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Employing complexity: complexification management for locked issues

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ABSTRACT
In line with wicked problem literature, we argue that public management based on ordering societal issues to make them controllable and solvable (simplification) can be initially attractive, but in the long-term ineffective. We elaborate on an alternative management mode of increasing the complexity of both the problem and the approach to deal with the problem (complexification). Based on an in-depth case-study about transforming Utrecht Central Station (the Netherlands), we present complexification as a management strategy to revitalize processes that got locked by simplification management. Path-dependency shows up as a weakness of simplification, and path-creation as a strength of complexification.

KEYWORDS Public management; complexity; path-dependency; simplification

Introduction

This article focusses on the relation between public management approaches and dealing effectively with societal issues. An approach that has been considered effective in the history of public administration and public management is the 'taming' of issues by cutting them into parts that can be solved by specialized actors with a linear, line-based or project-based approach (Roberts 2000; Conklin 2001; Zittoun 2016; Daviter 2017). In these approaches, it is assumed that problems can be bounded and processes organized linearly to achieve pre-defined results within time and budget (Turner 2016; Wysocki 2011). We will argue that this management approach is a demonstration of James Scott's concept of simplification: the government imposing an order on society to make it controllable and solvable (Scott 1998). Bureaucracies and project and task organizations are founded on this mode of simplification, and the promise of efficiency and control probably explains its popularity.

In this article, the attractiveness and application of the simplification mode of public management is identified in a major infrastructural transformation challenge: the renovation of Utrecht Central Station in the Netherlands. In this case, the municipality of Utrecht together with other actors has applied the simplification mode for several years. They reduced the renovation issue by splitting it up in areas and projects that were managed separately. The underlying assumption seems to be that simplification will result in a controllable process and a high-quality result.

This assumption has been critiqued for several decades now. Rittel and Webber (1973) have argued for its inadequacy in dealing with wicked problems. Order and control may be initially attractive but will fail if they are unable to deal with fast-changing and unpredictable issues (Snowden and Boone 2007). Complex issues do require an approach that is equally complex (Ashby 1991); one that 'plays with' instead of 'fights against' complexity (Hertogh and Westerveld 2010), 'embraces complexity' (Boulton, Allen, and Bowman 2015; Haynes 2015), or 'engages with complexity' (Castelnovo and Sorrentino 2018). This article builds upon literature that utilizes complexity sciences for public administration and management, in this journal, for example, by Teisman in 2008 (Teisman 2008; Teisman and Klijn 2008a; see also Klijn 2008; Teisman, van Buuren, and Gerrits 2009), and recently by Eppel and Rhodes (2018). However, we try to go beyond the merely reactive attitude of embracing and acknowledging complexity, and want to gain insights on public managers who pro-actively employ and enlarge complexity in their search for high-quality results. Some complexity scientists have contended that complexity can be an evolutionary driver that enlarges the chance of results being good enough to survive (Allen, Strathern, and Varga 2010; Heylighen 1999). Increasing complexity can be a strategy to achieve results, by Heylighen (1999) called complex-ification. We introduce complexification to public management, by saying that complex-ity is something to actively enlarge in managing complex issues, in order to enhance the chance of successful public decision-making processes.

Next, we will argue that simplification creates a path-dependency by working with linear processes, formal decisions, and strictly bounded problems and solutions. These mechanisms decrease the room to manoeuvre. This might be effective in the beginning but offers too little space for adaptation when conditions in the context change. Several studies have stressed the need for adaptive and program-based planning to accommodate the dynamics in the context of infrastructural projects (Busscher, Tillema, and Arts 2015; Giezen 2013; Giezen, Bertolini, and Salet 2015). However, changing ineffective course in cases of path-dependency is a serious challenge (Aagaard 2012; Gerrits and Marks 2008).

Therefore, we will demonstrate how a new path can be created by increasing and employing complexity. It will be identified how complexification creates the space and conditions to break with undesired outcomes and escape from locked processes generated by simplification. Nevertheless, it will also become clear that simplification resurfaces, creating new path-dependency, giving cause to another complexification, and so on. This means that simplification and complexification are two poles in the evolution of decision-making processes. After a theoretical exploration of simplifica-tion and complexification, the path-dependency that goes along with simplification, and path-creation as the power of complexification, we provide an in-depth, close-up, and longitudinal case-study about Utrecht Central Station. In this case study, we investigate how public managers succeeded in increasing complexity and thereby created the favourable conditions for a memorable change in the decision-making process, that ultimately resulted in a high-quality design of the transformation area. We conclude by discussing the relevance of our findings in the debate about public management and dealing with complexity.

Simplification, and its relation to path-dependency

The concept of simplification was introduced by the political scientist and anthropologist James Scott in his book 'Seeing like a State' (1998). He analysed how states, since the

industrialization period in the 19th century, have started to impose an order to society and model it after a machine with clear boundaries, legible to state officials and open for steering and control. Complexity is considered a hindrance for societal progress, and therefore society and societal issues are subjected to a simple, repetitive logic, and arranged in a formal order from a helicopter-view (Scott 1998). Examples of this simplification are the transformation of the complex street patterns of medieval city centres into straight and broad streets, and the modelling of forests after a grid of single-species trees in straight lines (Scott 1998). It was believed that simplification would result in the highest effectiveness and efficiency and improve the well-being of citizens.

Simplification has attained a strong position in public administration literature, although implicitly. The simplified, machine-view on society is mirrored in organizational and administrative structures. It can be found in the traditional machine-bureaucracy: a stable and coherent organization, hierarchical, and with a clear division of tasks (Morgan 1986). In a search for even more effectiveness and efficiency, the output-side of the administrative machine was reinforced by the use of business management techniques, such as output parameters and performance benchmarks, well known as New Public Management (Hood 1991; Osborne and Gaebler 1992). Simplification can also be found in project management. Although often executed horizontally between line-organizations, it shows simplification in its well-ordered linear chain of activities (from A to B), restricted scope of projects (separated from other projects), a specified and beforehand defined completion date, and fixed financial resources (Wysocki 2011), all implemented and monitored by a temporary project organization (Turner 2016). In these management approaches, both the problem and the approach to solve the problem are being ordered.

Our theoretical exploration identifies that simplification can be applied to three dimensions of public administration: its content (problem and solution definitions), its processes (the way to achieve results), and its structures (organizational design) (see Ongaro and Van Thiel 2018; Hildreth, Miller, and Rabin 2006; Peters and Pierre 2003; Raadschelders 1999 for comparable dimensions of administration). In terms of content, problems are cut in well defined and bounded sub-problems that can be matched to solutions. On the process dimension, the path is split up into pre-defined steps (e.g. agreements) that will lead to pre-determined results. On the structure dimension, the organization is designed by formal, hierarchical positions and fixed relations guided by bounded tasks. Characteristic for this conceptualization is an ordered and mechanical administrative practice. Next, simplification has a strong relation with the well-known concept of path-dependency, which can be understood as restricting 'the space of possibilities' (Mitleton-Kelly 2003). Past decisions restrict future decisions and guide them into an overall direction that can be potentially ineffective (Arthur 1994; David 1985; Ebbinghaus 2005; Gerrits and Marks 2008; Mahoney 2000; Pierson 2000; Sydow et al. 2012; Vergne and Durand 2010). It can be argued that the ingredients of simplification (bounded problems and solutions; linear processes; formal, hierarchical relations) correspond to mechanisms that create path-dependency (see Table 1): bounded problems and solutions form simplified mental maps by which people make sense of complex situations (Denzau and North 1994; Haase, Roedenbeck, and Söllner 2009); linear processes are guided by institutional procedures and agreements that ask for commitment (Ebbinghaus 2005; Torfing 2009); and hierarchical structures imply power relations that enhance the status quo (Ebbinghaus 2005; Pierson 2000; Torfing 2009). If there is a similarity between the ingredients of simplification and the

Table 1. Simplification and path-dependency.

Simplification		Path-dependency	
Dimensions	Description	Mechanisms	Description
Content: problems and solution definitions	Separated, bounded and clearly defined sub-problems and sub-solutions	Simplified mental maps	To make sense of complex situations, people develop simplified mental maps
Process: the guidance of events	Linear chain of sequential events, working with procedures, keeping on track	Institutional agreements and procedures	Agreements and procedures guide behaviour and ask for commitment
Structure: the organization of actors	Hierarchical, vertical organization, restricted collaboration based on formal roles	Hierarchical (power) relations	By formal power relations the status quo is preserved

mechanisms of path-dependency, the argument can be that simplification generates path-dependency and reduces the capacity to adapt and manoeuvre.

Complexification, and its relation to path creation

Simplification generating path-dependency is not a problem so long as the path is effective (Gerrits and Marks 2008). The question is whether simplification risks to result in ineffective path-dependency. Literature on complex and wicked problems seems to reply in the affirmative. It is argued that these kind of problems resists imposing order which results in all kinds of unintended or unanticipated consequences. Wicked problems, as argued by Rittel and Webber (1973), are ill-defined, tightly connected to other problems, and have no clear set of proven solutions. These kind of ambiguous, fluid problems increasingly characterize late-modern society (Bauman 2000). It is also argued that it is more accurate to speak about 'issues' instead of problems: sets of interrelated problems and sub-problems that develop non-linearly and dynamically and involve a variety of different, interdependent actors (Klijn and Koppenjan 2012; Teisman and Klijn 2008b). In the context of wicked, complex issues, simplification does not generate the desired effects. It is not only ineffective (Ansell and Gash 2008; Head and Alford 2008), it even risks a vulnerable, impoverished society (Scott 1998) and unexpected outbursts of chaos (Taleb and Blyth 2011). Also in large infrastructural renovations as in our case-study, the ineffectiveness of ordering approaches has been identified (Flyvbjerg, Bruzelius, and Rothengatter 2003). In sum, simplification as management mode is expected to be an ineffective path when applied to complex issues.

If simplification is ineffective in dealing with complex issues, it seems a logical next step to search for an approach that mirrors the complexity of the issue and conforms to the 'law of requisite variety' (Ashby 1991). In this article, we present the complexification approach. The idea of complexification can be found in Heylighen (1999), who discussed the growth of complexity during evolution, and how organisms increase their complexity as an adaptive reaction to enhance their chances to survive. In artificial intelligence, complexification is presented as 'the incremental elaboration of solutions through adding new structure' (Stanley and Miikkulainen 2004, 63). Gershenson and Lenaerts (2008) define complexification as 'diversification between evolving units'. Also Allen, Strathern, and Varga (2010) present complexification as

'exploring diversity' to improve organizational performance. According to these authors, complexification is about increasing variety and diversity to enhance the chances to survive (in evolutionary context) or to improve outcomes and performance (in organizational context).

Coming to the domain of Public Administration, complexification brings along a positive perception of complexity, not being a 'risk or an obstacle', but 'an asset, or at the very least a source of productive inquiry and understanding' (Wagenaar 2007, 23). Also Weick (2007) states that complexity means 'richness' that has 'generative properties', an idea that can also be found in complexity leadership literature (Murphy et al. 2017; Teisman, van Buuren, and Gerrits 2009; Uhl-Bien, Marion, and McKelvey 2007). In administrative practices, complexification can have the form of increasing the amount of different actors involved, as known from network theory and collaborative governance (Agranoff and McGuire 2004; Ansell and Gash 2008; Klijn and Koppenjan 2012; Rhodes 1997). It can also entail the incorporation and combination of different problems and solutions (Gerrits and Marks 2017), or the replacement of linear processes by non-linear, adaptive, and improvised ways of working (Kamoche and Cunha 2003; Teisman 2005).

Using the same dimensions of public administration as in the previous section, complexification can be defined along the lines of content, process, and structure. Complexification means the widening of the scope of problems and solutions by combination and integration; the opening up of processes by adapting to emerging events and improvisation; and a broadening of structures by involving a variety of actors and building relations based on the added value actors bring in. In this definition of complexification, in contrast to simplification, a management approach is presented that is characterized by variety and diversity and a non-mechanical way of working. Analogous to simplification and path-dependency, complexification is now related to the concept of path-creation. Whereas path-dependency refers to the restriction of the space of choice, path-creation is about increasing the possibilities. Literature about path-creation discusses processes of successful change in which agents succeeded in 'dis-embedding' and 'mindfully deviating' from existing structures (Garud and Karnoe 2001). There are also other related concepts, such as branching pathways (Ebbinghaus 2005), path generation (Djelic and Quack 2007), and also complexity leadership literature (Senge et al. 2005).

From this literature, conditions can be derived under which paths can be successfully changed. Our argument is that these conditions can be matched to the definition of complexification. In other words, complexification creates the favourable conditions for change (see Table 2). The combination and integration of problems and solutions corresponds to de-framing and re-framing existing viewpoints. By remixing problems and solutions, taken-for-granted perspectives are questioned and discredited, and new perspectives are sketched (Garud and Karnoe 2001; Garud, Kumaraswamy, and Karnøe 2010). On the process dimension, non-linear and improvised ways of working enable the 'cultivation of chance', which means the utilization of events that can create change. These events can be accidental but afterwards experienced as 'magic' and decisive (Lichtenstein 1997). On the structure side, enlarging and diversifying the network corresponds to the introduction of new actors and the mobilization of actors that can support change (Garud and Karnoe 2001; Garud, Kumaraswamy, and Karnøe 2010). Previously external actors are employed in criticizing the existing approach (Djelic and Quack 2007; Ebbinghaus 2005).

Table 2. Complexification and path-creation.

Complexification		Path-creation	
Dimensions	Description	Conditions	Description
Content: problems and solution definitions	Creative combination of problems and solutions	De- and reframing of existing frameworks	Questioning the relevance of existing views and sketching new perspectives
Process: the guidance of events	Adapting to new and unexpected events, connecting events to temporary wholes	Cultivating chance	Utilizing events as opportunities for change
Structure: the organization of actors	Horizontal organization, based on equality, openness for new stakeholders, collaboration based on added value	Changing and mobilizing the network	Introducing new actors, mobilizing actors that can stimulate change, building coalitions

In sum, the theoretical argument is that complexification management creates the favourable conditions for changing and unlocking processes that got locked by simplification. Simplification easily results in ineffective path-dependency, and by complexification, another path can be created that is potentially more effective in dealing with complex issues. In the following case-study about the transformation of Utrecht Central Station, we will test and validate these assumptions.

Methodology: in-depth, close-up, longitudinal case-study

Case introduction: transforming Utrecht Central Station

The research consists of an in-depth case-study about the eastern square of Utrecht Central Station, the biggest railway station in the Netherlands. This railway station area has been subjected to substantial transformations: the terminal, the surrounding areas, and several squares have been renewed. After the failure of one integrated plan, the transformation challenge was split up into separated projects. We focused on one of these projects, the Eastern Square area. In the old situation, the station was directly connected (on +1 level) to the largest inner-urban shopping centre in the Netherlands (Hoog Catharijne). This generated the highest revenues per square metre for owner Klepierre. However, the municipality wanted not only to give the station a separated, recognizable entrance at the city side, but also make the area on the street level more attractive and secure. Given this situation, we are dealing with a high revenue area with huge interests at stake. Moreover, there are other issues to consider: the area was relatively small, and also claims of the Dutch Railways (terminal owner) and ProRail (rail owner), and competing project organizations dealing with other projects in the surrounding area had to be accommodated. In total, in a period of over 10 years, eight actors have been involved, each owning different development initiatives, partly overlapping each other.

Choice for critical and paradigmatic case

This case has been chosen for two reasons. First, among infrastructural projects, the case of the Eastern Square is quite a complex one because of the variety of interconnected projects and actors involved. This makes the case a 'critical case' (Flyvbjerg 2006), well suited to study governmental strategies for dealing with this high-complexity. In addition, at the

start of the case study, it was clear that a long period of very limited progress has ended with a clear moment of change, followed by a much more successful period. This gave rise to the question whether this change could be explained by using the concepts of simplification and complexification. The case was therefore also a 'paradigmatic case', being the founder for theory developing and demonstrating a promising framework about the management approaches of simplification, complexification, and the dynamics between them (Flyvbjerg 2006).

Narrative case-study

The case-study, characterized by close-up observation of limited materials, serves the aim of identifying the context of social phenomena and how actors behave and make sense of that context (Flyvbjerg 2001; Ragin and Becker 1992; Stake 1995). An appropriate form to present human behaviour and experience within specific contexts is a narrative (Abbot, 1992; Becker 1992; Flyvbjerg 2001; Uprichard and Byrne 2006). The case narrative presented below is a 'thick description' (Geertz 1973), a detailed and contextualized account on how actors perceive and manage complexity. It presents the sequence of events, and the conflicting sense-making of these events is presented in key episodes and rounds of decision-making. The rounds model, developed by Teisman (2000), pays attention to the role of events, changes in course, constellation, and personal involvement during a long period of transition. The rounds are identified by key events that changed the (definition of) problems and solutions at hand and/or the constellation of actors involved.

Data collection and analysis

In the case study, we conducted interviews with 26 persons of eight actors involved and analysed over 100 documents, such as meeting reports, policy documents, planning documents, designs, and decision histories. In the interviews, the process and the experiences of actors have been discussed. A semi-structured interview guideline was used, focusing on perceptions of complexity and the transition process from simplification to complexification, but also allowing space for respondents to tell their own story. The interviews were transcribed and processed in an extended case document. In analysing the interviews, a theoretical operationalization of our concepts was used. In the appendices, it is shown how the key concepts of simplification, complexification, path-dependency, and path-creation have been indicated in the case study, based on their definitions presented in previous sections.

When making the case-narrative, the interviews were re-read and missing information has been added to the case-description to avoid overseeing essential aspects. Regarding the document analysis, information from documents has been processed in the extended case document and used particularly for reconstructing events and making a time-line of the decision-making process, as well as collecting more technical information about designs. The case-study was presented several times to the respondents for correction and validation.
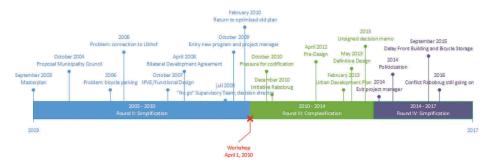
Figure 1. Time-line decision-making process Eastern Square (round I is excluded to prevent that the figure becomes too large).

The challenging renovation of the largest railway station in the Netherlands

In this section, we describe the longitudinal sets of attempts to transform the station area of Utrecht in order to keep up with new demands (see for an extended case-description our professional publication: Joosse-Bil and Teisman 2017). We start our reconstruction at the end of the 20th century and identify four rounds of decision-making: round I (before 2003), the integrated attempt of transformation that ultimately failed; round II (2003–2010), the project-based approach giving life to the Station Square project amongst others; round III (2010–2014), a new approach of combination and integration; and round IV (2014–2018), again a split-up of the area during the implementation (Figure 1).

Round I: an ambitious, but fruitless attempt of complexification

Before 2003, several attempts to transform the area have been taken, but ultimately failed in the collaboration between stakeholders. One attempt was the integrated Utrecht City Plan proposed by the famous Dutch Urban Planner Riek Bakker. In 1987, the municipality, Jaarbeurs, Dutch Railways, and the General Civil Pension Fund (ABP) delivered a first sketch, but the actors could not reach an agreement. In a next attempt, four actors founded the Utrecht City Project (UCP), a partnership that would have led to an integrated plan without clear boundaries between the different areas. However, the many cross linkages between the parts generated such strong feelings of an unmanageable and threatening approach that the actors did not feel comfortable enough to step in. In total, four attempts, each in different forms of partnerships, have been initiated and successively failed. After the elections of 2001, a new political party (Leefbaar Utrecht) entered the stage. Wanting to stop the existing approach, it initiated a citizen referendum on two equal visions, labelled as Vision 1 (City Centre Compact) and Vision A (City Centre Extended). After a clear vote for Vision A, civic legitimacy and support was created for a next transformation round.

Round II: an effective looking application of the simplification mode leading to a lock-in

In the next attempt called Masterplan (2003), the municipality stipulated a cut between central station and shopping centre. In addition, the municipality council decided to divide the transition program into separate projects guided by project leaders, each with their own scope, planning, and budget. The redesign of the Eastern Square became one project among four others: (2) the north building, (3) the New Station Street, (4) Hoog Catharijne, and (5) the terminal. The projects were interrelated but managed separately. It was assumed that a strictly guided process and separation between parts would create order and sufficient simplicity to achieve the results defined in advance. The results would be built up by intermediate steps of bilateral agreements. From the onset, all stakeholders were enthusiastic to realize their own project. Soon, however, the managers of the separated projects were facing problems due to changing conditions and decisions taken by other projects. One example is the decision confirmed by the city council in 2004 to broaden the New Station Street. This decision consequently limited, quite literally, the space of possibilities for the square. Ultimately, the municipality and Klepierre did not succeed in finding a solution for the problem 'square' (created by a solution for the street) that was mutually commercially attractive (private interest) and a progression on liveability (public interest).

A second example that challenged the simplification approach was the increase in the estimated amount of public transport passengers. In reaction, the municipality developed an adaptive solution: a bicycle flat on the Eastern Square. By doing so, it created a new (sixth) project. However, soon the bicycle flat faced exploitation problems and had low added-valued for the attractiveness of the area. Moreover, and based on the new estimations about numbers of passengers, the municipal board decided to replace the busses to the university campus ('De Uithof') by trams. Now, a tram stop was necessary at Eastern Square. The tram became separately managed project number seven, even though it literally crossed all other projects. For the parties involved in the Eastern Square project, this new project was unexpected and uncoordinated. Due to these dynamics, which were rational from the perspective of the separated project ambitions, the whole set of intertwined projects became unmanageable. Almost no freedom of choice was left, and the projects cannibalized each other and formed parasitic relations, especially on their space to find high-quality solutions for the problems at hand.

Despite the growing dissatisfaction, this situation has been sustained for 6 years. Two reasons, among others, were given in interviews. First, bilateral agreements made in 2008, committed actors to execute the agreement and keep going on. Second, respondents declared that a new path was simply unimaginable and also uncertain in its success. Leaving the simplification approach evoked the fear of falling into chaos and reaching no result at all.

By mid-2009, external pressure was building up. A supervisory team of architects, strategically mobilized according to some respondents, initiated an assessment of the quality of the whole set of project plans, criticized the lack of quality of the Eastern Square, and threatened to stop the national subsidy if the actors would continue the process. In addition, frustration was building up about the limited progress and the accumulation of problems, especially because of the *Uithof* tram stop. Therefore, the municipal director of the Central Station Area decided to stop the decision-making process and start again. After

that decision, the municipality searched for more quality in a work session in July 2009. In less than several hours, by 'making some creative steps in thinking' a new idea was developed that merged several previously separated projects and succeeded in solving the tangle of problems, although the plan was more costly, risky, and complex. Additionally, a new and 'fresh' project manager replaced the project manager during his holidays, and he kept that role after the previous manager returned.

Also a new program manager took up office. The director, new program manager and new project manager started talking, pushing and pulling to receive support for the new ideas. Slowly, the process 'started moving', the program manager said. Some months later (February 2010), the municipality had to choose among three designs: the new plan, the old but optimized plan, and a third plan. The new plan gave rise to anxiety because of its risks and complexity, and, therefore, the municipality chose to stick to the optimized old plan. On 1 April 2010, this optimized plan was presented to all stakeholders in a workshop meant to solve some problems together. However, the actors firmly said that the old, optimized plan could neither solve the existing problems nor reconcile the different stakeholder interests. The workshop was in danger of failure. The manager instantly sensed that this could be an opportunity to change plans. He consulted his director and asked for 'more space'. After permission, he returned to the workshop and gave the stakeholders the space to set aside the unsatisfactory compromise and open up the floor for better ideas. A new, creative, and joint result was realized in hours and was embraced by all stakeholders. The bicycle flat, criticized by several actors, was now moved under the square. The square itself was enlarged, giving more space for commercial activities in and around the square. In addition, Klepierre allowed the Dutch Railways to make use of their expedition space. Financially, synergy was created by combining the budget of the old bicycle flat and the square. By removing boundaries and combining problems and solutions, a new path with significant more benefits for both shareholders and stakeholders was found. Although the ideas have already been available for half a year, it was on April 1 that the moment to embrace had come. Respondents, especially from the municipality, identified this moment as a 'magic' moment, an unexpected breakthrough that generated energy and perspective in the design process. The project manager declared: 'Suddenly, it changed from competition to cooperation. In this plan, everything came together. This moment will always stick in my memory'.

Round III: a period of complexification leading to an innovative design

The workshop opened a new trajectory (new negotiations, new designs) in the complexification mode, in which the degree of complexity was much higher, but finding high-quality solutions was much easier. In the third round, all actors were around the table at the same time. Together, they considered the effects of solutions on the whole area. Every idea and proposed solution were given a chance by making an extra design by the architect. Saying 'this is not possible' was postponed as long as possible. Finding solutions were a matter of 'seeking and puzzling, instead of fighting', a respondent declared. Actors thought in terms of opportunities instead of risks. They took each other on board regarding to the interests and considerations of their internal organizations. Respondents did not see the planning process as something hindering or blocking.

However, respondents feared that the new process and plan was so complex that actors would return to the old plan. The openness to other desires and interests also evoked the fear of 'having no vote'. The project manager, however, had an attitude of 'it is going to be all right'. In April 2012, a pre-design was completed, declaring that 'actors succeeded in giving a new future to one of the most intensive Station Areas of the Netherlands'. Nevertheless, there were some heavy struggles between the actors concerning the design of the roof, the kiosks on the square, the bicycle storage, and the cables and pipelines under the square. A potential threat to the process also came in October 2012 from the municipality council, which wanted to codify the new plan, for which the actors were not ready. A soft framework on headlines was found that satisfied the council. In December 2012, a bridge ('Rabo bridge') over the platforms outside the Eastern Square area was proposed, which would strongly influence the commercial position of Hoog Catharijne, creating tensions between the actors. Also, in February 2013, an unexpected tense period dawned when an urban development plan was made in which the Eastern Square was one of the parts. Some political parties wanted adjustments, while the project manager had almost no space in planning anymore to accommodate these wishes.

In 2013, the design period was completed with a decision memo. The project manager consciously kept the memo unsigned by the parties to avoid fixations on the designs and to keep some room open for manoeuvring. The ultimate design consisted of the largest bicycle storage of the world, located under a commercially attractive and livable square that reconciled the interests of different parties on a higher level.

Round IV: the implementation – back to simplicity or innovative executing?

A remarkable result was achieved. This could be the end of our case-description, but keeping in mind that decision-making never stops, we are interested in whether a complexification path can survive in the next round of implementation and contracting out that started in 2014. In this phase, six sponsors and three builders had to execute the design on the small area (called by some 'building on a stamp'). The tension was rising because of increased pressures of time, budget, and accountability. In addition, new players, such as outsourcing experts, builders, and contractors entered the scene, with less loyalty to the area and its different interests. They also were not 'infected' by the enthusiasm and results of round III, and not primarily oriented to adding value, but more skilled in deconstructing the result in 'simple', tenderable parts that can be guided and controlled. Furthermore, for the implementation phase, the municipality chose to appoint a new project manager more conformed to the project management principles. In sum, several crucial players in round III were not part of round IV. A new round of simplification started, like in round II. A program manager declared: 'We returned to our own islands, where we know what to do and what not to do. Now we speak different languages and became prisoners of our own organizational logics'. Actors framed their own risks, instead of managing them jointly. They experienced that the split-up of the area and closure of the process resulted in energy fading away, raising costs, and delays in the building of the bicycle storage and the front building of Hoog Catharijne.

Analysing how complexification management favoured the creation of a new path

Having told this story, we now analyse the management modes of simplification and complexification in the different rounds, how the simplification approach created an ineffective path, and how public managers applied the alternative strategy of complexification, able to generate a new path.

When considering the rounds of decision-making, the simplification and complexification modes seem to alternate, as if they were the tides in the sea, each with their own qualities and results. The simplification mode dominated in round II and IV. In these rounds, on the three dimensions of management and administration, the simplification mode was present: the issue was split-up in separate projects, each focusing on its own problem and looking for its own solutions; the process had restricted dynamics and linearly followed the steps to a predefined result; and the structure consisted of restricted, bilateral collaboration between the actors. This simplification approach was chosen to make the complex issue readable, controllable, and solvable for the actors involved.

On the other hand, in round I and III the management mode of complexification was applied. In round I, the plans of 1987 and 1996 incorporated the complexity of the area as much as possible. Although this round was not the focus in this research, it is interesting to note that complexification can fail when actors become paralysed by focusing on the whole and feeling unable to take responsibility for any part. This gives informative insights about the weaknesses of complexification. In round III, the complexification mode was applied to the three dimensions mentioned before. On content, the boundaries between the separate projects were removed and problems and solutions combined. The issue was considered holistically, which means that the problems and solutions were evaluated on their mutual effects and on the square as a whole. On process, the way to a result was open and improvised. New, emerging preferences were tried to accommodate into the design. On structure, the actor constellation was broadened and collaboration was multilateral and joint.

The case study also demonstrates the weaknesses of the simplification. In round II, the simplification mode initially gave comfort but ended six years later in a dissatisfying lock-in situation. Simplification created a path-dependency that appeared to be ineffective in the long term. We identified two explanatory mechanisms. First, reducing issues to separate problems-solution-combinations (Gerrits 2012) came to serve as a strong *mental map*: a conviction that the imposed order of problems and solutions was the only way to make sense of and deal with the complexity of the area. This is confirmed by respondents declaring that another approach was unimaginable and would open the door for chaos. Second, the built-in step-by-step *institutional agreements* (the proposal of the municipality council in 2004, the functional design in 2006 and bilateral agreement in 2008) created a strong commitment of the stakeholders to the embarked path.

These mechanisms created a path-dependency that became problematic as soon as the actors did not succeed in generating the desired quality in the design. The ordered project grid, linear process, and bounded structure narrowed the path down towards an impoverished compromise that did not satisfy any of the actors involved. None of the actors had the space to safeguard their own interests, and no added value was

created on the level of the whole. In fact, the projects co-evolved parasitically. Also the imposed order was too static to accommodate new developments, such as the bicycle flat and the Uithof line. As a result, the created order turned into chaos, and the intended capacity to steer and control turned into inability and powerlessness. The actors found themselves locked into a dissatisfying situation. However, the intriguing story in this case is that actors succeeded in breaking through the path-dependent simplification mode. They were finally able to open up the path by bringing more complexity in the content, process, and structure of decision-making. First, the change and broadening of the structure has played an important role in the path switch. The (accidental) introduction of the new project manager, the joint collaboration between the stakeholders, and the mobilization or activation of the supervisors created much more creativity and pressure to change course. Second, the removing of the boundaries between problems and solutions was a way of reframing the issue and immediately generated new perspectives on rich and fruitful combinations of problems and solutions that reconciled the different interests on the level of the whole area. And third, the project manager applied a much more open process approach in which he was seeking for the 'right' events to utilize them for change. He was prepared for instantly making use of the dynamics during the workshop on April 1, following Pasteur's saying 'fortune favors the prepared mind' (Garud and Karnoe 2001).

These are three ways by which complexification created the favourable conditions for changing path and improving the impoverished compromise. Of course, the conditions are interconnected; together they form the fertile ground for a better result. The workshop on April 1 could be cultivated as a moment of change because more complexity was already brought in the problem-solution combinations and the structure of the network. The new, innovative design 'was already there', as well as the new project manager and the broadened actor constellation. These conditions were already realized so that also another condition could become reality: a chance event to utilize as the actual moment of transformative change on 1 April 2010. In the table, it is summarized how complexification created the favourable conditions for change in the case of Utrecht Central Station (Table 3).

The reader might notice that we speak about conditions instead of mechanisms or causes. Using mechanisms would imply a hind-sight view in which factors inevitably and linearly lead to a result, and this would ignore the bumpy and difficult process as experienced at the moment. Path creation is not a kind of 'exit coming up about two miles', but

Table 3. How complexification favoured the creation of a new path in Utrecht.

Complexification		Path-creation	
Increasing the complexity on …	meaning …	was a way to …	resulting in …
Content: problems and solution definitions	Removing the boundaries between projects, and combining formerly separate problems and solutions	De- and reframe existing situation	Rich and satisfying matches between problems and solutions
Process: the guidance of events	Looking for events to utilize and connect	Cultivate chance	A 'magic' change event on 1 April 2010
Structure: the organization of actors/network	Bringing together actors in a joint effort, and introduction of authorized supervisors	Mobilize the network	A joint decision to say goodbye to the existing result and embrace an innovative design

characterized by two steps forward and one backward. The new innovative plan was initially put aside by the optimized, old plan, and even the workshop was initially meant to solve problems within the simplification mode. Conclusively, success was never guaranteed; we only can say that the conditions for change have been created by employing complexity.

In this analysis, the focus has been on the turning point between round II and round III. Complexification management resulted in a goodbye to the old, low-quality result of round II and in a unique and innovative design that was elaborated in round III. Nevertheless, it is interesting to spend some words on the dynamics in round III and IV. In sum, we see that complexification management is a vulnerable approach that is constantly in danger of replacement by simplification management. Already in round III, attempts of the municipality council were taken to codify and harden the results and thereby create order in the management approach. In round IV, the early death of the complexification mode is a fact. New actors split up the area in tenderable parts and organized themselves by formal responsibilities. A simplification round started with 'new' path-dependent behaviour that seems to result (again) in undesired outcomes. An assumption arising from the case is that the downturn of complexification and the reappearance of simplification are part of the 'normal' dialectics in decision-making processes.

Discussion: complexification management for unlocking ineffective paths

Our case-study and analysis contribute to public administration literature in three ways. First, the study clarifies the process of creating conditions under which an ineffective management approach can be left. Second, we present two management modes for dealing with complexity that are not presented before in terms of simplification and complexification. Third, we connect the concepts of path-dependency and path creation to the management modes of simplification and complexification. In this section, we discuss these contributions and their implications.

The first contribution is in the identification of conditions for path creation. In public administration literature, much attention has been paid to how paths can get stuck and locked-in. With the notion of path-dependency, we can identify how a chain of decisions, rational at the moment, creates an ineffectiveness in the long term and in retrospect, and also makes it difficult to change course. Less attention, however, has been paid to unlocking a path and how actors succeed in turning to another path. Therefore, we brought some insights together on path creation (Garud and Karnoe 2001; Garud, Kumaraswamy, and Karnøe 2010), path generation (Djelic and Quack 2007), branching pathways (Ebbinghaus 2005), and complexity leadership (Senge et al. 2005; Uhl-Bien, Marion, and McKelvey 2007). Based on this theoretical exploration, and combined with an in-depth and longitudinal case-study, we identified three conditions that favour the creation of a new path: de- and reframing of the existing approach and its dissatisfying results, cultivating chance by utilizing events that can create change, and changing and mobilizing networks by moving in new and 'fresh' managers and actors that stimulate change. These form a set of conditions with promising explanatory value, while acknowledging its limited predictive value in the sense that transformation remains a matter of coincidences: conditions coming together and clearing the way for change.

Our study confirms the insights of Ebbinghaus (2005) that pressure (internal and external) incrementally builds up towards a critical change event, although this actual

moment of change is unexpected from the onset and considered something 'magic', beyond control, not explainable by logic, which is in line with the work of Lichtenstein (1997). Our study highlights the importance of these transformative events. These moments are not only some kind of pep talk used by management gurus (Huczynski 2012), they exist in real life and have substantial impact. Our case-study also corresponds to the work of Senge et al. (2005) and Scharmer (2009) about the psychological aspects of group dynamics. They do not present processes of change as a policy memorandum, but as an interpersonal process of increasing awareness during a group setting (the workshop on 1 April 2010).

At first sight, the idea of conditions paving the way for change has important similarities with the concept of windows of opportunities (Kingdon and Thurber 1984). During these windows, actors make use of opportunities to re-match problems and solutions and create change in existing policy processes. Indeed, our study shows the important role of 'policy-entrepreneurs', in this case, the project manager who considered the dynamics during the workshop an opportunity for change. However, in contrast to the model of Kingdon, in our case, there was no match between the streams of politics, policy, and problems. Moreover, the stream of politics was more or less absent in the case. The transformation process was mostly a matter of administration, not of politics; politics was context, not the change-creating subject. It is also in this way that our findings differ from the political agenda-setting theory and the politics of punctuated equilibrium of Baumgartner and Jones (2010); Jones and Baumgartner (2005).

The second contribution of our study lies in the presentation of two management modes in dealing with complex issues. Based on the work of Scott (1998), we brought the concept of simplification to the front. Although the characteristics of simplification can be found in many public administration literature (see also the debate on specialization and integration: Bezes et al. 2013; Christensen and Lægreid 2007; Fimreite and Lægreid 2005; Pollitt and Bouckaert 2004), as a concept it has never been established. In our view, the term simplification enables us to combine elements from several public administration models that reduce complexity and impose order to issues (traditional government, New Public Management, project management) under one umbrella. It also enables us to confront it firmly with its opposite, complexification, and the rising, but still contested, idea of beneficial complexity (Allen, Strathern, and Varga 2010; Cilliers and Preiser 2010; Heylighen 1999; Scott 1998). Based on the case study, we demonstrated the weaknesses of simplification in dealing with complex issues, thereby contributing to insights about the unintended, unanticipated, and reverse effects of imposing order and control to complex issues (Merton 1936; Pressman and Wildavsky 1984; Scott 1998). In addition, and to nuance Scott's focus on the state or governments in general, our case-study points out that simplification is also applied in networks with private and third-sector parties which indicates that simplification is not only a matter of government, but a broader societal strategy to deal with complexity.

We also provided an in-depth demonstration of the surprising results of increasing instead of reducing complexity, thereby confirming and strengthening similar arguments in public administration literature (Gerrits and Marks 2017; Wagenaar 2007; Weick 2007) and going beyond merely embracing and acknowledging complexity. We showed that complexification can be a full and effective management approach to achieve high-quality options in dealing with complex societal issues. Because it brings in diversity in problems, solutions, and actor constellation, it enhances the chance to achieve result that is valued in the eyes of the actors involved. We introduce complexification into the debate in public

management and administration about approaches that match to the late-modern, liquid, and fast-changing issues of contemporary society (Farazmand 2009; Howlett and Ramesh 2014; Karré, van der Steen, and van Twist 2011; Termeer et al. 2015).

The third contribution is in relating the path-concepts to the management-concepts. We have argued that applying an ordered approach (simplification) to complex issues creates a strong path-dependency that easily turns out to be ineffective, while increasing complexity (complexification) is a strategy to unlock processes, break free from dissatisfying results and create high-quality results. Based on literature and case-study, we have demonstrated that simplification corresponds to the mechanisms of creating path-dependency, and that complexification fits to the conditions of creating new paths. This novel theoretical argument should, however, not close our eyes for the pitfalls of complexification and the strengths of simplification. Increasing complexity can also result in paralysis, as in the first round of the Utrecht case, and also in volatilization and lack of consolidation of result, as in the fourth round of the case (see also Teisman 2005). In addition, simplification will not inevitably result in ineffective paths, as it is a suitable strategy in non-complex, mechanical contexts (e.g. Snowden and Boone 2007).

Therefore, the nuanced argument is that simplification has a considerable risk of ineffective path-dependency in complex issues, while complexification has a strong potential for unlocking paths. For public managers, this means that complexification can be applied as a management strategy in cases of deadlocked processes, in order to enlarge the chance for more promising results, for example, by bringing in variety in problems and solutions, broadening the (organizational and network) structures, and improvising in processes. Perhaps the most daunting and intangible part is in the improvisation, namely how to be open for chance events to utilize, or in the words of Eppel (2012), to 'anticipate on surprises' and be 'mindful of the unknown'. A possible way to further develop the practicalities of complexification is to profit from insights from design thinking, which is presented as a practical, open search and creative process of matching problems and solutions in complex, wicked issues (e.g. Buchanan 1992; Dorst 2006).

In this discussion, several questions emerged to be addressed in future research. Most importantly, attention needs to be paid to the dialectic relation betwestrenghten en simplification and complexification. As the case-study shows, there is neither a definitive win of the new approach over the old approach, nor a simple opposition between both. Rather, there is a dynamic, continuous, and evolutionary movement between both strategies, with alternating dominances. Therefore, it is important to research, validate, and refine how both management modes alternate, how the weaknesses and shortcomings of the one strategy do invoke the other strategy, and how public managers have a role in these turning points. This can be researched in different contexts to enable a sophisticated comparison. The same is true for our finding of the effectiveness and path-creating capacity of complexification. Additional in-depth case-studies are necessary to complete the stories of employing complexity to unlock processes and achieve high-quality results. At this point, establishing the link to the concept of adaptive capacity can be helpful, as well as applying creative design thinking to develop the practical aspects of complexification.

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Appendix

Operationalization of simplification.

Dimensions	Description	Indicator in the case-study
Content: problem and solution definitions	Separated, bounded and clearly defined sub-problems and sub-solutions	E.g. the issue is divided in sub-areas and sub-projects, that logically sum-up to the whole area
Process: the guidance of events	Linear chain of sequential events, working with procedures, keeping on track	E.g. a strict planning is used with identified intermediate steps and agreements (from A to B)
Structure: the organization of actors	Hierarchical, vertical organization, restricted collaboration based on formal roles	E.g. bilateral collaboration, with clear lines of communication, only regarding to the specific task of the actor and his sub-problem

Operationalization of complexification.

Dimensions	Description	Indicator in the case-study
Content: problem and solution definitions	Creative combination of problems and solutions	E.g. boundaries between separated sub-problems and sub-projects are removed
Process: the guidance of events	Adapting to new and unexpected events, connecting events to temporary wholes	E.g. planning is flexible; emerging problems, solutions, and desires are accommodated
Structure: the organization of actors	Horizontal organization, based on equality, openness for new stakeholders, collaboration based on added value	E.g. all actors jointly around the same table, informal deliberation about each other's (potential) impact on the whole

Operationalization of path-dependency.

Mechanisms and outcomes of path dependency	Description	Indicator in the case-study
Simplified mental maps	To make sense of complex situations, people develop simplified mental maps	E.g. the existing approach is experienced as the only possible way of dealing with complexity
Institutional agreements and procedures	Agreements and procedures guide behaviour and ask for commitment	E.g. already made agreements have to be respected; giving another try to execute them
Hierarchical (power) relations	By formal power relations, the status quo is preserved	E.g. managers use their formal authority to continue the process
Lock-in	The experienced costs to leave the path are too high	E.g. turning to another management mode is no option anymore
Inefficiency and ineffectiveness	The goals are not achieved, useless spending of time and money	E.g. dissatisfaction, low-quality compromise

Operationalization of path creation.

Conditions of path creation	Description	Indicator in the case-study
De- and reframing of existing frameworks	Questioning the relevance of existing views and sketching new perspectives	E.g. other definitions of problems and solutions are proposed, as well as another management approach
Cultivating chance	Utilizing events as opportunities for change	E.g. managers wait for their chance to use events for creating change
Changing and mobilizing the network	Introducing new actors, mobilizing actors that can stimulate change, building coalitions	E.g. new managers come in, authorized actors are activated that can (help to) change course