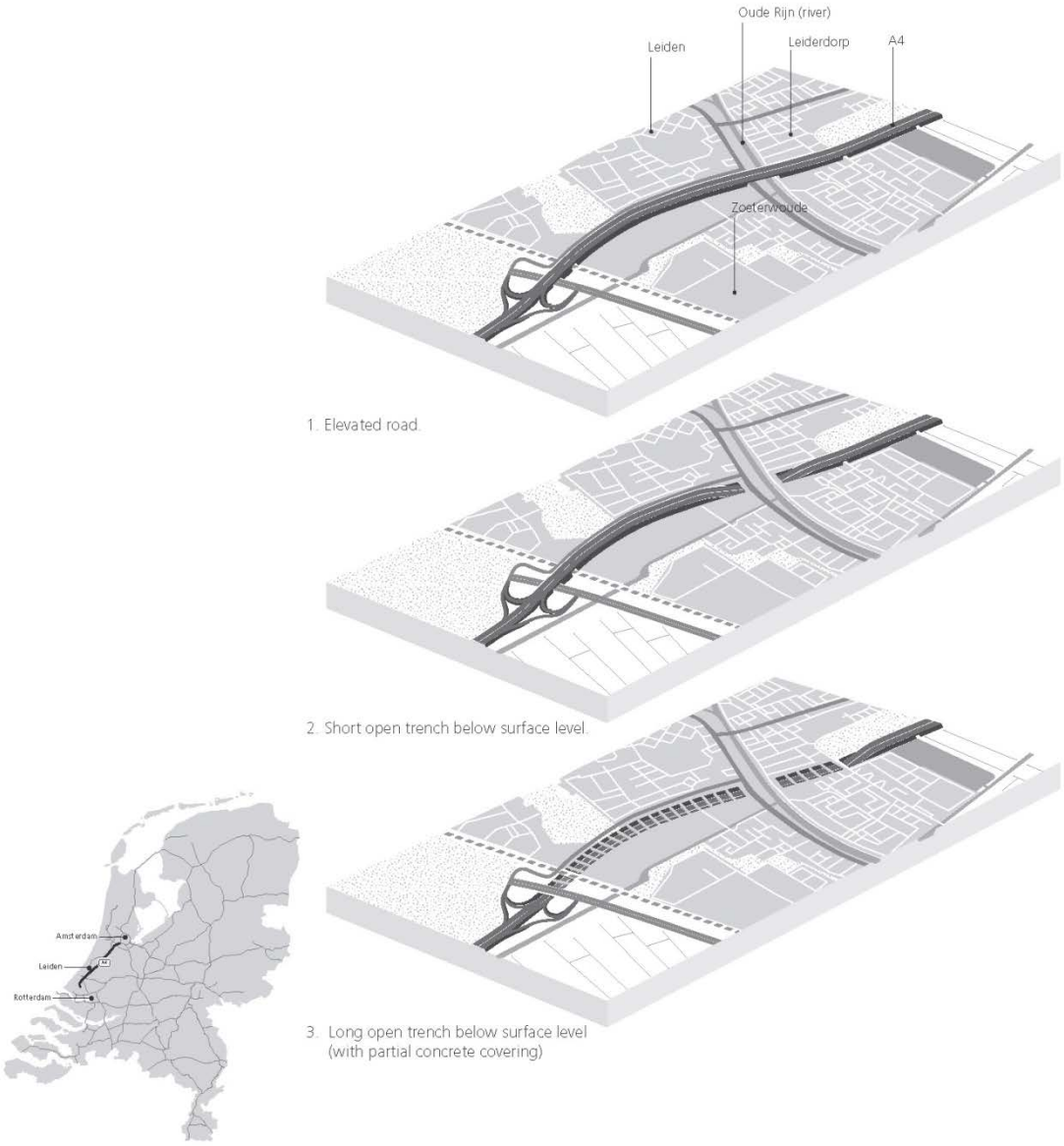

Figure 3. Geographic location of highway A4 Burgerveen - Leiden in the Netherlands

The national highway A4 was established in 1958 and is an important link in the national highway network in the Randstad conurbation (the economic core of the Netherlands) and an important international hinterland connection. The A4 connects the country's two mainports: Rotterdam harbour and Schiphol Amsterdam Airport (see Figure 3). Consequently, the road generates still growing amounts of traffic. To supply for this growth, in 1994 the Ministry of Transport decided to expand the highway from a two-lane to a three-lane dual carriageway (V&W, 1994) in order to improve traffic circulation and reduce congestion.

Studying different options to improve traffic circulation took three years and showed that alternatives for expanding the highway, e.g. road pricing and public transport improvement, would not alter the modal split enough to reduce road traffic and congestion (V&W, 1997).

Therefore, all parties agreed that highway expansion was necessary, but disagreed on the way to do so. Figure 3 shows the complex spatial situation in which the highway A4 Burgerveen – Leiden had to be altered. Not only are multiple municipalities (Leiden, Leiderdorp and Zoeterwoude) affected by the road (e.g. noise, air pollution, land take issues), also solutions to bridge or tunnel the Oude Rijn river had to be generated.

In the original situation, the fact that the highway was located on an elevated bank (Picture 1 in Figure 3) made it a significant visual barrier. Ministry of Transport studies showed that the option of constructing a short stretch of road below surface level in an open trench would be compliant to air and noise regulation and deliver the highest value for money (Picture 2 in Figure 3). However, both the municipalities of Leiden, Leiderdorp and Zoeterwoude as well as citizens pleaded for a longer open trench, accompanied by extra mitigation measures such as horizontally placed concrete pollution and noise barriers (Picture 3 in Figure 3). Nevertheless, the Ministry of Transport chose their first option and started an Environmental Impact Assessment (EIA) on this basis, initiating severe discussions (V&W, 1997). A former alderman, for example, states that "*this decision created a lot of turmoil. Not only on political level, but also within the civil society. It felt like we were all against the Ministry of Transport*." Eventually, involved municipalities decided not to issue the necessary permits to the Ministry of Transport and a large group of citizens and municipalities even went to court in order to prevent the implementation of this project.

The project thus encountered severe social complexities. In addition, since involved stakeholders wanted a more advanced road design, this increased the project's technical complexity. As a former project manager explains "*if we would include the wishes of the other parties, this would really push our technological limits, particularly with respect to technologies to compensate for noise and air pollution*". As a result of the different opinions on what the project would entail and how it should look, the project reached an impasse. The Ministry of Transport advocated their road design regardless of external influences. This was in line with political commissioning for the project (TMC, 2000). Politics focused on realizing optimal value for money. However, as has become clear from the interviews, the Ministry decided to withdraw their Final Route Decision Plan in 1999. "*It appeared that the project opponents' could put some valid points forward which would have led to court injunction*" explains a national policy officer. Such withdrawal at the stage of taking the Final Route Decision never occurred before and has not happened since.

Both literature and the interviews make clear that in order to break the impasse the Ministry of Transport had to actively respond to discussions among stakeholders, rather than take the official procedural stance of waiting until courts claims were made. A stakeholder manager involved in the project, for example, mentions that "*the Ministry of Transport has always been narrowly focused on road development. However, smart process management made us more aware of the context we have to operate in*." Indeed, in 1999, the Ministry of Transport together with the municipalities of Leiden and Leiderdorp, initiated a quick scan searching for possibilities to improve the road's landscape fit. This showed that when the focus would shift from just realizing additional infrastructure towards a more regional and integrated approach, the more expensive alternative (Picture 3 in Figure 3) could be financed by capturing the value of real estate and industrial developments within the area.

In this way, the project would become a public-public partnership called W4 after the four components the project would focus on: housing, working, water, roads (in Dutch: *Wonen, Werken, Water, Wegen*). The partnership included the Ministry of Transport, Ministry of Environment, the province of Zuid-Holland and the municipalities of Leiden, Leiderdorp and Zoeterwoude. All stakeholders agreed on this expanded scope. However, this did not only introduce technical complexities, but also additional financial complexities. The total investment of the conglomerate of local and regional governments amounted to € 33 million, initiating a long political discussion on different ways of financing the project. A former alderman, for example, denotes that "*most discussions went about money. You have to keep in mind that also small municipalities were involved that would have to make relatively large investments. In case this went wrong*

that could bankrupt the entire municipality of for instance Zoeterwoude. We had to find a sensible way to balance risks, investments and possible returns". As a result of the political discussion, it took until 2002 before final financial arrangements were made, a joint 'master plan' was developed, and, the collaboration covenant was signed between the authorities involved.

However, even after decisions had been made on the financial arrangement, political discussion on who would pay for what continued. Still, different financial frameworks were applied by various stakeholders and different forecast scenarios were used. Furthermore, it proved to be difficult for smaller public organizations as municipalities to maintain financial commitment throughout the project. Largely as a result of financial disputes, it took until 2006 before the Final Route Decision was issued and the road could be constructed. To move things along, the Ministry of Transport agreed to provide additional funding, which took away most financial complexities. In the meantime, everybody was convinced that the project would be appropriately fitted into the landscape and that it would be beneficial for all stakeholders involved through its focus on regional development. Even local residents were in favor of the project. The open trench would be fitted with horizontally placed air and noise barriers, improving air and noise conditions compared to the old situation. In the meantime, the highway had become one of largest bottlenecks in the Dutch highway system (VID, 2007). The high levels of congestion caused high levels of air pollution and noise nuisance. Local residents realized that expanding the road would improve this situation (VVD Leiderdorp, 2007). A local news network, for example, mentioned that "*the people who live close to highway are positive as they expect that the amount of noise will reduce when the project is finished*" (Omroep West, 2009). However, despite the large consensus amongst stakeholders, one environmental interest group could not reconcile the construction of a new road with their environmental principles and went to court. They stated that additional research into the impact of the new road on air quality was necessary to gain a full overview of the impact on air quality in the region. The interviews indicate that the court's 2007 decision surprised many involved stakeholders. The court followed the environmental interest group's reasoning and decided that the project could not be implemented before all significant effects of the road on the air quality would have been studied and possibly mitigated (ABRvS, 2007). The project stakeholders did not anticipate this outcome and felt dejected. As a policy officer explains: "*the day the high court announced its decision was really a black day for all of us. Nobody expected this decision; it came as a complete shock to us. How could we possibly take all effects into account?*". In the meantime, the project came to a standstill.

Over time, the project had encountered several complexities, outlined in table 1 (below). Some had been dealt with by shifting towards a more communicative project planning approach. Nevertheless, in 2007, the project reached an impasse. The question was: how to move forward now?

Table 1. Complexities on project level in the case of the A4 Burgerveen – Leiden

Complexities:	Appearance in project
Technical	Project scope was constantly under pressure. Initially, the project was only aimed at requirements of the Ministry of Transport. Later on, other stakeholder wishes regarding working, housing and water issues also had to be taken into account. This resulted in a broad array of complex technical measures both for the road design as well as for the mitigating measures as horizontally placed noise barriers and noise absorptive wall padding.
Social	Initially, the Ministry of Transport was little responsive towards the needs of local stakeholders focusing on delivering value for money. However, both decentralized government agencies and local residents opposed to the project, resulting in huge social dynamics. Eventually, the Ministry of Transport, as project principal, understood that it had to move with rather than fight against these dynamics and agreement amongst authorities was reached.
Financial	The enlarged project scope could only be realized if additional funding was found. An innovative Public-Public Partnership (called W4) was used to pool the financial resources of different governmental agencies. Still it proved difficult for partners to maintain financial commitment throughout the project.
Political	The initially narrow project scope was in line with the political mandate at the time. After the collaboration covenant had been signed by all authorities, it proved challenging to maintain political attention, which was caused in part by the election cycle of both local and national politicians.
Legal	It was thought that the project was able to comply to all legal requirements, until the project was faced with the court decision that all significant effects on the air quality had to be taken into account.

In practice, it proved difficult to take note of all significant effects on the air quality caused by a specific project. Through jurisprudence infrastructure projects were faced with the task of calculating significant effects in more detail and for larger areas (Blijenberg et al., 2008; Arts et al. 2010). This was not only true for the A4 Leiden-Burgerveen project but also for other road projects. For instance, in another road infrastructure project, the highway A74, this resulted in an air quality study covering a 160-km stretch from the city of Venlo to the town of Ridderkerk, while the project only entails 2.5 kilometer of new road near the city of Venlo. When, next to the highway projects of the A4 and A74 also another project failed, discussions in Parliament led to the establishment of a special committee, the Committee Elverding. This Committee – mentioned after the last name of its chairman Peter Elverding, who was the top executive of chemical company DSM at the time – was tasked with the investigation of the cumbersome planning and realization of infrastructure projects in the Netherlands. In 2008 it finished its advice. In response to this advice, the Ministry of Transport issued new legislation. A new law, the Acceleration Law (*Wet Versnelling Besluitvorming Wegenprojecten)*, was ratified in April 2009. This law contained two major changes. First, in response to court verdicts as in case of the national highway A4, the study area for air quality was narrowed down in the case of infrastructure projects. This was made possible by the simultaneous development of a National Collaboration Programme on Air Quality (*Nationaal Samenwerkingsprogramma Luchtkwaliteit,* [*NSL*]). The second change for infrastructure projects was that they could refer to this programme on air quality matters, which contained all important spatial and infrastructure projects to be undertaken on different administrative levels in the period 2009 – 2015 (Arts et al., 2010; Busscher et al., 2014). The programme included projects from the Ministry of Transport, various provinces and also several municipalities. The cumulative impact of these projects on air quality was calculated per square kilometer throughout the whole of the Netherlands. All stakeholders would have to implement mitigating measures in order to compensate for the negative impact of new infrastructure. By doing this programmatically, this could be done at once and no longer on a project-by-project

basis. The rationale behind this is similar to, for example, the application of procedural Programmatic Agreements in the United States, that allow for generic decision-making on several environmental issues for a category of similar projects (CEE, 2010). As a national policy officer explains "*by taking this up collaboratively we finally found a way to move beyond individual project scrutiny*". Both the implementation of the compensating measures and external developments have to be monitored on an annual basis from 2009 till 2015. In case the air quality deteriorates beyond European norms, the stakeholders agreed to jointly undertake additional measures to compensate for these events. Because of the NSL, the study area for infrastructure projects could be narrowed down, as effects outside the study area would be compensated by the NSL.

In the meantime, the A4 project did not only become part of the NSL, it was also incorporated in the Urgent Approach Programme *(Programma Spoedaanpak,* [*PS*]). The establishment of this programme was part of the Acceleration Law and focused on the construction of 30 projects, 10 of which had to be finished before May 2011. Similar initiatives can be found around the globe. In the United States the 'Everyday Counts' programme has been established, in which "reducing the time it takes to deliver highway projects" (FHWA, 2013) is an important element. Based on the same rationale as the Everyday Counts programme in the United States and the PS in the Netherlands, the New South Wales government in Australia has introduced new legislation (for example, Restart NSW and the Planning Bill 2013) and established new regulatory bodies and advisory bodies (for example, Infrastructure NSW) all to accelerate the realization of priority infrastructure projects (see, e.g. Dobbs et al., 2013).

The PS in the Netherlands consists of 30 that projects were considered to be bottlenecks in the existing infrastructure network. From a network an infrastructure network perspective, these bottlenecks could be solved by relatively minor adjustments. These adjustments, however, as the A4 Burgerveen – Leiden shows, could imply rather large projects. The PS was aimed at speeding up the projects' decision-making process. Time was considered the essential scarce resource, which had to be managed carefully. As a national policy officer mentions "*the phrase 'time is of the essence' really got a new meaning*": Every two weeks the programme team would consider the different projects. A detailed time planning was made, establishing project milestones. Delays were immediately reported to the Ministry's executive agency's top management and to the Minister of Transport himself. To enable speedy decision making, additional financial and personnel resources were provided.

As a result of these developments, a new Final Route Decision was issued in 2009. Remarkably, this was almost exactly the same Final Route Decision as in 2007. The only difference was the fact that "*the most recent data was included to support the decision. […] Road design has not been altered*" (V&W, 2009, p. 7). The environmental interest group went to court again. However, given the developments on programme-level, outside the project scope, this time, the court no longer considered their objections to be valid, and so the project is currently being constructed.

In the next section, we focus more in-depth on the role the different programmes have played in enabling project implementation. We are particularly interested in the ability of programmes in dealing with the complexities encountered on project level.

5. Analysis: programme influences on project complexities

Although the legal complexities were too large to handle on project level, the A4 project was able to deal with other types of complexity. Here, we focus more specifically on how the project dealt with these complexities and in what way programmes were able to support project delivery eventually. We aim to gain insight into the impact of programmes on the different forms of complexity.

We first focus on the project level. Immediately after the project scope was defined in 1998, it encountered severe social complexities. Various important stakeholders were opposing the

project. In line with the political mandate, the Ministry of Transport had selected the option that would deliver most value for money taking little account of contextual developments. As a former alderman mentions, "*the Ministry of Transport thought that they could realize the project only as they liked. They thought they could push the project through. We, as decentralized governments, really proved them wrong, although we had to use all our powers of persuasion to stop them*". Eventually, this resulted in a deadlock. Rather than following the procedural line and wait for stakeholders to come to the Ministry, to deal with the social complexities, the Ministry needed to be pro-active and find ways to reach consensus. As depicted in figure 4, this entailed a shift from internal focus on project management towards a more receptive and consensus-seeking and context-sensitive approach as also identified in section two. The aim of this approach was to develop a project scope that all involved parties could agree on (Van Duin, 2008). Because the expanded project scope was oriented towards regional and cross-sectoral integration, all public stakeholders could gain something (Thissen, 2005). Furthermore, in the advanced highway design, the social circumstances of the local residents would improve as the air quality would increase and the noise nuisance would decrease. However, the aim of these deliberations was still to provide a predefined output, accompanied by a definable time schedule and financial budget. Because of the extensive consultation, it was expected that this scope would remain stable throughout the rest of the project. All stakeholders had to stick to their deals.

By adopting this communicative planning approach, the Ministry of Transport was able to deal with most of the social complexities. This did, however, influence technical and financial complexities. Even in its old design, the project was considered technically complex. Next to the road expansion it included the alteration of several structures such as bridges and aqueducts (V&W, 1997). The scope changes meant that now a total of 1.4 kilometers of highway had to be constructed in a trench, which would be largely covered by horizontally placed noise barriers that would reduce visual intrusion effects. Possible future road expansion was already taken into account in the design of the new road. In addition, the project also entailed more and improved connections for local, slow and waterway traffic to increase accessibility of the whole region. Despite the increased technical complexities, these complexities proved to be manageable on project level through the application of traditional management strategies. As a project manager explains "*taking account of these stakeholder wishes of course influenced the project scope. However, we were always very focused on ensuring that we could really deliver to what we agreed. It has been challenging, but we have always found a way to keep to live up most stakeholder demands.*"

Although financial complexities proved to be a source of heavy dispute, eventually, they also proved to be manageable on project level – see Table 1. Complexities originate in the extensive set of financial arrangements between partners. For example, construction fees paid by the Ministry of Transport to the municipalities would be reinvested in the project. The same goes for the Ministry's financial contribution to compensate for damage to local water- and ecosystems. In addition, the increased value of land near the road would be captured and be reinvested by the municipalities involved. However, as the project was halted in 2007, and planned roadside real estate could not be realized, municipalities ran into financial trouble. A stakeholder manager involved in the project, also states that "*agreements were made in economic high times, when property value was expected to exponentially grow. When the crisis hit, the smaller municipalities involved in the project really felt this*". In 2008, the municipality of Leiderdorp was even prepared to go to court to try and reduce their financial contribution. Eventually, this problem was solved by reducing municipalities' contributions and increasing that of the Ministry by € 17 million (RWS, 2009). All in all, the total costs of the scope alterations amounted to € 94 million vis-à-vis a total budget of € 684 million (I&M, 2013). It was possible to secure the additional funding for the project because in the meantime the project had become part of the Urgent Approach Programme *(Programma Spoedaanpak,* [*PS*]).

This development reflects the shift away from focusing on the delivery of a specified output, towards focusing on a desired end state or outcome, as identified in section 2. Arrow 2 in Figure 4 depicts this shift schematically. To enable this outcome, thirty projects that were about to be realized, but somehow encountered delay along the way had been selected in the PS. The programme aimed to overcome these sources of delay and to put pressure on project delivery. As was the case in the highway A4, this meant that additional funding had to be realized.

In addition to funding, other organizational means were appointed to the programme. In line with recommendations made by the Committee Elverding (2008), projects were supported by well-trained and experienced staff. "*The best people were collected and put on those projects*", as denoted by a national policy officer. The idea was to meet all preconditions to enable quick project delivery. In these projects, time was identified to all organizations as the essential resource (Van Beurden, 2010; Arts, 2010). This also called for a different legal strategy. Usually, the Ministry of Transport chooses a risk-averse legal strategy. This means, for example, that construction does not start before all possible legal objections are eliminated. This often resulted in project implementation delays. Under the PS, when protesters had litigated the project, an analysis of their objections was made. Based on this, a decision would be made to either start construction immediately, or to await the court's decision. This strategy resulted in construction starting immediately after the (revised) Final Route Decision had been sent out in all thirty projects, including the A4 between Burgerveen and Leiden. As a national policy officer explains "*time was the main focus. Within the programme we were very focused on finding possible ways to expedite project delivery*".

Partly, all this was possible because the National Collaboration Programme on Air Quality (*Nationaal Samenwerkingsprogramma Luchtkwaliteit,* [*NSL*]) had been developed. As discussed above, this programme took away what proved to be the most successful argument to halt infrastructure project implementation: air quality legislation. "*With the NSL we could finally build again*", as said by a provincial policy officer. A joint effort by all levels of administration, the NSL was supposed to take sufficient measures to mitigate air quality effects of all infrastructure projects. Unlike the PS, the NSL does not focus on internal programme management that is often aimed at speeding up project implementation. Rather, it concentrates on ensuring that European air quality standards will be met despite infrastructure projects being completed in the Netherlands. To do so, the programme focuses on collaboration between all stakeholders and on external developments (Busscher et al., 2014). To make sure that standards are met, for instance, also autonomous and international developments have to be taken into account.

In the case of the A4 Burgerveen-Leiden we can see both shifts identified in planning practice that were depicted in figure 1. On the one hand, with the establishment of the W4 collaboration, the project represents a shift towards a more communicative approach (arrow 1 in Figure 4). On the other hand, with the establishment of the PS the project also shows a shift towards a programme-oriented planning approach (arrow 2 in Figure 4). Interestingly, the NSL appears to represent an additional alternative to the conventional project planning approach. As figure 4 depicts, in relation to the other planning approaches, this approach can be situated in the upper right corner as it entails both a focus on external developments as well as an outcome instead of an output orientation (arrow 3 in Figure 4).

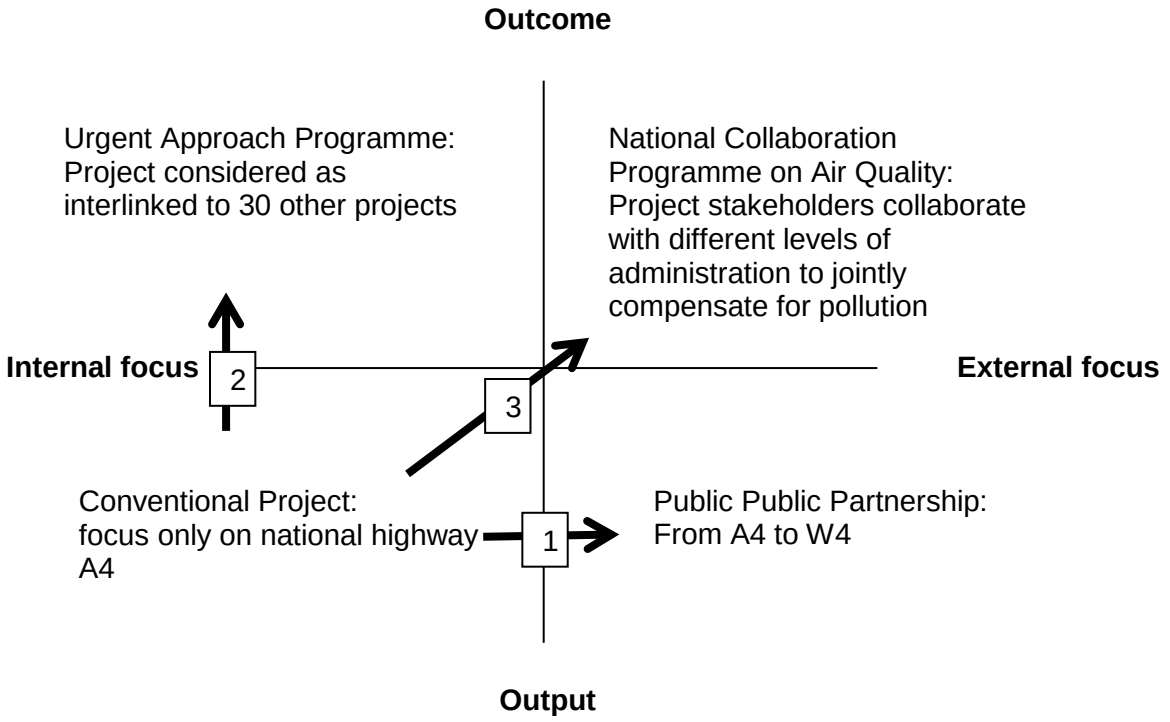

Figure 4. Shift in planning approach in the case of the A4 Burgerveen-Leiden

What both the PS and the NSL programmes seem to share is that they provide a platform for debate about complexities amongst politicians. Both programmes were able to raise project-bound debate to a higher, more strategic policy level. The NSL proved to be a means to overcome the detailed scrutiny of individual project influence on the air quality. Instead of trying to calculate the exact possible project emissions, the programme focused on the cumulative impact of all projects (Arts et al., 2010). As a result, political attention focused on developing both generic and location-specific mitigating measures. This no longer had to be done on a project-by-project basis. By taking the political debate to programme level, projects could proceed again: "*we were finally relieved from the constant political discussions about individual projects and which effects the project could or could not have on the regional air quality*", as stated by a national policy officer.

The PS influenced the political complexity in a different way. As this programme was among the responsible Minister's focal points, he was eager to make it work: "*He was a source of inspiration due to his enthusiastic involvement in the programme*" (RWS, 2011, p. 1). Similar to the NSL, political debate focused on the programme, and no longer on the project. Combining 30 different projects into one programme enabled the Minister to make a more substantial political claim as delaying decisions at project level would influence progress on programme level. He was able to frame the political debate in such way that the costs of holding back the programme would not weigh up to potential individual gains. As a consequence, potential further delays were prevented and the project gathered momentum.

This is also reflected in the fact that what initially took from 1999 till 2007, in terms of stakeheholder consultation, could now be realized in less than two years. Furthermore, it is interesting to see that after the project became part of the programmes, the scope as well as the costs of the project remained rather stable, after historic estimates differed from € 480 million in 2002 (V&W, 2002) till € 685 million in 2006 (V&W, 2006). Together, the programmes were able to prevent further delays and in this way also an important source of cost overruns. The programmes not only raised political discussion beyond the project level to the programme level and by doing this, also structured, political decision-making, but also provided clarity to all

stakeholders what needed to be done in order to live up to environmental rules and regulations. This had a stabilizing effect on the project: in the period from 2006 till 2013 the total cost estimate in 2006 remained more or less the same. Nowadays, it is expected that the total costs of the project amount to € 684 million (I&M, 2013).

Table 2. Programme influence on complexities on project-level

Complexities:	Programme impact	
	National Collaboration Programme on Air Quality [NSL]	Urgent Approach Programme [PS]
Technical	Limited. Programme did not influence project scope	By putting well trained and experienced staff forward
Social	Limited. Programme did not influence discussion among stakeholders	Limited. Programme did not influence discussion among stakeholders
Financial	Limited. Programme did not influence financial budget, yet estimated project costs remained stable after inclusion in the programme	By providing additional funding. Estimated project remained stable after inclusion in the programme
Political	By taking away political discussion on air quality matters	By explicitly linking the programme progress to individual project progress
Legal	By taking away legal objections based on air quality regulations	Limited. Programme did not influence related rules and regulations.

6. Conclusion

As Table 2 shows, we have distinguished five different types of complexity that influence project performance. These are: technical, social, financial, political and legal complexity. On the basis of a case study into the A4 Burgerveen – Leiden highway project, we were able to provide insight into how a the conventional project planning approach struggles to deal with these complexities. In order to deal with these complexities, planning theory and literature often advocates a more communicative project planning approach. Our case analysis shows that this approach is indeed able to deal with some of the identified complexities. As has been demonstrated in the case of the A4, building consensus through the integration of multiple stakeholder wishes proved to be effective to deal with social complexities. At the same time, however, this resulted in changes of the project scope. Subsequently, this influences technical and financial complexities. Interestingly, in order to deal with the increased technical and financial complexities traditional project management strategies were applied.

At the same time, also the Urgent Approach Programme [PS] helped the A4 project to deal with these complexities. This programme consists of 30 projects that are considered to be bottlenecks in the infrastructure network and can be solved through relatively simple adjustments. All these projects have to be implemented within the same timeframe. Maylor et al. (2006) describe such a programme as a portfolio programme. As Maylor et al. (2006) argue, the portfolio type nature of the programme has also implications for the type of programme management (see also Busscher and Arts, 2011). In portfolio programmes, programme management is often focused on prioritization of shared resources between the various projects (Engwall and Jerbrant, 2003; PMI, 2013). In the case of the A4 Burgerveen - Leiden, this is resembled in the fact that in relation to the project, the programme predominantly influences the technical and financial complexities. In fact, this type of programme management is strongly related to project management. Due to its internal focus, the aspects of scope, time and costs that Engwall (2002) characterized as central to the conventional project planning approach, are also central to the programme-oriented planning

approach. While this is in line with theoretic thinking on programmes (see, e.g. Lycett et al., 2004; Pellegrinelli, 2011), the fact that the PS was also able to deal with political complexities in planning practice is new. Through explicitly connecting the A4 project to other projects, political discussions that would potentially hold one project, would now hold all 30 projects. No politician wanted to get blamed for this. This shows how programmes as the PS can be a powerful instrument in order to speed up decision-making in relation to political complexities.

This also applies for the National Collaboration Programme on Air Quality [NSL]. In this programme various involved stakeholders all agreed to undertake joint measures to deal with air quality issues. Following the typology of Maylor et al (2006), this programme can be seen as networked in nature. According to Maylor et al (2006), this implies that the programme management strategy has to be oriented towards collaboration between multiple parties. This is also reflected in the NSL by the fact that the involved stakeholders together agree upon joint action and in this way structure the context in which the project has to be implemented, and also structure political decision-making. However, this not only applies to political complexities, it also applies to legal complexities. Through the fact that the stakeholders together make sense of rules and regulations and together develop measures that are to be undertaken within the programme legal complexities are reduced. In addition, through focusing on the cumulative outcome of the entire programme, the NSL also proved to be able to restructure exiting environmental rules and procedures and prevent the need for individual project scrutiny. In turn, this allowed for fast legal approval on the project without the need to either undertake extensive studies or develop expensive project-bound mitigating measures to ensure compliance to strict environmental rules and regulations.

This shows that through structuring the context of the project, programmes prove to be able to deal with financial, legal and political complexities. Programmes seem to be able to stabilize the context in which the project has to be implemented and ensure the right preconditions for a successful conventional project planning approach. In other words, the main function of the programmes seems to be to serve as a 'firewall' and protect project implementation from possible contextual developments such as legislation, political discussion or other complexities that could interfere with project delivery. In this way, programs impact project performance regarding scope, time and cost. However, this is not done by creating additional oversight and control as perhaps would be expected on the basis of traditional programme management literature, but by providing essential preconditions and creating a stable environment so that project management techniques can be effectively applied.

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