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MASTER THESIS



THE ROLE OF PUBLIC-PRIVATE COOPERATION IN THE TRANSITION TOWARDS A NEW SOCIO- TECHNICAL SYSTEM BASED ON SUSTAINABLE CITY LOGISTICS

*An analysis of initiatives in historical G40 cities in the
Netherlands*

Colophon

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Hanneke Koedijk

Groningen, August 18, 2019

Abstract

Cities are experiencing a transformation from a 'place to buy to a place to be'. Related to this transformation are the increasing leisure activities resulting in the supply of goods into the city centres. Furthermore, the e-commerce is still increasing resulting in an additional transport flows into the centres. The city as a place to be demands for a liveable and attractive centre in which these transport flows are undesired. Here, a discrepancy arises. Furthermore, the European Commission mandates cities to have a zero-emission zone in city centres by 2030. In order to reach this objective, public authorities have to cooperate with private parties in the logistic sector.

The focus of this research is on how the transition towards sustainable city logistics can be triggered in Dutch historical cities based on sustainable city logistic initiatives. The following research question is established in order to meet the objective of this research:

Under what prerequisites can public-private cooperation trigger a transition towards a liveable city based on sustainable city logistic initiatives in historical G40 cities?

The transition theory and theories on governance frame this research. First, the sustainable city logistics developments on the socio-technical landscape, regime-level and niche-level are outlined. Results have been derived based on desk-research and empirical research consisting of a multiple-case research. These results are, in the form of a synthesis, reflected on the theory. The focus of the synthesis is on the position of initiatives on the transition S-curve and the role of the government per transition-phase. Furthermore, pre-requisites are identified that frame public-private cooperation. Finally, the synthesis elaborates on how transition management should be constructed

This research pleads for public-private cooperation in which the government should take on the leading task and develop policy plans concerning the transition. Private parties should be involved in order to identify bottlenecks and increase support. Furthermore, the government should facilitate and stimulate the transition. Essential is the construction and communication of clear and unequivocal regulation and maintenance of regulation. This can create a sense of urgency that can further stimulate the transition as stakeholders feel the necessity to act.

Keywords: *transition theory, governance, zero-emission, liveability, transport, logistics, public-private cooperation, roles of the government.*

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List of abbreviations

B2B	business to business
B2C	business to consumer
C2B	consumer to business
C2C	consumer to consumer
Green Deal ZES	Green Deal Zero Emissie Stadslogistiek

Chapter 1: Introduction

1.1 Relevance

Cities as the dynamic motor of the economy and everyday life are prone to continuous transformations triggered by external factors (Platform31, 2018). In the past decades, city centres have been known as 'shop Valhalla', with the main focus on consumption. However, substantial changes occurred since the beginning of the 21st century that had a major impact on the image of city centres. The economic crisis of 2008 and the changing shopping behaviour of consumers, partly due to the rise of the internet and the related ease of the online world and internet shopping, caused an increase in real estate vacancies in city centres. (Platform31, 2018).

Since a couple of years, cities are again transforming due to economic prosperity which comes with new consumer demands. The focus has changed from consumption into experience. Related to the transition towards experience is the transition of the idea behind 'cities as a place to buy' towards 'cities as a place to be' (Platform31, 2018).

Cities are transforming into a place that is multi-functional and where various functions coexist. Historically, city centres used to have a multi-functional character, through time the focus shifted towards the mono-functional city in which consumption was the leading principle. However, city centres are currently returning to its original multi-functional character. Visitors are attracted by these combinations of functions of which some side-aspects are of major importance, such as: accessibility of places; safety; quality of the public space; and an attracting residential climate. The multi-functional climate arises as a result of the demand for events; the rising catering-industry, and places where products are generated. Diversification of city centres is the focus area of municipalities as cities are eager to develop their own identity in which the transformation towards experience is leading. Attention shifted away from city centres as shopping areas, towards car-free centres in which the focus is on culture, high-quality designs of the public space and a strong unique identity (Platform31, 2018).

Research indicates that Dutch cities with the strongest identity are cities that are G40 cities with a historical city centre. These cities are experiencing an increase in (foreign) tourism rates as tourists are increasingly avoiding hotspots such as Amsterdam as they are aiming for experiencing the local environment (ABN AMRO, 2019). Historical city centres are important in determining the atmosphere experienced in the city due to the different cultural aspects visible in the design of the city. The large spectrum of facilities available to visitors and inhabitants of these cities define the vibrant character and atmosphere of these cities (Querl & Swart, 2014).

The transformation towards the multi-functional city raises problems concerning city logistics, especially in historical city centres. Historically, city centres are built for horse and cart, not for freight transport. Streets in historic city centres are relatively narrow compared to newly constructed areas. The transformation towards the multi-functional city generates increased logistic flows into the city centre (KiM, 2017a). Besides, continuously growing e-commerce cause even more logistic flows into the city centres as the current world is getting used to 'delivery within a day, throughout the day' standards (KiM, 2017a). City logistics have a direct

and disproportional impact on the liveability of the city centres as logistics are responsible for emissions, noise, vibration and physical nuisance. Besides, freight transport contributes to traffic unsafety and damage to infrastructure. (European Commission, 2013; KiM, 2017a; Quak et al., 2016). This negatively influences the aim of cities to create the centre as 'a place to be'.

The aim to reduce nuisance caused by city logistics is not new in policies. Municipalities are implementing policies that restrict freight transport from entering city centres during certain time periods since the beginning of the 21st century. An example of this are time windows. However, with the implementation of time windows the problem is centred to a certain period in which the pressure on the city centre further increases. In this way, new problems arise. (CSD, 2007).

Since the 1990s, city logistics are included in the 'Structuurvisie Infrastructuur en Ruimte (SVIR)', the national mobility policy of the Netherlands. City logistics are also included in national and local policies on themes such as climate and liveability; and urbanisation. Recently, more emphasis was put on this theme as the European Commission published their *White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system in 2011*. In this White Paper, the European Commission introduced the aim for CO₂ neutral city logistics in 2030 (European Commission, 2011). Member-states of the European Commission are obliged to translate this aim into their national policy.

In 2014, the Green Deal Zero Emission Stadslogistiek (Green Deal ZES) was put into practice. Within Green Deal ZES, signed parties aim for emission free logistics in city centres by 2025. Purpose of the Green Deal ZES is to reduce the emission of CO₂, NO_x, and particulate matters to zero and restrain noise nuisance (Green Deal ZES, 2014).

In practice, several municipalities in the Netherlands are working on innovative technologies that decrease air pollution and nuisance caused by city logistics. Some technologies are applicable to several cities, some technologies are tailor-made and therefore non-transferrable to other cities (Quak et al., 2016). City logistics can be seen as a tailor-made problem that exist in cities to a different extent. It therefore is very important to take the local context into account while developing policies and measures to solve the problem (KiM, 2017a).

1.2 Problem definition

To be able to on the one hand increase the liveability of a city to further increase the experience of visitors and on the other hand decrease the negative aspects of city logistics, a system-innovation has to take place to guide the transition of the socio-technical system. To establish this, cooperation between involved stakeholders is of main importance. Some stakeholders already acknowledge the role of cooperation among stakeholders to be able to establish this transition (Platform31, 2018). However, not all stakeholders acknowledge the problem to the same extent and some municipalities are not making progress in taking action compared to other municipalities. Public-private cooperation in which public and private parties actively cooperate, has potential to stimulate the cooperation and trigger system-innovations and the transition of the socio-technical system (Taniguchi, 2014). The main question is what role municipalities should take in cooperating with the stakeholders to be able to transform the city to a place that is both liveable and sustainable on the one hand and innovative within the logistic sector on the other hand.

Summarizing, to reach the 2025 goals of the Green Deal ZES, cities need to start acting. This thesis explores what prerequisites within public-private cooperation are when it comes to triggering the transition towards the liveable city based on smart city logistics in historical G40 cities in the Netherlands.

1.3 Research objectives

The aim of this research is to provide insight into the prerequisites of public-private cooperation for triggering a transition towards the liveable city based on sustainable city logistics in historical G40 cities in the Netherlands. Information collected during this research has potential to provide a guidance for Dutch historical G40 cities towards the right direction in this transition. This research sheds light on the barriers and opportunities that are identified through in-depth interviews with municipalities, initiatives, entrepreneurs, and the logistics sector. Based on these barriers and opportunities, prerequisites that trigger the transition towards a new socio-technical system based on sustainable city logistics are derived.

In order to meet the objectives, the following research question has been derived:

Under what prerequisites can public-private cooperation trigger a transition towards a liveable city based on sustainable city logistic initiatives in historical G40 cities?

To answer the main research question, the following sub-questions must be answered:

- (1) In what phase of the transition are sustainable city logistic initiatives currently operating according to the multi-phase concept as part of the transition theory?
- (2) What barriers and opportunities are sustainable city logistic initiatives facing in reaching the subsequent step in the multi-phase concept within the transition towards the liveable city based on sustainable city logistics?
- (3) Which prerequisites can be identified as essential for a sustainable city logistic initiative to develop?
- (4) Which role should the government take in a public-private cooperation per phase of the multi-phase concept according to the sustainable city logistic initiatives in order to accelerate the transition towards the liveable city based on sustainable city logistics?

1.1.1. Scientific relevance

This research elaborates on the effect of public-private cooperation in the transition towards a new socio-technical system in city logistics.

Problems within city logistics can be regarded as wicked problems in which the problem is complex (Quak et al., 2016), uncertain and fragmented. To solve the problems, adaptive planning is required. However, complexity within city logistics is reflected in the often-large number of stakeholders, their bilateral dependence, divergent interests and the uncertainty about the consequences of change (KiM, 2017b).

According to Taniguchi (2014) three elements can be considered essential for promoting the transition in city logistics:

- (1) Application of innovative technologies;
- (2) Change in the mind-set of logistic managers;
- (3) Public Private Partnerships

The third element, a cooperation construction such as a Public-Private Partnership has potential when it comes to decreasing the complexity within city logistics (Quak et al., 2016). Cooperation between public and private parties allows the participation of stakeholders from the initial phase resulting in an understanding of the situation and related problems from various perspectives and avoid unexpected side effects of policy measures (Taniguchi, 2014). A cooperation can therefore result in a window of opportunity to trigger the transition towards a sustainable logistics system within urban planning (Quak et al., 2016). However, a knowledge gap seems to exist within literature on the prerequisites of public-private cooperation that are essential for a transition towards a new socio-technical system (Taniguchi, 2014). The aim of this research is to investigate the role of prerequisites of public-private cooperation in the transition towards a new socio-technical system in city logistics.

1.1.2. Societal relevance

In this research, sustainable city logistics initiatives operating in historical G40 cities in the Netherlands will be analysed. The results of this analysis could contribute to the development of a general overview of prerequisites of public-private cooperation that trigger the transition towards a new socio-technical system within city logistics. Since the problems within city logistics are context specific, tailor-made measures should be derived for cities (Quak et al., 2016). As the European Union's aim is to reduce the emission rates in urban areas to zero by 2030 (European Commission, 2011), member states should start to act. Furthermore, these objectives of the European Union are included in the Paris Climate Agreement (2015), which the Dutch government embraced creating a pressure on Dutch cities to incorporate strategies to meet the objectives (Rijksoverheid, 2016). City logistics are responsible for 20-30% of emission rates in cities (KiM, 2017a). To tackle the problem, a substantial change should be made in the way city logistics are currently organized (Quak et al., 2016). In other words, a transition should be started to a new socio-technical system on city logistics. The process of starting this transition could be facilitated by developing a general overview of identified prerequisites. Municipalities could take actions to specifically meet the prerequisites that could trigger the transition and support them in reaching the goals set by the European Union and the Paris Climate Agreement.

1.4 Scope of the research

The logistic sector is a broad sector including various sub-sectors. The focus of this research is on city logistics. City logistics can be subdivided into the following five flows of goods (KiM, 2017a):

- (1) Deliveries (B2B, B2C, C2B, C2C)
- (2) Service
- (3) Passenger traffic (shopping-motive)
- (4) Construction logistics
- (5) Waste logistics

All these flows of goods are different in nature and scope. Including all these five flows of goods into this research would be out of this master thesis' scope. Therefore, the focus of this research is on the first flow of goods, deliveries. Specifically, on initiatives taken in the delivery-sector or initiatives that affect the delivery-sector.

1.5 Research design

This research is divided into two different stages, which can be derived from figure 1.1. The first stage is focusing on a theoretical research. Within this theoretical research, the focus is on two theories: the transition theory and theories on governance. Chapter 2 will elaborate on these theories. Insights obtained from these theories are used as input for the second stage of this research, the empirical research. The empirical research consists of a case study research of the regime level (municipalities) and niche level initiatives (carriers, entrepreneurs, suppliers, individual initiatives). Furthermore, a document-analysis is conducted on official governmental documents/reports and former research on sustainable city logistic initiatives. Outcomes of both the case study research and the document-analysis will be outlined in chapter 4 and 5.

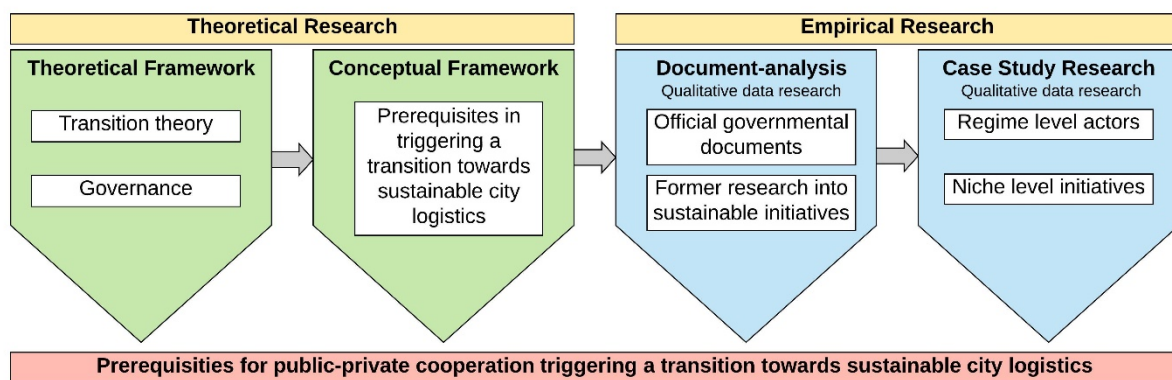


Figure 1.1: Research design (Author, 2019)

1.6 Outline of the report

This thesis consists of 7 chapters of which the first chapter has been set out. In chapter 2 the theoretical background of this research is presented in which the relevant theories related to this research are set out. Chapter 2 concludes with a conceptual model illustrating the concepts and relations between these concepts, forming the foundation of this research. Chapter 3 elaborates on the research methods used in this thesis. The following chapter, chapter 4, presents the first outcomes of initiatives included in this research. In chapter 5, the outcomes of chapter 4 are combined into a synthesis reflecting on the theories outlined in chapter 2. Based on chapter 4 and 5, chapter 6 presents the conclusions and provides recommendations for further research. Finally, a reflection of the entire process of conducting this research will be presented in chapter 7. References used in this research and the appendices can be found at the end of this thesis.

Chapter 2: Theoretical Framework

This chapter provides the theoretical framework of this research by describing the theoretical insights and is divided into two subchapters. The first subchapter will elaborate on the three concepts of the transition theory; (1) the multi-phase concept, (2) the multi-level perspective, (3) transition management. The second subchapter presents theories on governance. First, different modes of governance are outlined, followed by the different roles of the government. This chapter concludes with a conceptual model which summarizes the main concepts set out in this chapter and illustrates the core of the research. This chapter constitute the academic foundation for answering the research question: '***Under what prerequisites can public-private cooperation trigger a transition towards a liveable city based on sustainable city logistic initiatives in historical G40 cities?***'.

2.1 Transition theory

Climate change is getting increasingly visible (United Nations, 2015). One of the main contributors to climate change are the increasing CO₂ levels in our atmosphere. To be able to tackle the negative aspects of climate change, CO₂ emission rates must decrease substantially (United Nations, 2015). To stimulate the European member-states, the European Commission aims at reducing CO₂ emissions rates within the transport sector with 60% by 2050 in comparison to the 1990 levels (European Commission, 2019). However, deep cuts in the CO₂ emission rates demand for a transition towards a new type of transport system (Geels, 2012). A transport system can be regarded as a socio-technical system (Geels, 2005). According to the transition theory, a transition is a gradual process of structural change based on co-evolution in which a socio-technical system transforms from an existing equilibrium to another new equilibrium in a stepwise manner (Rotmans et al., 2001). To establish a transition, interacting system innovations based on experiments and innovations are required which develop at different levels and at different speeds (Kemp & Loorbach, 2006). The transition process is a long-term process which usually experiences a time-span of one generation (25-50 years), has a non-linear character (Geels et al., 2017; Geels & Kemp, 2007; Kemp & Loorbach, 2003; Kemp & Loorbach, 2006; Rotmans et al., 2001; Van der Brugge et al., 2005), and is disruptive and contested by nature (Geels et al., 2017). However, recent transitions showed that transitions can take place more quickly compared to the historical transitions. A requisite for these new transitions is that these transitions are consciously governed (Edmondson et al., 2018). A central element in accelerating the pace of a transition is therefore policy, which forms an integral constituent of transitions towards sustainability (Edmondson et al., 2018). Three concepts are essential for understanding the transition theory: (1) multi-phase; (2) multi-level perspective and (3) transition management. These three concepts will be elaborated on in the following sections.

2.1.1 Multi-phase concept

Conceptually, the multi-phase concept approaches a transition from a perspective based on the speed of change (Van der Brugge et al., 2005). According to this, four phases can be distinguished: (1) the predevelopment phase; (2) the take-off phase; (3) the acceleration phase, and (4) the stabilization phase (Rotmans et al., 2001; Van der Brugge et al., 2005). These phases have a non-linear character by nature which can be derived from figure 2.1. In the pre-development phase, no visible changes appear, and changes take place hidden from the outside world. The non-linear character is revealed by a slow change which can be defined as the take-off phase. In this phase, thresholds are reached, and the system starts to change slowly. The take-off phase is followed by the acceleration phase which is characterized by rapid change due to the reinforcement of different elements created through co-evolution. The acceleration phase is followed by a phase of stabilization. In this phase, a new equilibrium is reached. (Kemp & Loorbach, 2003; Van der Brugge et al., 2005; Rotmans et al., 2001).

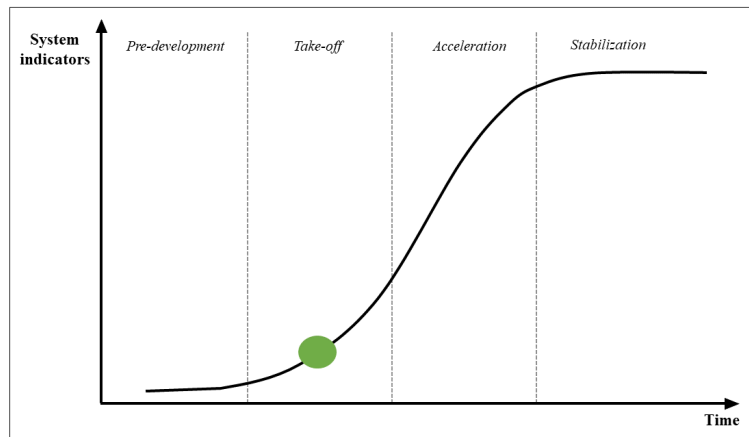


Figure 2.1: The current position of the transition towards sustainable city logistics within the four phases of a transition (author, 2019. Based on Van der Brugge et al., 2005)

One can argue that the overall transition towards sustainable city logistics is currently situated at the take-off phase as several initiatives are operating by means of pilots in Dutch historical cities. However, initiatives within the field of sustainable city logistics are context-specific which is reflected in the extent to which these initiatives are currently embedded in the local context.

In the Netherlands, the introduction of the Green Deal Zero Emission Stadslogistiek can be regarded as the trigger for cities to start thinking about how to deal with the goal concerning the reduction in CO2 emission rates as set by the European Commission (European Commission, 2019). Some initiatives are already implemented in some cities whilst other cities are lacking behind on starting initiatives. The central question is which conditions can stimulate the different initiatives to reach the threshold value and how these conditions can reinforce the system to accelerate the transition.

2.1.2 Multi-level perspective

To be able to understand how transition processes take place, it is essential to distinguish between different scale levels. The multi-level perspective is the second concept underlying the transition theory. The basic premise in this concept is non-linearity caused by the interrelatedness of multiple developments at the three scale levels (Elzen et al., 2002; Geels, 2012). The main argument underlying the multi-level perspective is the notion that socio-technical transitions command for interactions within and between the three interrelated scale levels within the multi-level perspective (Geels, 2012; Geels et al., 2017; Geels, 2018). The general interrelated scale levels, as distinguished in society, are the macro-, meso- and micro-levels. Within the multi-level perspective, these interrelated scale levels are divided respectively into the socio-technical landscape, regimes and niches as can be derived from figure 2.2 (Van der Brugge et al., 2005).

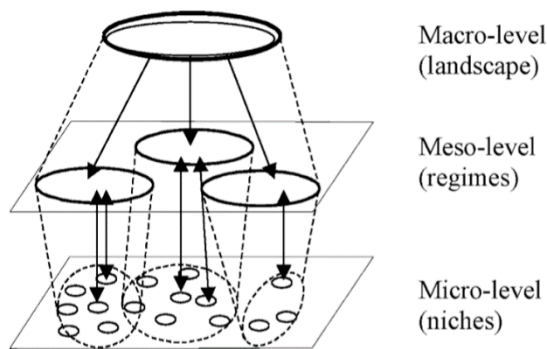


Figure 2.2: Visualization of the multi-level perspective (Van der Brugge et al., 2005)

The socio-technical landscape can be defined as the overarching level defining the context for the regime level and can exist of two forms: stabilizing the regime level or exerting pressure on the existing regime level (Geels, 2012; Geels & Kemp, 2000; Geels & Schot, 2007). Within the socio-technical landscape the focus is situated on issues such as the political culture, (macro)economic growth, and infrastructure (Hodson & Marvin, 2010). The socio-technical landscape facilitates an environment for actors and coalitions of actors to cooperate (Geels & Schot, 2007; Hodson & Marvin, 2010).

The regime level exists of the dominant established practices, technologies and associated rules. These associated rules are deeply embedded in society and structure the way in which actors guide and coordinate their perceptions and actions (Geels, 2012; Kemp & Loorbach, 2003). Due to a wide variety of elements and deeply embedded rules, path-dependence and lock-in mechanism exist within the regime level. As a consequence of this, the regime level is prone to innovations on an incremental basis resulting in regime optimization rather than regime transformation (Elzen et al., 2002; Geels, 2012). However, due to pressure from or changes within the overarching socio-technical landscape, the regime level can experience destabilization. Destabilization can create a window of opportunity for the niche level to break through and trigger a regime transformation, on the condition that simultaneously an internal momentum has been built within the niche level (Geels, 2012).

The niche level is a rather protected but dynamic space in which individual actors or small groups of actors form a network wherein novel technologies and innovations are being developed (Geels, 2012; Geels & Kemp, 2000; Geels & Schot, 2007; Hodson & Marvin, 2010). These technologies and innovations are radically different from the existing regime level and socio-technical landscape (Geels et al., 2017). From within the niche-level, bottom-up pressure is developed on the regime level. As a result of path-dependence and lock-in mechanisms at

the regime level, a breakthrough of niche innovations on the regime level is rather difficult. A requisite to establish a breakthrough is the presence of a 'window of opportunity' within the socio-technical landscape or the regime level (Geels & Kemp, 2000). The niche level itself and the technologies developed within the niche level cannot be defined as a transformer, the underlying processes within the niche level form the basis for accelerating a transition. These processes are affiliated to the interaction between processes on the regime level and within the socio-technical landscape. (Geels & Kemp, 2000). Niches provide the seeds for systemic change which is the underlying notion of the transition theory. Therefore, niches are of crucial importance in accelerating a transition (Geels, 2012).

From the above can be derived that for a transition to start, it is crucial that interrelatedness and simultaneous horizontal and vertical development within and between the three scale levels of the multi-level perspective exists. Reinforcement will occur as a result of the interplay of the developments on the different scale levels (Kemp & Loorbach, 2006). Changes in the socio-technical landscape can destabilize the regime level creating a window of opportunity for the niche level. However, windows of opportunity prove fortunate when innovations at the niche level are fully developed simultaneously which can subsequently result in reaching the threshold value to start the take-off phase (Geels, 2012; Geels & Kemp, 2000). Put in different words, a transition cannot occur when a reinforcement cannot be established due a lack of one of the requirements as set above.

Reflecting the multi-level perspective on the case of city logistics, a distinction can be made between the different scale levels. The socio-technical landscape, in this case, can be interpreted as the norms set by the European Union and the aim of the Dutch national government to reach emission free city logistics by the year 2025 (Green Deal, 2014). These aims create pressure on local governments to start working towards policies based on emission free city logistics. The local government, in this case, can be interpreted as the regime level. The regime level is bounded by existing norms such as emission norms and norms on noise nuisance. Furthermore, several Dutch cities implemented policy measures that regulate logistic flows in city centres, such as time windows. Due to the large number of stakeholders involved within the field of city logistics, path dependence occurs. Businesses involved adapted the way they operate their logistics based on the set norms and policies. Besides, sunk costs such as investments in trucks and operating systems make it rather difficult to radically transform the way businesses operate. The niche level is formed by a small group of actors that are working on innovations based on emission free transport modes. Some of these innovations are currently being tested, but a breakthrough to the regime level has, in most cases, not occurred yet. Barriers for a breakthrough to be established can be regarded plural and is particularly related to the way governance is organised. Governance can be regarded as the interaction between multiple public and private actors with the main purpose of gathering resources and achieving collective goals (Wittmayer et al., 2017). As the transition towards sustainable city logistics is dependent on the interplay between the regime level and niche level, a demand for public-private cooperation arises as public parties are essentially performing on the regime-level whereas private parties are involved in innovations on the niche-level. This is where the focus on governance originates. Governance in this research is covered in the research question of this study as this is focused on public-private cooperation. The notion of public-private cooperation reflects the cooperation between the public and

private sector and the way this is organized. Chapter 2.2 will further elaborate on theories on governance and public-private cooperation.

2.1.3 Transition Management

The third and last concept of the transition theory is focused on governing transitions and is called transition management (Van der Brugge et al., 2005). Multiple public and private actors are involved in transitions; therefore, transitions should be managed. Transition management can be considered as a specific form of the multi-level governance approach which can be used for bridging the gap between top-down planning and bottom-up incrementalism by considering multiple actors (Kemp et al., 2007; Van der Brugge et al., 2005). However, this is not regarded as easy since managing transitions requires a form of process management that addresses uncertainty, complexity and interdependencies (Kemp & Loorbach, 2003). Within transition management, private and public actors are brought together with the aim to co-produce and coordinate policies on different policy levels. To be able to change and manage the way in which society is organized the transition management model is established which forms the foundation of the transition management. The transition management model exists of the interaction between three levels with the focus on processes: (1) a strategic level; (2) a tactical level; and (3) an operational level (Kemp et al., 2007).

Within the strategic level a multi-actor network is organized wherein a long-term goal is formulated, processes of visions are developed, and a strategic discussions are held. The main purpose of the tactical level are processes of agenda building through negotiations, formation of networks and coalition building. On the operational level the focus is on processes of experimenting, this is established by among others project building and implementation. The three levels are monitored and evaluated on the process and content. Out of this, joint learning and search processes are established which takes place

in transition arena's (Kemp et al., 2007; Van der Brugge et al., 2005). The above described process is represented in the four stages as visible in figure 2.3.

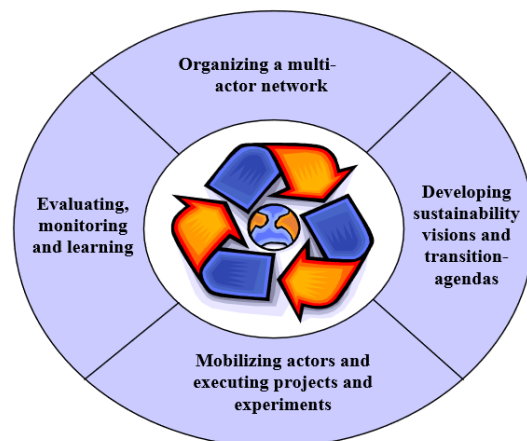


Figure 2.3: Transition management cycle (Kemp & Loorbach, 2003)

As in the multi-level perspective, co-evolution is crucial since processes and outputs of processes differ at each level. The main purpose of transition management is to influence, organize and coordinate the processes so that these processes are interrelated and reinforce each other creating co-evolution (Kemp et al., 2007).

The above described transition management cycle (Kemp & Loorbach, 2003) can be reflected on the multi-level perspective as described in section 2.1.2. The strategic level corresponds with the socio-technical landscape. Reflected on the case of city logistics this consists of the evolvement of a national vision as included in the Green Deal ZES. The following tactical level corresponds with the regime-level of the multi-level perspective. Within this research, the regime level is defined by the local governments working on policy regarding the specific goal

as set by the national government, zero-emission city logistics in the G40 cities in 2025. The operational level consists of performing pilots and experiments regarding innovations established at the niche-level. Reflected on this research, the operational level exists of pilots in city centres regarding sustainable initiatives. As this research focus is on public-private cooperation, one would suggest that an interplay would exist between the tactical and operational level. On the tactical level, public parties are defining the context whereas the operational level is predominantly defined by the private parties working on innovations and technologies. The final stage of the transition management cycle is defined by the learning-by-doing concept that provides insight into the main barriers and opportunities of initiatives which are reflected on all three stages.

2.2 Governance

Governance of modern societies can be regarded as the interaction between multiple public and private actors, at different levels, in different governance modes and orders but with the main purpose of gathering resources and achieving collective goals (Kooiman, 2003; Wittmayer et al., 2017). This mixed public-private nature is one of the key elements of modern governance. Governing issues are frequently shared and becoming diffused over various societal actors. Relationships among these actors are constantly changing (Kooiman, 2003). According to Kooiman (2003), modern governance arose out of the mindset that governments are not the only actors that are occupied with addressing societal issues. New modes of governance, besides the traditional mode, are needed to harness the societal issues. An argument for this is the unique character of societal issues. These issues are context-specific and differ per country, region, and sector and are therefore asking for a governance mode that is flexible and suits the context.

Furthermore, Kooiman (2003) argues that different types of governance exist. First, hierarchical governance can be seen as the most formalized form of governance in which a direct exertion of formalized influence exists to reach the set goal based on interventions. Second, co-governance is characterized by collective action on a generally equal basis based on interplays rather than independent action. There is no formal authority or domination between the involved actors. Third, self-governance is the capacity of entities to govern themselves in an autonomous way. However, societies are not able to rely exclusively on self-governance as a mode of governance, as there is always a role for the state.

In this thesis, the focus will be on modes of co-governance. In the following section (2.2.1) will elaborate on the different types of co-governance.

2.2.1 Modes of co-governance

The essence of co-governance is that interacting parties involved in co-governance share common interests in reaching a specific goal. Co-governance involves co-creation and co-production which is established by the active involvement of citizens by creating partnerships with the state to create public service delivery (Johnston, 2015). The five co-modes as discussed in this section are based on Kooiman (2003) and are (1) communicative governance; (2) Public-Private Partnerships (PPP); (3) co-management; (4) networks; and (5) regimes. These five co-modes can be seen as structural arrangement in which governing

actors collaborate or cooperate with each other (Kooiman, 2003). A distinction can be made between collaboration and cooperation in which collaboration is defined as working together to create something by establishing a shared vision whereas cooperation is defined as being important in networks in which the focus lies on supporting goals instead of establishing a shared goal. Cooperation can be achieved through sharing information and resources.

2.2.1.1 Communicative governance

Within communicative governance, it is assumed that the actors involved are reasonable citizen which form a central element in decision-making processes. Communicative governance is strongly related to the concept of the communicative rational as defined by Habermas (Healey, 1996). The basic premise of communicative rationality is that an intersubjective understanding can be reached among the involved actors (De Roo, 2012; Healey, 1996). It is translated into governance by public participation which has potential to enhance the legitimacy of the outcomes of the decision-making process. However, communicative governance becomes a difficult mode of governance and is not suitable when interest involved have contradictory nature (Kooiman, 2003).

2.2.1.2 Public-Private Partnership (PPP)

Public-Private Partnerships can be defined as a governing situation wherein public and private parties cooperate in governing interplays to reach a win-win outcome, by exploiting common resources and knowledge and sharing risks, costs and benefits (Klijn & Teisman, 2003; Kooiman, 2003). The focus herein is on creating a synergy, a situation that would not have existed without a Public-Private Partnership (Klijn & Teisman, 2003). Public-Private Partnerships originated in the 1990s due to an increase in the systematic way in which interaction between public and private actors occurred. Originally, two forms of Public-Private Partnerships existed, the first form being a financial-economic motive, the second a managerial-strategic motive. However, Public-Private Partnerships in practice show difficult to achieve due to several conditions that must be met and the unique character of Public-Private Partnerships (Kooiman, 2003).

2.2.1.3 Co-management

Co-management is situated in-between government regulation and community-initiated regulation. Co-management is not exclusively consultation, it involves a say in formal public decision-making and the authority to make and implement regulations on its own. The basic premise behind co-management is that by directly involving users, the knowledge on which this is based is more adequate than it would be without consulting the users (Kooiman, 2003).

2.2.1.4 Networks

According to Kooiman (2003), a network suits governing situations where a relatively open form of public-private interplay can be organised which represents a wide variety of interests of all actors involved. A network can occur in two forms, either within their own social domain or between different social domains. In literature, the development of a network-society is often seen as being closely linked to ideas about the so-called 'hollowing-out of the state', meaning that the state has become a collection of a variety of actors, both governmental as non-governmental, lacking an actor involved in steering or regulating the other actors. The Dutch

approach on how to manage networks is a reaction to the multi-actor perspective on governance and emphasises interdependent interaction between all actors involved with as main purpose the exchange of resources and goals.

2.2.1.5 Regimes

Regimes are defined as the set of norms, rules, principles and procedures around which actors are managed in a specific area of interrelations (Kooiman, 2003). However, rules and procedures are prone to change over time but must be in line with the existing norms which define the regime. A regime can change due to changing rules and procedures which can be created by a transition (Kooiman, 2003). Regimes are easily upset by changes in balance or power and are therefore not constant in form (Kooiman, 2003).

2.2.2 Roles of the government

Historically, the Dutch government organized society in a top-down manner in which the state was in charge. Since the beginning of this century, a shift is visible in the way society is organised. This can be seen as the dichotomy of public and private in which added value is created by either the market (bottom-up) or via the collective production by the state (top-down) (Van der Steen et al., 2014). Simultaneously, an interaction between the public and private occurs through for example hybrid organisations, public support for private initiatives, and different forms of Public-Private Partnerships (Van der Steen et al., 2014).

Bottom-up initiatives contributing to goals set by the government are upcoming, resulting in the question what the role of the government is in supporting these initiatives (Van der Steen et al., 2014). This discussion especially takes place in areas where these initiatives contribute to public goals, since the government is always involved when public goals are at stake (Schulz et al., 2017). Innovations are an example of such public goals (Van der Steen et al., 2014). Literature on innovation suggests that a break-through is not directly caused by governmental interferences but governmental interferences can contribute to innovation in a variety of ways. However, the relation between the government and the market can be defined as a grey area in which the role of the government is never self-evident (Schulz et al., 2017; Van der Steen et al., 2014). Contributing to that, it is important to realise that the role of the government depends on the context and should therefore be determined per initiative (Schulz et al., 2017).

2.2.2.1 Steering mechanisms

According to Van der Steen et al. (2014), four steering-mechanisms of the government can be identified which reflect the possible roles of the government in initiatives which can be derived from figure 2.4. In the first mechanism, the public-administration perspective is leading. Within the public-administration perspective, the role of the government is hierarchical in which political ambitions are directly translated into policy by means of rules, regulations and procedures (Schulz et al., 2017; Van der Steen et al., 2014; Visser & Kansen, 2018). The second mechanisms links to New Public Management, in which the notion that a goal is important but that this goal is reached by an effective and a customer-oriented manner instead of strict rules, regulations and procedures is leading (Schulz et al., 2017; Van der Steen et al., 2014; Visser & Kansen, 2018). In the third mechanism, network governance, the focus is set on an integral, cooperating, networking and flexible role of the government. The government

can reach this by including and connecting to societal initiatives (Schulz et al., 2017; Van der Steen et al., 2014; Visser & Kansen, 2018). In the fourth and last mechanism is defined as societal resilience. In this mechanism, the government supports upcoming bottom-up initiatives in an adaptive and responsive manner. Examples of this are monitoring, reducing obstructions, and creating space to develop (Schulz et al., 2017; Van der Steen et al., 2014; Visser & Kansen, 2018). It is important to keep in mind that the role of the government can vary between the different phases of the of the transition-curve as visualized in figure 2.4.

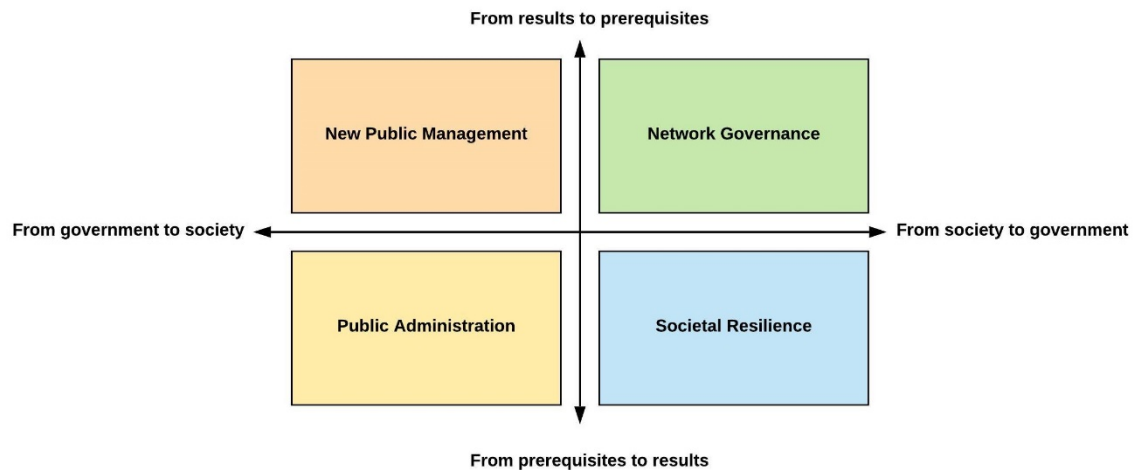


Figure 2.4: Steering mechanisms of the government (author, 2019. Based on Van der Steen et al., 2014)

2.2.2.2 Four roles of the government

Kolkman et al. (2013), translated the steering mechanisms of van der Steen et al. (2014), as can be derived from figure 2.4, into four concrete roles for the government. These roles and the thereto related instruments are visualized in figure 2.5.

The first identified role is the role of regulator. This role is similar to the steering mechanism of public administration. The second role is the role of realisor, which is similar to the steering mechanism New Public

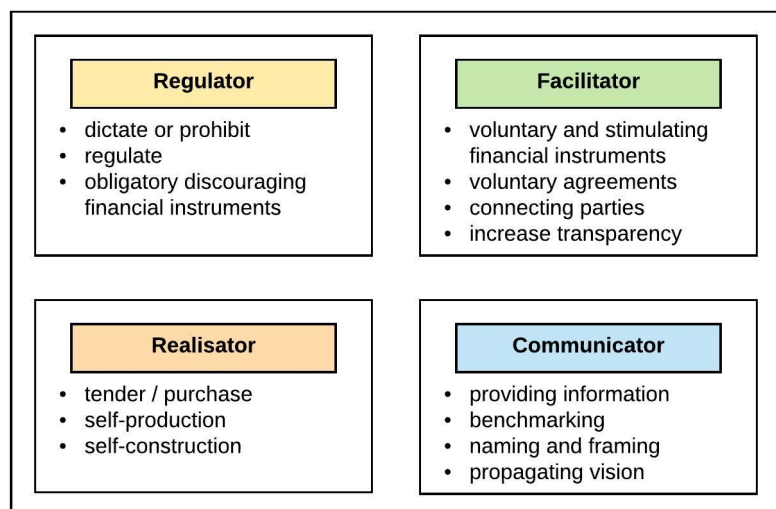


Figure 2.5: Identified roles of the government (author, 2019. Based on Kolkman et al., 2003 and Visser & Kansen, 2018)

Management in which efficiency is a central element. The government ought to realize projects in the most efficient way. This could be either by self-production and self-construction or by putting out a tender. Facilitator is the third role identified by Kolkman et al. (2003) and is similar

to the steering mechanism network governance. In this role, the government ought to cooperate to align with the initiatives. Last, the role of communicator is similar to the steering mechanisms of societal resilience in which the initiatives are bottom-up driven, and the role of the government is to support these initiatives. (Kolkman et al., 2003; Visser & Kansen, 2018).

2.2.2.3 Shifting roles of the government

The increasing involvement of society and the market in societal issues ask for a different role of the government (Visser & Kansen, 2018). The traditional and hierarchical role of the government in which decision-making occurred in a top-down manner fits best with the role of regulator. The shift towards the greater involvement of society and the market resulted in a shift towards the quadrants on the right side of figure 2.5, the roles of facilitator and communicator (Visser & Kansen, 2018). Related to this is the interactive effort the government is required to make to be able to support the upcoming initiatives. This interactive effort can take place in different manners (Visser & Kansen, 2018).

Reflecting the above on this research, the outcomes of this research will put the analysed initiatives in the sector of sustainable city logistics in the different roles of the government, per phase of the transition-curve (chapter 4).

2.3 Towards a conceptual framework

This chapter discussed theories and concepts of as part of the transition theory and governance in order to understand the transition towards a new socio-technical system based in city logistics on public-private cooperation. The combination of these theories and concepts have resulted in the conceptual framework as is shown in figure 2.6. This section elaborates on the theoretical framework.

The main phenomenon under research are the prerequisites for public-private cooperation that can trigger a transition towards a new socio-technical transition based on sustainable city logistics. The transition theory provides a theoretical perspective on the elements and process of a transition and consists of three concepts: (1) **the multi-phase concept** (section 2.1.1); (2) **the multi-level perspective** (section 2.1.2); (3) **transition management** (section 2.1.3). First, the multi-phase concept consists of four variables forming the transition phase: (1) **pre-development phase**; (2) **take-off phase**; (3) **acceleration phase**; (4) **stabilization phase**. Second, the multi-level perspective consists of three levels within society: (1) **niche-level**; (2) **regime-level**; (3) **socio-technical landscape**. The niche-level will be under study in this research from which **prerequisites** for triggering the transition towards sustainable city logistics will be derived. Third, the transition management concept consists of three levels and a feedback mechanism in the form of monitoring and evaluation: (1) **strategic level**; (2) **tactical level**; (3) **operational level**. These three concepts of the transition theory are interlinked which is represented by the green arrows in figure 2.6.

The second theory included in this research are theories on governance. Different types of governance can be identified; (1) **hierarchical governance**; (2) **co-governance**; (3) **self-governance** (section 2.1). The type of governance leading in this research is **co-governance** (section 2.2.1). The focus of co-governance is **cooperation** of the government with third parties. Various roles of the government can be distinguished: (1) **regulator**; (2) **facilitator**; (3) **communicator**; (4) **realisator** (section 2.2.2). These roles of the government define how

public-private cooperation must be shaped in order to trigger the transition towards sustainable city logistics.

The conceptual framework shows the relation between all concepts included in this research and offers a tool for the empirical part of this research. The empirical part of this research will be tested in the following chapters.

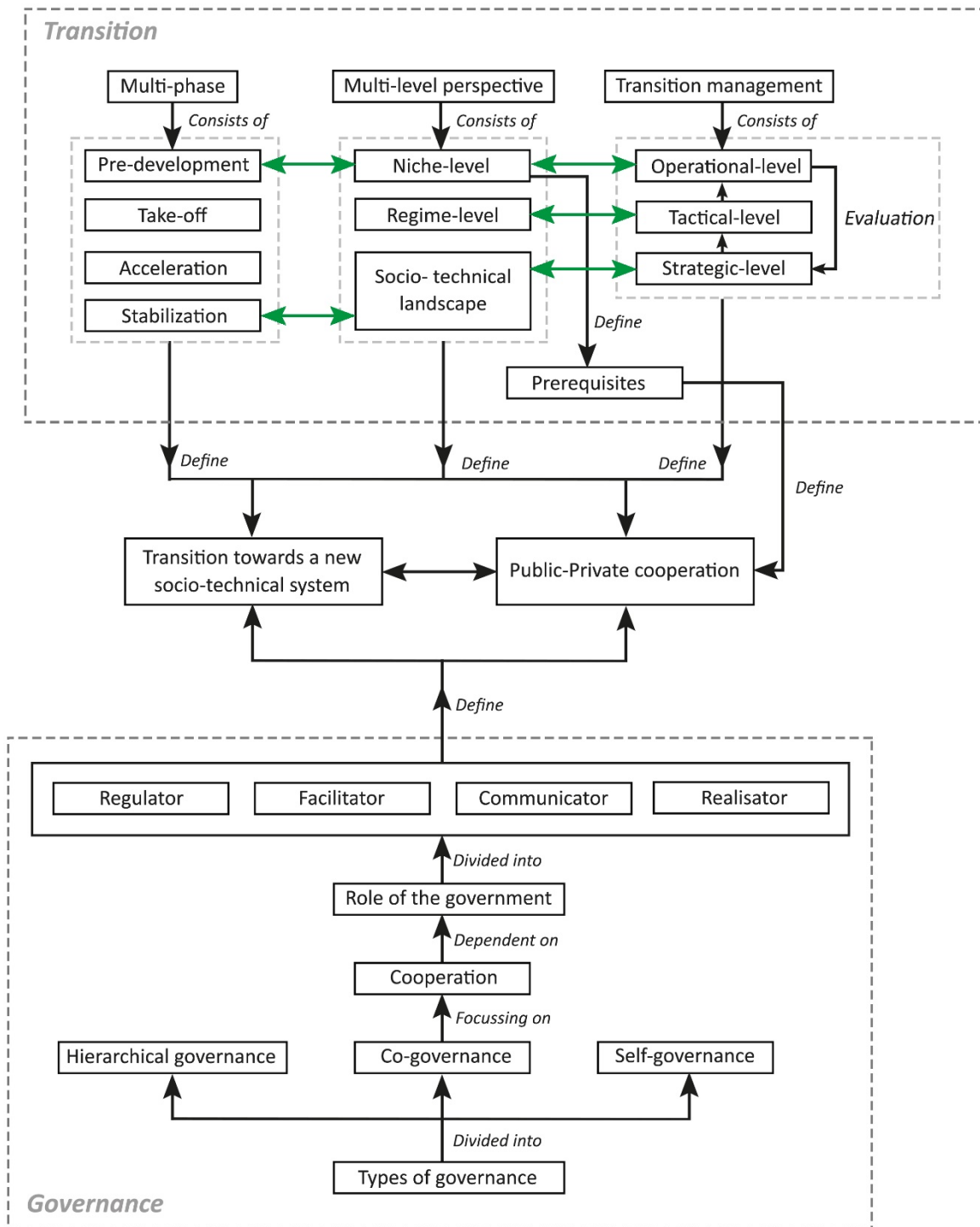


Figure 2.6: Conceptual framework (Author, 2019)

Chapter 3: Methodology

The first chapter initiated the topic of this thesis, the relevance of this research and the research questions. Subsequently, the second chapter consisted of a thorough explanation of the transition theory and theories on governance related to this research. The second chapter concludes with the conceptual framework, forming the foundation of this research. This chapter elaborates on the research approach and the research methods that are used in this research (section 3.1). Section 3.2 elaborates on doing a multiple-case study research and identifies the multiple cases included in this research. Subsequently, section 3.3 reflects on the data collection process, followed by section 3.4 that elaborates on the data analysis. In section 3.5 the focus is on the operationalization of the data analysis via a SWOT-analysis. Finally, section 3.6 elaborates the ethical considerations of this research.

3.1 Research approach

This research explores the research question: ‘***Under what prerequisites can public-private cooperation trigger a transition towards a liveable city based on sustainable city logistic initiatives in historical G40 cities?***’. The research takes on an investigative nature focussing on the transition theory and theories on governance as can be derived from the conceptual model (section 2.3). The conceptual model outlines the variables as part of the transition theory and theories of governance that are relevant for answering the research question. The research approach used for answering the research question employs a multiple-case study based on sustainable initiatives taken in the city freight logistics sector. The research methods used in this research are qualitative by nature and consists of both desk research and empirical research. Desk research is derived via a literature study, and a document-analysis. The empirical research consists of semi-structured interviews.

3.1.1 Literature study

The main objective to conduct a literature study is to derive central theories that can be considered as the foundation of this research. Chapter 2 presented the theoretical framework that is the outcome of the literature study. The theoretical framework elaborated on variables central in the transition theory and theories on governance. These variables are visualized in the conceptual model (section 2.3) and function as input for the document-analysis and the semi-structured interviews. The variables identified are included in the interview guide as part of the multiple-case study (section 3.1.3).

3.1.2 Document-analysis

A document-analysis is executed to determine developments taking place within the socio-technical landscape, regime level and niche level as part of the multi-level perspective concerning the transition towards sustainable city logistics (section 2.1.2). Information conducted from the document-analysis is used as a guidance and input of the interview guide and as additional information besides the outcome of semi-structured interviews. Bowen (2009) defines a document-analysis as a systematic procedure for evaluating and reviewing documents. As a result of following this systematic procedure, the researcher can gain understanding, elicit meaning and develop empirical knowledge (Bowen, 2009). Baarda and

De Goede (2005) emphasize that a document-analysis can provide a broad research base under the condition that it is executed well. Additionally, a document-analysis can function as method to conduct information about non-reactive sources (Reulink & Lindeman, 2005). The researcher should take on a critical perspective when considering the usability of documents. Documents are established, modified and published by third parties, regularly with a purpose deviant from the objective of the research in progress and are context-specific (Bowen, 2009; Yin, 2014). Therefore, documents should be evaluated against other sources of information (Bowen, 2009). An advantage of a document-analysis is the information that can be derived from documents which can generate new interview questions for in-depth research (Bowen, 2009).

The document-analysis included in this research consists of documents published by public authorities or research institutes, as they are assumed to be more trustworthy. Information derived from the document-analysis at the one hand consists of information concerning specific research into initiatives taken on the niche-level, and on the other hand comprise information about policies and plans concerning the transition towards sustainable city logistics on the regime-level and in the socio-technical landscape.

3.1.3 Semi-structured interviews

Semi-structured interviews have been executed to gain in-depth information about the current position of initiatives (niche-level) and municipalities (regime-level) concerning the transition towards sustainable city logistics. Semi-structured interviews are verbal interchanges, in which the interviewer extract information from the respondent by asking pre-determined questions (Clifford et al., 2012). The semi-structured character of an interview provides the researcher with the possibility to guide the interview in a pre-determined direction on the one hand, and provides flexibility in the way issues are addressed by the participant on the other hand. The informal and conversational tone of a semi-structured interview allows for an open response and provides room for gaining depth and insights that need further explanation (Gill et al., 2008). Participants are encouraged to answer in their own words instead of yes/no responses, through which explanations and context can be derived (Longhurst, 2010).

3.1.4 Multiple research methods

The decision has been made to use multiple research methods, because the four sub-questions ask for divergent strategies. Through the usage of different data sources and methods, convergence and corroboration can be sought that strengthen the substantiation of the research which reduces the effects of a preconceived opinion (Bowen, 2009).

3.2 Conducting a multiple-case study research

A case study research is, according to Verschuren and Doorewaard (2010), defined as a research strategy in which full insights into objects or processes that are confined in time and space are gathered by the researcher. As a consequence of the small number of research units, referred to as cases, quantitative data analysis is not feasible. The emphasis within case study research is therefore on the utilization of different qualitative research methods focusing on comparing and interpreting results rather than counting and calculating as is the emphasis within quantitative research. The focus of case study research is on depth rather than breadth, which is realized by applying various and intensive methods when it comes to generating data.

Depth can be created by applying several sources which is defined as the triangulation of sources. (Verschuren & Doorewaard, 2010).

A case study can consist of either a single-case study or a multiple-case study. This research will focus on a multiple-case study with a hierarchical method as a variant. Within the initial phase of the hierarchical method, separate cases are approached as series of single-case studies. The outcomes of these cases are studied independently of each other. For the creation of coherence and the facilitation of comparison in the results, it is important to proceed according to a pre-established pattern. This pattern will function as a guide for comparison in which the researchers aim is to find similarities and differences between the various cases (Verschuren & Doorewaard, 2010).

Within this research, the researcher chose to execute a multiple-case study with a hierarchical method as variant. As evidence derived from a multiple-case study is often considered more compelling, the overall research is likely to become more robust (Yin, 2014). The cases in this multi-case study were formed by initiatives taken within the city freight logistics sector. Research methods used for the data collection consisted of both desk-research and empirical research through a literature study, a document-analysis and interviews. Via the execution of different research methods, converging lines of inquiry and data triangulation were established (Yin, 2014).

3.2.1 Selection criteria

This research consists of a multiple-case study. The cases part of this multiple-case study consisted of both niche-level (initiatives - private) and the regime-level (municipalities - public) in order to provide insights into the prerequisites for a public-private cooperation. The multi-level perspective (section 2.1.2) stated that initiatives developed at the niche-level can initiate a transition as the regime-level provides the context that allows niches to upscale and accelerate. The selection procedure of the multiple-case study in this research is approached from a regime-level perspective, focussing on historical G40 cities as these cities are obliged to have a zero-emission zone in 2025. For the selection of the cases the following criteria have been considered:

- **Part of the Green Deal ZES:** the cases should include cities that have been taken concrete action or are planning on signing the Green Deal ZES. Signing the Green Deal ZES shows commitment for taking action.
- **Sustainable city logistics initiatives:** the cases should involve multiple different initiatives taken in the city in order to create a broad view.
- **Population size:** as the research question focussed on G40 cities it is crucial to select cases based on size. To create a complete picture, three different sizes of cities should be included in the research: (1) a G4-city; (2) a large city; (3) medium-sized city as can be derived from table 3.1. Small cities are not included in the scope of this research as they have not the highest priority due to the potential benefit of larger cities concerning reduction of CO₂-levels and high population shares.

Symbol	Definition	Population size
G4	G4	Amsterdam, Den Haag, Rotterdam, Utrecht
L	Large city	> 200.000
M	Medium-sized city	100.000- 200.000

Table 3.1: Overview of different sizes of cities

- **Developed action plan:** the cases should include cities that have developed a concrete action plan or are working on an action plan in order to define a zero-emission zone.

A list of all historical G40 cities in the Netherlands that were meeting the criteria are provided in table 3.2.

	Signed GreenDeal ZES	Initiatives	Population size	Developed action plan
Alkmaar	No	Few	M	No
Amersfoort	Yes	Few	M	No
Amsterdam	Yes	Yes	G4	Yes
Arnhem	Yes	Few	M	No
Breda	No	No	M	No
Delft	Yes	Few	M	No
Den Bosch	Orientation	Few	M	No
Dordrecht	No	No	M	No
Den Haag	Yes	Few	G4	No
Eindhoven	Orientation	Few	L	No
Enschede	Yes	Few	M	No
Groningen	Yes	Yes	L	Yes
Haarlem	Yes	Few	M	No
Leeuwarden	Orientation	Yes	M	No
Leiden	Yes	Few	M	No
Maastricht	Yes	Few	M	No
Nijmegen	Yes	Few	M	No
Rotterdam	Yes	Yes	G4	No
Tilburg	Yes	Few	L	No
Utrecht	Yes	Yes	G4	No
Venlo	No	No	M	No
Zwolle	Yes	Few	M	No

Table 3.2: Overview of historical G40 cities

It can be concluded from table 3.2 that the following three cities were suitable for a multiple-case study: (1) Amsterdam; (2) Groningen; (3) Leeuwarden. Amsterdam and Groningen both signed the Green Deal ZES, have several initiatives unfolding in the city and developed an action plan. Leeuwarden is currently in the orientation phase of signing the Green Deal ZES, planned during the summer of 2019 and contradicting to Amsterdam and Groningen has not developed an action plan.

The initiatives included in this research are listed in table 3.3. These initiatives were selected based on their (planned) activity in at least one of the three cities included in this research. Qualitative data was derived from semi-structured interviews with the initiatives listed in table 3.3. Furthermore, semi-structured interviews were held with the representative for all the entrepreneurs in the cities of Groningen and Leeuwarden and with representatives of the municipalities of Amsterdam and Groningen. The exact features and more details of the cities and the initiatives on the selected multiple-case study are provided in chapter 4 and 5.

	Company	Amsterdam	Groningen	Leeuwarden
Cubicycle	<i>DHL Express</i>		X	Planning
Streetscooter	<i>DHL Parcel</i>		X	X
Cargobike	<i>PostNL</i>	X		
Pakketbrievenautomaat	<i>PostNL</i>	X	X	
Cargobike	<i>Cycloon</i>	X	X	
SimplyMile		X	X	Planning
Slimme Laad- Los Plek		X		
Pakketautomaten	<i>EVAnet</i>	Planning	Planning	Planning
Facilitaire stromen				X
Sligro Food Group & Hanos			X	X

Table 3.3: Overview of initiatives (X= present, Planning = planned to start in these cities).

3.3 Data collection

3.3.1 Document-analysis

As mentioned in section 3.1.2, a document-analysis was part of this research. The main objective of the document-analysis was obtaining additional information on niche-level and regime-level developments concerning initiatives and governmental plans and policies. These documents were found as a result of a desk research, recommendations from respondents of the semi-structured interviews, and recommendations from the supervisors of Royal HaskoningDHV. The documents included in the document-analysis concerning regime-level information can be derived from table 3.4. Documents concerning niche-level initiatives and developments can be derived from table 3.5.

#	Title	Author	Year	City
D1	Uitvoeringsagenda Stedelijke Logistiek Amsterdam	Gemeente Amsterdam	2017	Amsterdam
D2	Actieplan Schone Lucht: Uitstootvrij Amsterdam	Gemeente Amsterdam	2019	Amsterdam
D3	Convenant Duurzame Stadslogistiek Groningen	Gemeente Groningen	2018	Groningen
D4	Meerjarenprogramma Verkeer & Vervoer 2018-2021	Gemeente Groningen	2017	Groningen
D5	Bestemming Binnenstad	Gemeente Groningen	2016	Groningen

D6	Collegebrief Stedelijke Logistiek Groningen	Gemeente Groningen	2017	Groningen
D7	PvA Stadsdistributie Update	Gemeente Leeuwarden	2018	Leeuwarden

Table 3.4: Overview of official governmental documents

#	Title	Author	Year
D8	Citylogistiek: Op weg naar een duurzame stadslogistiek voor aantrekkelijke steden	Ploos van Amstel, W. In <i>Logistiek+: Tijdschrift voor toegepaste logistiek</i> , 2016 nr 2.	2016
D9	Delivery Modes in the Dutch Parcel Market – No Man’s Land in Leadership	Zschocke, K. & Verduijn, T. In <i>Logistiek+: Tijdschrift voor toegepaste logistiek</i> , nr 2.	2016
D10	E-mobility in stadslogistiek	Altenburg, M., Balm, S. & Ploos van Amstel, W. In <i>Logistiek+: Tijdschrift voor toegepaste logistiek</i> , 2017, nr. 3.	2017
D11	Last Mile: Lokale Problematiek Telt.	Van de Munt, M., Bogers, E. & Weijers, S. In <i>Logistiek+: Tijdschrift voor toegepaste logistiek</i> , 2018, nr. 4.	2017
D12	Stadslogistiek met licht elektrische vrachtvoertuigen	Balm, S. & Ploos van Amstel, W. In <i>Logistiek+: Tijdschrift voor toegepaste logistiek</i> , 2018, nr 6	2018
D13	Bereikbaar Overtoom: Intelligente laad- en losplekken	Royal HaskoningDHV, Gemeente Amsterdam, Technolution, Connection, Connekt, Hogeschool van Amsterdam	2018

Table 3.5: Overview of documents as part of the document-analysis

3.3.2 Semi-structured interviews

Clifford et al. (2012) state that during the selection process of participants for semi-structured interviews it is important to carefully select respondents based on their experience with the topic and involvement in the cases. The selected respondents were all approached by e-mail to make an appointment for the interview. The possibility was given to the respondents to either have a face-to-face interview or an interview via the telephone/Skype. Representatives of initiatives were interviewed first because the output could be used as input for interviews with representatives of the municipalities. A list of the respondents is shown in table 3.6.

#	Date	Name of the Respondent	Organisation	Function	Sector
R1	May 21, 2019	F. Konings	Cycloon Fietskoeriers Groningen	Manager	Carrier
R2	May 22, 2019	E. Koekoek	SimplyMile	Director	Initiative
R3	May 23, 2019	R. Paré	DHL Parcel	Regional Manager	Carrier
R4	May 23, 2019	A. Tempelman	DHL Parcel	Terminal Manager	Carrier
R5	May 24, 2019	A. Paulides	PostNL Stadslogistiek	Projectleader City Logistics	Carrier
R6	May 24, 2019	J. Dam	PostNL Stadslogistiek	Projectleader City Logistics	Carrier
R7	May 24, 2019	L. Aandewiel	PostNL Fietslogistiek	Projectmanager Bicycle logistics	Carrier
R8	May 24, 2019	S. Camps	Royal HaskoningDHV	Processmanager Slimme Laad- en Los Plek Amsterdam	Initiative
R9	May 29, 2019	H. Boer	DHL Express	Service Centre Manager	Carrier
R10	June 3, 2019	H. Galema	Binnenstadsmanagement Leeuwarden	Manager	Entrepreneur
R11	June 11, 2019	E. Bos	Groningen City Club	Chairman	Entrepreneur
R12	June 11, 2019	L. Tuinhout	EVAnet	CEO/Founder	Initiative
R13	June 12, 2019	E. Regterschot	Municipality of Amsterdam	Projectmanager	Municipality
R14	June 13, 2019	K.Y. Haarsma	Municipality of Leeuwarden	Projectleader	Municipality

Table 3.6: Overview of conducted semi-structured interviews

A characteristic of semi-structured interviews is that it provides room for respondents to introduce new topics, ideas or examples, therefore a predefined list of questions does not exist

(Reulink & Lindeman, 2005). Nevertheless, an interview-guide was used in this research to structure the interview. Three interview guides were set up prior to the interviews: (1) interview guide for initiatives and carriers; (2) interview guide for entrepreneurs; (3) interview guide for municipalities (Appendix I.A). All interview guides included the variables as part of the conceptual model derived from the theoretical framework (section 2.3). The interview guide ensured that all topics were covered during the interview and research questions could be answered accordingly. A part of the interviews was conducted via a face-to-face interview whereas the other part was conducted via a phone-call, this was dependent on the preference of the respondent. The interview with DHL Parcel was a double interview, where two respondents of DHL Parcel were interviewed at the same time of which one respondent was focused on B2B-deliveries whereas the other respondent was focused on B2C and C2C-deliveries. The interview with PostNL was conducted with three respondents of which two respondents were focused on city logistics and the third respondent was focused on bicycle logistics. Prior to all interviews, respondents were asked for their permission to record the interview and to publish the outcomes, the informed consent form can be found in Appendix I.A. All interviews were recorded, transcribed and analysed. The transcripts of the interviews can be found in Appendix II. Chapter 3.4 elaborates on the data analysis.

3.3.3 Non-structured interviews

Non-structured interviews were held with stakeholders that were not actively involved in the initiatives or government, but were part of the initiatives. An example of these stakeholders are the wholesale traders in the catering industry (Sligro Food Group/Hanos). During non-structured interviews, the interview does not follow a predefined order and are therefore less useful for making comparisons. However, interesting findings can be found due to the flexible nature of non-structured interviews through which new elements could emerge that can be used as input for other interviews (Longhurst, 2010). Table 3.7 lists the conducted non-structured interviews. The non-structured interviews were not recorded and therefore summarized directly after the interviews were held.

#	Date	Organization	Sector
RA	April 1, 2019	Sligro Food Group Drachten	Supplier
RB	April 2, 2019	Hanos Heerenveen	Supplier

Table 3.7: Overview of conducted non-structured interviews

3.4 Data analysis

Qualitative research and the data that is conducted is subject to the interpretation of the researcher based on own perspectives and experiences of the respondents. This should be taken into account while conducting qualitative research (Strauss & Corbin, 1998).

3.4.1 ATLAS.ti

The transcripts of the recorded interviews and the documents included in the document-analysis were analysed and processed by the software tool ATLAS.ti. ATLAS.ti is specifically designed for analysing qualitative data and is therefore suitable for this research (Friese, 2014). One requirement for using ATLAS.ti is the production of codes, containing a short definition concerning the content of the code (Van Thiel, 2015). Codes can be attributed to

various elements such as opinions; behaviours; motives; activities; confessions; relations; situations; events; and perceptions (Van Thiel, 2015). Via the code manager, so-called ‘families’ of codes can be produced which show the most important elements and concepts of the research (Friese, 2014). Codes can be derived via deductive research or inductive research. In deductive research, codes are prior to the analysis produced in accordance with the operationalisation whereas in inductive research, codes are produced during the analysis (Van Thiel, 2015). In this research, codes were developed deductively, based on the variables included in the conceptual model (section 2.3) and reoccurring terms during the conducted semi-structured interviews. Appendix I.C provides an overview containing the codes, families and definition of codes used in this research. Responses given during the semi-structured interviews were marked using the codes and can through the family be linked to the central elements of the research for comparison.

3.5 Operationalization of the research

The second sub-question of this research is ‘**What barriers and opportunities are sustainable city logistic initiatives facing in reaching the subsequent step in the multi-phase concept within the transition towards the liveable city based on sustainable city logistics?**’ (section 1.3). The focus of this sub-question is on the barriers and opportunities of the initiatives at the niche-level included in this research. In order to create an overview of these barriers and opportunities a SWOT-analysis is used for structuring the outcomes of the interviews in chapter 4.



Figure 3.1: Example of a SWOT-matrix (Gooden, 2014)

Hay and Castilla (2006) define a SWOT as a ‘*strategic planning tool, used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project (p.4)*’. A SWOT (figure 3.1) is suitable for this research in order to create a distinction between internal strengths and weaknesses of initiatives and the external opportunities and threats of the environment, wherein barriers are perceived as threats. *Strengths, Weaknesses, Opportunities* and *Threats* are included in ATLAS.ti as codes for the analysis of the semi-structured interviews and documents.

3.6 Ethical considerations

Ethics must be respected when conducting interviews. The most important ethical aspects that should be considered are anonymity and confidentiality (Clifford et al., 2012). Results of this research could contain sensible information about the conditions that resulted in the successfulness of the initiatives. The researcher should consider that publication of this information could be used as input for competitive initiatives and could thereby harm these initiatives. It therefore must be acknowledged and respected that in some cases, the respondent is not willing to share all information about the initiative. In advance of the interview, all respondent received an overview of the most important questions of the interview and additional information concerning the background and objectives of the research. In this way, the participants were able to prepare themselves for the interview, which lead to extensive responses. Before interviews were conducted, the participants were asked for approval

concerning recording the interview via an informed consent form (Appendix I.B). Additionally, the participants were asked if they were willing to remain anonymous in this research, this is respected. At last, the participants were offered the possibility to receive the results of this research.

The researcher should under all circumstances possess a neutral and objective perspective on the research subject. This research is conducted in cooperation with Royal HaskoningDHV, a Dutch consultancy firm. Therefore, it must be acknowledged that there is a possibility that the researcher is influenced by the perspective of Royal HaskoningDHV. This could result in a conflict of interest concerning the neutral and objective perspective of the researchers and hence on the quality of the outcomes of this academic research. The researcher was aware of this and actively tried to not deliberately be influenced by the perspective of Royal HaskoningDHV. Furthermore, a control mechanism in the form of the criteria of the University of Groningen assured the quality of this research.

Chapter 4: Results

Chapter 3 outlined the methods used for gathering data in this research. This chapter will elaborate on the findings of this research. Section 4.1 consists of the developments taken on in the socio-technical landscape. Subsequently, section 4.2 outlines the findings regime level developments in the cities of Amsterdam, Groningen and Leeuwarden. Finally, section 4.3 elaborates on the initiatives developed at the niche-level.

4.1 Socio-technical Landscape

A socio-technical landscape is defined as the overarching level forming the defining context for the regime level. Two different forms of a socio-technical landscape can be distinguished. First, the socio-technical landscape can stabilize the regime-level. Second, the socio-technical landscape can exert pressure on the regime level with the main aim to initiate a change. (Geels, 2012; Geels & Kemp, 2000; Geels & Schot, 2007). In this research, the focus of the socio-technical landscape is on the latter, aiming for a transition towards sustainable city logistics.

In 2015, the Paris Climate Agreement was established during the United Nations Conference in Paris. The Council of Ministers of the Kingdom of the Netherlands has acknowledged this agreement and presented the Dutch Climate Agreement based on the directions of the Paris Climate Agreement and the national context on June 28, 2019 (Rijksoverheid, 2016; Rijksoverheid 2019). The Dutch Climate Agreement determine that an acceleration need to take place to reach the objectives of the Green Deal ZES. The objective is that in 2025, the G40, the 40 largest municipalities of the Netherlands, has implemented an operating zero-emission zone in city centres (Rijksoverheid, 2019). The Dutch government established an action plan for these municipalities in April 2019 (SPES, 2019). This action plan consists of a general operation procedure supplemented with local tailor-made measures on different aspects for all stakeholders involved (SPES, 2019). The regime level can use this action plan to define their context and rules and regulations.

4.2 Regime-level

The regime level consists of dominant established practices, technologies and associated rules. These elements are deeply embedded in society and therefore path-dependence and lock-in mechanisms can exist within the regime-level (Geels, 2012; Kemp & Loorbach, 2003). A consequence of this is that the focus of the regime level is on system optimization instead of system transformation (Elzen et al., 2002; Geels, 2012). In this research, the focus of the regime-level is on the latter, aiming for a transition from fossil fuel-based city logistics towards sustainable city logistics. To establish this, the overarching socio-technical landscape can exert pressure on the regime level as is explained in section 4.1. The emphasis of this research is on three cities; Amsterdam, Groningen, and Leeuwarden. The specific context of the regime level focused on city logistics will be elaborated on in the following sections.

4.2.1 Amsterdam

The city of Amsterdam experiences poor levels of air quality since the beginning of the 21st century. In April 2019, the municipality of Amsterdam published an action plan 'Schone Lucht' with the emphasis on zero-emission Amsterdam. Within this action plan, various policy measures are described that will be deployed in a broad context. The first explicit step in this action plan is a zero-emission zone for public-transportation

buses and touring cars in 2022 working via a zero-emission city centre in 2025 (within the ring road A10) towards a zero-emission zone covering the urban area of Amsterdam. Different roles of the government are required to assure that the specific measures will be accomplished (Gemeente Amsterdam, 2019).

These future regulations have an impact on the way the local society of Amsterdam is organized. A sector that will be affected by the action plan 'Schone Lucht' is the logistic sector. In May 2017, the municipality of Amsterdam developed an implementation plan for city logistics in Amsterdam with the main aim to reduce the traffic density in the city, increase liveability and increase air quality. Underlying of the measures proposed in this implementation plan is a thorough research that functions as baseline-measurement and identified bottlenecks. Based on the outcomes of this research, the city of Amsterdam developed measures that support the objective of the implementation plan. Measurements are divided in three categories: (1) tailor-made measurements per area; (2) general measurements for the city; (3) innovation and research. A pilot of as part of the category (3) innovation and research is included in this research (Gemeente Amsterdam, 2017).

4.2.2 Groningen

The city of Groningen experiences a general change in how the city centre is perceived by visitors and citizens towards the centre as 'living-room' of the city. During the last couple of years, the municipality of Groningen invested money for physical improvements in the city centre. The main objective was to create coherence in the city centre in both infrastructure as well as the vibrant atmosphere, the municipality of Groningen established 'Bestemming Binnenstad'. 'Bestemming Binnenstad' is an official document containing a comprehensive plan to reach the objective. An element of this document is the paradigm shift towards sustainable city logistics that is required to meet the objective (Gemeente Groningen, 2016).

The department of Transport of the municipality of Groningen established the 'Meerjarenprogramma Verkeer en Vervoer 2018-2021' describing projects and developments in Groningen concerning transportation for the period 2018-2021. The topic city logistics is included into this document containing two focus areas. First, the accessibility and traffic flows and second, the impact of freight transport on public spaces (Gemeente Groningen, 2017a). Within these two focus areas, four themes are distinguished: (1) action plan Green Deal ZES 2025; (2) Urban Consolidation Centres; (3) knowledge development and innovation, (4) dispensation policy city centre (Gemeente Groningen, 2017a).

The first theme, action plan Green Deal ZES is linked to this research. Within this theme, two concrete actions are taken by the municipality of Groningen. First, in January 2017, the municipality changed the time window-regulation. The current regulation contains an extension of the former time-window during the morning hours (5.00-12.00 a.m.) and abolishment of the time-window during the evening hours. Furthermore, the municipality of Groningen implemented a preferential policy for electric vehicles during non-time window hours. Additionally, the municipality of Groningen formulated the aim for strict maintenance of the time-windows (Gemeente Groningen, 2017b).

Second, in order to guide this paradigm shift, the municipality of Groningen, in cooperation with a focus group, developed the agreement 'Convenant Duurzame Stadslogistiek Groningen' that will function as action plan. This agreement contains 10 specific measures that should be implemented to establish the aforementioned paradigm shift and create a liveable city. A specific example of an element of this covenant is the creation of an uniform and unequivocal regulation concerning the provisioning of goods. The municipality of Groningen is currently conducting pilots of measures (Gemeente Groningen, 2018).

4.2.3 Leeuwarden




During the past years the municipality of Leeuwarden invested in the infrastructure within and surrounding the city. The objective of the municipality for the period 2018-2021 is to focus on sustainability. One of the elements acknowledged by the municipality of Leeuwarden is smart and sustainable logistics in the historical city centre. Currently, the municipality of Leeuwarden utilizes time windows and length restrictions for freight transport. However, concrete measures and an action plan have not been developed within the municipality of Leeuwarden (Gemeente Leeuwarden, 2018).



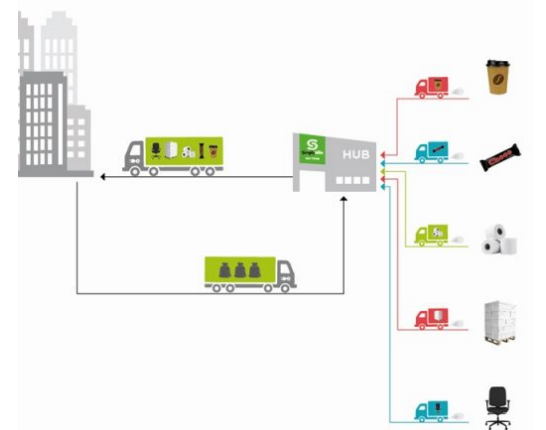
4.3 Niche-level

The niche level can be regarded as a protected but dynamic space wherein individual actors or groups of actors form a network with the objective to develop novel technologies and innovations. These developed technologies are radically different from the existing regime level and socio-technical landscape (Geels et al., 2017). Innovations on the niche-level generate bottom-up pressure on the regime-level. However, as a breakthrough is difficult, a 'window-of-opportunity' can be regarded as prerequisite to create a breakthrough (Geels & Kemp, 2000). The top-down pressure from the national government on the regime-level regarding the implementation of a zero-emission zone in 2025 can be perceived as a 'window-of-opportunity' for innovations at the niche-level to breakthrough.

4.3.1 Introduction to the initiatives

Table 4.1 provides an overview of the initiatives included in this research. This overview consists of the ambition of the business, the cities in which the initiatives is operating, a description and picture of the initiative.

Business	Ambition	Location	Description of initiative	Picture of initiative
<i>DHL Express</i>	Reduce DHL CO2 emission rates to 0% in 2050, reaching a reduction of 50% by 2025 by actively working on sustainable initiatives.	Groningen	International and national B2B, B2C and C2C parcels are delivered once a day via the storehouse in Zwolle. Subsequently, the parcels are divided over the DHL cubicycle and delivered throughout the day based on zip-codes and incoming bookings. Cubicycles are CO2-neutral bicycles containing a square cube and electric pedal support (R9, 2019).	 <p>Source: DHL (2019)</p>
<i>DHL Parcel</i>	Reduce DHL CO2 emission rates to 0% in 2050, reaching a reduction of 50% by 2025 by actively working on sustainable initiatives.	The Netherlands	National B2C and C2C parcels are delivered by a streetscooter in various cities in the Netherlands. The streetscooter is an electric vehicle and replaced DHL fossil fuelled vehicles. For the B2B-deliveries, DHL is working on sustainable initiatives as the technology for electric trucks is currently underdeveloped (R3; R4, 2019).	 <p>Source: Duurzaamnieuws.nl (2017)</p>
<i>PostNL</i>	Zero-emission last-mile deliveries in 25 Dutch cities in 2025.	Amsterdam, Leeuwarden, Utrecht	PostNL internally developed the cargobike to improve the delivery process in the city of Amsterdam as they were confronted with traffic jams on a daily basis, negatively influencing the delivery process. Cargobikes are allowed to use bicycle lanes which results in the possibility to avoid these traffic jams (R7, 2019).	 <p>Source: PostNL (2018)</p>

<p><i>PostNL</i></p>	<p>Zero-emission last-mile deliveries in 25 Dutch cities in 2025.</p>	<p>Amsterdam, Groningen and various other cities</p>	<p>In order to decrease the traffic movements in neighbourhoods, PostNL developed a pakketbrievenautomaat (PBA). A PBA is a cabinet consisting of various boxes. PostNL delivers parcel in these PBA's while making use of sustainable transportation. Customers can decide when they pick-up their delivery using a code (R5; R6, 2019).</p>	 <p>Source: PostNL (2019)</p>
<p><i>Cycloon Fietskoeriers</i></p>	<p>Reduce the number of vehicles in city centres.</p>	<p>Groningen and various other cities</p>	<p>Cycloon initiated the use of different models of cargobikes. These cargobikes are developed in order to comply with the volume growth experienced within the sector. However, there are limits to growth and the cargobikes are not suited to replace all deliveries in city centres (R1, 2019).</p>	 <p>Source: Slim en Schoon 2025 (2017)</p>
<p><i>SimplyMile</i></p>	<p>Nationwide coverage by incorporating at least 25 cities into their business in order to reduce traffic movements in city centres.</p>	<p>Amsterdam, Groningen and various other cities (planned in Leeuwarden)</p>	<p>SimplyMile is an urban consolidation centre that cooperates with local logistic companies within the relocation sector. Due to changing market conditions, continuation of the core-business of these logistic companies became difficult. The storage capacity of these logistic companies is currently functioning as consolidation centre and transfer location for goods to decrease traffic flows. SimplyMile offers suppliers sustainability by facilitating the last mile of the transport process. Different transport flows are bundled at the consolidation centre and delivered once or several times a week (R2, 2019).</p>	 <p>Source: Djinny Slimme Logistiek (2019)</p>



<p><i>Slimme- laad en losplek</i></p>	<p>Derive a solution for the logistic problems in the city centre of Amsterdam and reduce 'search-kilometres'.</p>	<p>Amsterdam</p>	<p>The slimme laad- en losplek consists of three elements: a camera, a LED-sign, and a software-system. A supplier or carrier can make a reservation via a booking system to assure that the slimme laad- en losplek is available in the time-frame they are planning to do a delivery. This initiative is likely to reduce the pressure on the transport system by means of controlled planning of deliveries in the area. The load-unload parking lot can be used for other purposes during timeframes that the load-unload parking lot is not operational. A pilot of the slimme laad- en losplek is currently in operation in the 'Overtoom' (R8, 2019; Royal HaskoningDHV et al., 2018).</p>	 <p>Source: City Nieuws (2019)</p>
<p><i>EVAnet</i></p>	<p>Restructure the last-mile in within the parcel-sector with the goal to decrease the number of traffic movements in neighbourhoods.</p>	<p>Operating in Spijkernisse, planned in 30 cities, among others: Amsterdam, Groningen, Leeuwarden</p>	<p>EVAnet actively cooperates with small businesses based on valuable expertise for the creation of initiatives that support sustainable last-mile deliveries. EVAnet is the hardware-side of the initiative. In cooperation with other businesses such as <i>De Buren</i>, EVAnet developed pakketautomaten. Izipack is the software-side of the initiative which provides users the ability to control the lastmile of their order (R12, 2019).</p>	 <p>Source: Chargemap.nl (2019)</p>

Table 4.1: Overview of the initiatives included in this research

4.3.2 Opportunities and barriers

The analysis of the outcomes of the interviews resulted in an overview of the opportunities and barriers experienced by initiatives and municipalities. The barriers and opportunities are divided over internal and external factors and are visualised in a SWOT-matrix as can be derived from table 4.2. The SWOT-matrix consists of four elements: the internal (1) strengths and (2) weaknesses, and the external (3) opportunities and (4) threats. This section will further elaborate on these four elements of the SWOT-matrix.

	Helpful for transition	Harmful for transition
Internal factors	Strengths <ul style="list-style-type: none"> • Intrinsic motivation of initiators to start working on this issue • Municipalities testing and monitoring pilots • Doing research to visualize the problems • Internal cooperation within the private sector 	Weaknesses <ul style="list-style-type: none"> • Lack of cooperation with direct rivals within the private sector • Uncertainty among stakeholders about the specific location of the ZE-zone • Administrative capacity of municipalities
	Opportunities <ul style="list-style-type: none"> • Public-Private cooperation • Regulation concerning access to city centres and strict maintenance of the regulation • Holistic approach within a municipality • Incremental steps for reaching the end goal 	Threats <ul style="list-style-type: none"> • Increasing volumes within city centres • Technological capacity of vehicles • Attitude of the government concerning willingness and taken action • Consumer behaviour
External factors		

Table 4.2: General identified Strengths, Weaknesses, Opportunities and Threats

4.3.2.1 Strengths

The **strengths** visualized in the SWOT-matrix (table 4.2) are elements present within sustainable initiatives that internally relate to the formation process of the initiative. These elements are considered beneficiary for the transition towards sustainable city logistics.

Intrinsic motivation of initiators

An important strength is the intrinsic motivation found by initiators. A result of this motivation is that these initiators voluntary started initiatives without governmental support, this indicates that awareness exists among stakeholders (R1; R2; R3; R4; R9).

Municipalities testing and monitoring pilots

Amsterdam and Groningen are both performing pilots to investigate which measures have potential and what the main pros and cons are. Additionally, the municipalities actively monitor the outcomes of the pilots to decide if the pilot fits into the local context (R8; R11; R13). Conducting pilots is an essential element in the transition towards zero-emission city logistics as the context of a city is unique and therefore, measures should always be adjusted to the local context. Furthermore, bottlenecks can be identified that can reduce the chance of failure in a later stage of the transition.

Doing research

The municipalities of Amsterdam, Groningen and Leeuwarden started with doing research into the location, sort and size of bottlenecks within the city centres, an example of this is research into traffic flows. Furthermore, research can contribute to the creation of support among stakeholders in the city (R8, R10, R11, R13, R14).

Internal cooperation

Internal cooperation is defined as the cooperation between stakeholders within the private sector or the presence of a positive attitude towards cooperation. An example of a cooperation is PostNL and Cycloon cooperating during evening-deliveries, and PostNL as executing party for the SimplyMile initiative (R1; R2; R5; R6; R7; R12).

4.3.2.2 Weaknesses

The **weaknesses** visualized in the SWOT-matrix are elements present within sustainable initiatives that internally relate to the formation process of the initiative. These elements are considered obstructive for the transition towards sustainable city logistics.

Lack of cooperation with rivals

Within the carrier sector cooperation with rivals is lacking. The outcomes of this research indicate that in the near future, the large players within the sector are not willing to bundle deliveries because of the current situation on the market which is defined by high levels of competition. Another weakness that is related to the lack of cooperation is the *lack of price-agreements within the sector*. Initiating a minimum price for parcel deliveries (R3; R4) could cover the business-model and create assets that could be invested in sustainable initiatives which are currently unprofitable in the purchase (R3; R4; R5; R6; R7; R9).

Uncertainty about the specific location of the ZE-zone

The national government of The Netherlands set 2020 as deadline for the determination of the ZE-zone in G40 municipalities. The current prognoses is that a large share of the G40 municipalities will not reach this deadline. Uncertainty about the specific location result in ambiguity among local entrepreneurs facing renewal of their vehicle fleet. Entrepreneurs are forced to make a decision for either an expensive but electric vehicle or a fossil fuel based vehicles with the uncertainty of future access-restrictions (R2; R3; R4; R5; R6; R7; R9).

Administrative capacity of municipalities

In Groningen and Leeuwarden, the municipality is facing a low administrative capacity on the topic of sustainable city logistics. A weakness of this is that the speed of a transition is affected by the administrative capacity of a municipalities that is in charge of establishing clear rules and regulations (R2; R10; R11; R12; R14).

4.3.2.3 Opportunities

The **opportunities** visualized in the SWOT-matrix are elements present outside the scope of sustainable initiatives that externally relate to the formation process of the initiative. These elements are considered beneficiary for the transition towards sustainable city logistics.

Public-Private cooperation

Cooperation between public and private parties has two main advantages for accelerating the transition towards sustainable city logistics. First, participation of the private sector in decision-making has potential to increase support for established policy plans and furthermore, can encourage parties to take action. Second, public parties can support private parties in different

manners to further accelerate the transition. An example of support is subsidies in the pre-development phase of an initiative or dispensation for sustainable initiatives (R11; R12; R13; R14). Van der Munt et al. (2017) states that collaboration is a prerequisite for the transition towards sustainable city logistics as this is a shared responsibility of both the government and the private sector. This pleads for public-private cooperation, in which the early involvement of the private parties can be regarded as successful. Besides, cooperation result in economies of scale which can further accelerate the transition as the lack of economies of scale are currently perceived as barrier for the transition towards sustainable city logistics (Altenburg et al., 2017; Van der Munt et al., 2017).

Regulation

One of the most important opportunities is the development of clear and unequivocal regulation. As long as clear and unequivocal regulations and the thereto related maintenance of regulation are lacking, stakeholders involved are not simulated to voluntarily take action to start sustainable initiatives since a level playing field is missing (R1; R2; R3; R4; R5; R6; R7; R8; R9; R10; R11; R12; R13; R14).

Holistic approach within municipalities

Official governmental plans are often affecting the physical environment wherein several departments of governments are represented. Creating a masterplan as a municipality, such as a roadmap towards 2025, demand for a holistic approach in which the represented departments cooperate. Nevertheless, it a fully holistic approach is not feasible (R11, R13, R14). On the other hand, a holistic approach could also be perceived as a threat as municipalities are occupied with decision-making and this typically demands for writing policies. Including the whole could make it difficult to establish this decision-making and create a master plan.

Incremental steps

In order to increase the success of initiatives, it is important to create a clear roadmap towards 2025. A prerequisite related to this is that incremental steps form the basis of execution of the roadmap. Starting initiatives on a small-scale level provides insights in the bottlenecks and performance rates of initiatives. Additionally, not every street share similarity in context and therefore plans should be made area-specific based on research insights. (R11; R13; R14).

4.3.2.4 Threats

The **threats** visualized in the SWOT-matrix are elements present outside the scope of sustainable initiatives that externally relate to the formation process of the initiative. These elements are considered obstructive for the transition towards sustainable city logistics.

Increasing volumes

A major threat for the carrier sector is the prospective of further increasing volumes within the parcel deliveries (E-commerce). Growing volumes will eventually reach the tipping point of sustainable initiatives in which these initiatives are no longer viable based on capacity (R1; R3; R4; R5; R6; R7; R9; R12).

Technological capacity

For the B2C- or C2C-market, several sustainable initiatives have been developed. For the B2B-market, mainly dependent on large trucks as a consequence of large volumes, lacking technological capacity is perceived as a major threat. For both trucks and electric vehicles, the

current technological capacity is inadequate to fulfil the needs of the sector. The main technological incapability of the parcel sector is the relatively short operating radius and short 'stops' being insufficient for charging bollards to fully re-charge. Technological incapability's perceived by suppliers and the B2B-market is the lack of electric trucks including refrigeration systems that meet the quality requirements of the government (R2; R3; R4; R9; RA; RB). Altenburg et al. (2017) confirms the above and additionally states that currently, benefits for purchasing electric vehicles are lacking.

Attitude of the government

Initiatives as part of this research perceive the willingness of the government as positive, however the willingness does not correspond to the actual action taken by the government. An often-mentioned element of this is the lack of strict regulation and maintenance. An example of this are the lack of maintenance on the time windows in Groningen. Lacking maintenance result in a negative sense of urgency and necessity among stakeholders further affecting the motivation of stakeholders to start sustainable initiatives (R1; R2; R3; R4; R5; R6; R7; R8; R9; R10). The cause of the lack of strict regulations are the cuts made within municipalities concerning the city logistic departments. These departments do not receive the highest priority resulting in adverse developments with respect to the above described demand for strict regulation and maintenance.

Consumer behaviour

A threat that is specifically experienced by stakeholders involved in parcel deliveries is consumer behaviour. The current market is extremely prone to competition. Consumer behaviour affect the successfulness of initiatives. As long as consumers are not changing their behaviour, it is difficult for these initiatives to develop. For example, increasing the price for home-deliveries in favour of pick-up points will result in the consumers' choice for the competitor (R2; R3; R4; R9; R12).

4.3.3 Prerequisites

This section elaborates on the prerequisites that could help initiatives to further develop and trigger the transition towards sustainable city logistics. Four main prerequisites are identified, these prerequisites are further supported by and related to other prerequisites.

The first prerequisite is a **green ambition of the municipality**. A green coalition within the municipality results in a pro-active and positive attitude towards the transition to sustainable city logistics. It is plausible that initiatives occur quicker when the surrounding climate has a positive attitude in favour of the initiative. (R11; R13, 2019)

However, as a green ambition of the municipality is likely to accelerate a transition it is not the only factor defining the climate in which initiatives develop. The second prerequisite is the **sense of urgency** that must be felt among stakeholders. This sense of urgency can emerge through implementation of **strict regulation and maintenance of this regulation**. Furthermore, this regulation should be **clear and unequivocal** for all parties involved. (R1; R2; R3; R4; R5; R6; R7; R8; R9; R10; R11; R12, 2019). A sense of urgency is also a prerequisite that is concluded by Altenburg et al. (2017). The urgency to solve the issue could be perceived as the most important factor for the establishment of initiatives as included in this research. Besides strict regulation, the character of historical city centres including narrow streets define the context as these streets demand for sustainable solutions.

The third prerequisite is **support during the development of an initiative**. An example of support is the **provision of subsidies in the pre-development phase**. The outcomes from this research indicate that large players in the sector predominantly start initiatives. This is due to internal assets of these businesses that can be invested in the pre-development phase. However, for this transition to be successful, it is of significant importance that all stakeholders involved are able to afford sustainable initiatives. Currently, sustainable initiatives are facing impediments and are often not perceived beneficial based on a price-quality ratio. Subsidies in the pre-development phase can remove the non-profitable part of the investment. Nevertheless, an important prerequisite is that the **business-case underlying the initiative is always positive and independent of subsidies**. In case an initiative is dependent on the subsidy, the initiative will not continue to exist as soon as the subsidy discontinuous. (R2; R3; R4; R5; R6; R7; R8; R9; R12, 2019). Research performed by Ploos van Amstel (2016) and Quak et al. (2014) confirm this.

Most of the transport initiatives currently available are either types of electric vehicles or of cargo-bikes. These types of vehicles are dependent on the distances between deliveries. A **high stop-density of the target market** is therefore a fourth prerequisite for initiatives to be advantageous. The outcomes of this research show that historical cities often comply to the fourth prerequisite due to the high population density in city centres forming the target market and the physical character of these cities with often small streets not suited for freight transport. (R1; R3; R4; R5; R6; R7; R9, 2019)

4.3.4 Roles of the government

Figure 4.1 distinguishes the four roles of the government (1) regulator; (2) facilitator; (3) communicator and (4) realisator, as described in section 2.2.2. This section will elaborate on and criticize the identified roles of the government according to the respondents.

4.3.4.1 Regulator

The regulator role is according to Kolkman et al. (2003) and Visser and Kansen (2018) characterized by the following aspects: (1) dictate and prohibit; (2) regulate; and (3) obligatory discouraging by means of financial instruments. The following quotations derived from the empirical research indicate that especially the first two aspects of the regulator role are significant.

'I know that regulation can trigger this transition, since you oblige businesses to take measures... however, municipalities have lots of ideas and wishes, but the initiatives must emerge from the businesses itself. (R9, 2019).'

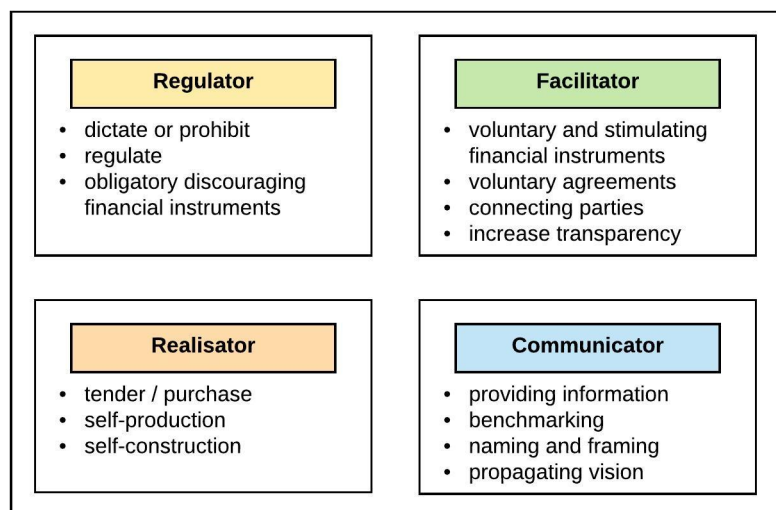


Figure 4.1: Identified roles of the government (author, 2019. Based on Kolkman et al., 2003 and Visser & Kansen, 2018)

'We are cooperating with the municipality. As long as the municipality allows a certain regulation are we able to act in a certain way. Several parties in the logistic service are now demanding for strict regulations that restrict access for fossil fuelled freight transport. Then an incentive for a solution will arise. (R4, 2019)'

'In case half of the city is working towards the right direction, but the other half that is continuing in doing it the unsustainable way, then the government is not fulfilling the correct role. As a government you must create a clear and unequivocal line. (R2, 2019)'

'Suppliers and carriers exhibit anti-social behaviour, as is my opinion. Their aim is to get as close to their point of delivery as possible, which is clearly not the load-unload parking lot. It is therefore not likely that they will start using the booking system. In case this initiative is spread over the entire city and the government creates regulation and starts maintaining the regulation, the initiative is likely to work due to the urgency that arises. (R8, 2019)'

'At the moment the municipality is focusing too much on ordering and prohibiting, you must do this, you have to do that, you cannot do this anymore...But then what? How should it be? And then it becomes quiet. (R9, 2019)'

From the quotations can be concluded that a demand exists among stakeholders for clear and unequivocal regulations concerning access to the city centre. This regulation should be used to create a sense of urgency for stakeholders and fair competition among stakeholders to start acting. Examples of regulations mentioned by respondents are the implementation of time windows and strict maintenance of regulation. (R1; R2; R3; R4; R5; R6; R7; R9; R11)

In order to be able to start initiatives a suggestion made by various respondents is the creation of a holistic approach concerning regulation in every municipality. On the operational level this would result in a general and an additional specific law. The general law can be regarded uniform for every Dutch municipality whereas the specific law is dependent on the local context, since this is unique for every municipality. (R5; R6; R7; RA)

4.3.4.2 Facilitator

The facilitator role is according to Kolkman et al. (2003) and Visser and Kansen (2018) characterized by the following aspects: (1) voluntary and stimulating financial instruments; (2) voluntary agreements; (3) connecting parties; and (4) increasing transparency.

The first aspect is acknowledged by various respondents. Voluntary and stimulating financial instruments, such as subsidy-programs, are perceived as both effective and undesirable. The following quotations indicate a discussion in the field:

'The municipality can take a facilitator role. For example, providing subsidies, discounts or co-finance initiatives. Help thinking along about potential locations or looking for a specific location would really help us. (R9, 2019)'

'Subsidies are important for initiatives. Without subsidies, the establishment of initiatives will be a financial burden on third parties, so I would say that subsidies are important for an initiative to start. (R8, 2019)'

'What you often see in case of subsidy-programs is that subsidies create an additional revenue stream for initiatives. As soon as the subsidy-program stops, the initiatives face a negative merit model resulting in the disappearance of the initiative. (R2, 2019)'

'As a government you can purchase material for the carrier sector. That is nice but will definitely not work. As a government you should assure that you tighten the regulations and by that create pressure on the market, then chances will appear, and the market will act. (R1, 2019)'

At the one hand, subsidies are perceived as stimulus for initiatives to develop, and especially in the pre-development phase could create benefits as this phase is often remarked as the most expensive phase. This is due to the innovative character of the pre-development phase, in which money is used for the process and the profitable element is lacking. Starting a new initiative therefore requires additional assets. Especially small businesses experiencing small assets are not able to invest in innovations. Subsidies are an example of additional assets that can reduce the unprofitable part. However, as respondent 2 indicates, it is important to be critical to the effect of subsidies as some initiatives' viability is dependent upon subsidies. Furthermore, guidelines should exist, and subsidies should be applicable to all stakeholders. From the above can be concluded that subsidies are a measure that has pros and cons. The best moment to implement a subsidy-program is in the beginning of a transition in order to stimulate the development of initiatives. As every situation is unique, the question is if subsidies are the best measure to implement to trigger this transition? Certainly, when kept in mind the pros and cons as mentioned above, a new way of 'stimulation' can be sought.

An example of a subsidy-program can be found in Amsterdam. The municipality of Amsterdam initiated the transition internally by the creation of a subsidy-measure and facilitating a change in regulation in favour of parties involved to further accelerate the transition. *'The municipality of Amsterdam provides subsidies for electric vehicles with a license plate. A couple of years ago, PostNL was thinking of changing their fossil fuel vehicles for goupils (electric vehicles). However, these goupils did not have a license plate and were therefore not entitled to claim the subsidy. As a municipality, we decided to change the regulation behind the subsidies in favour of PostNL. (R13, 2019)'*

Connecting parties as the third aspect of the facilitator role is acknowledged by respondent 8 concerning the slimme laad- en losplek pilot in Amsterdam. For this pilot, the government could function as a 'mediator' for connecting stakeholders involved in the process (R8, 2019). However, this aspect of the facilitator role is situated in a so-called 'fuzzy area' since a certain overlap can be observed with the communicator role (section 4.3.4.3).

The fourth aspect of the facilitator role is increasing transparency, concerning transparency in decision-making processes and future plans regarding zero-emission zones (R2; R5; R6; R7; R8, 2019). This aspect is strongly connected to the communicator role aspect of 'providing information'.

4.3.4.3 Communicator

The communicator role is according to Kolkman et al. (2003) and Visser and Kansen (2018) characterized by the following aspects: (1) providing information; (2) benchmarking; (3) naming and framing; and (4) propagating visions.

The first aspect of the communicator role is providing information, which is connected to the fourth aspect of the facilitator role, increasing transparency, as increasing transparency is related to the provision of information. Increased transparency and the provision of information creates certainty for stakeholders involved (R5; R6; R7, 2019). As can be derived from the following quote, there is a demand for the provision of information and increasing transparency.

'At this moment, it is still unclear what the exact zero-emission zone will be in cities. This should have been clear by now! Entrepreneurs in city centers that are facing vehicle fleet depreciation are not sure if they have access to their business in 2025. (R2, 2019).'

An example of the providing information is the effort the municipality of Amsterdam takes in raising awareness among stakeholders concerning the availability of the subsidy-program (section 4.3.4.2) as can be derived from the following quote. *'As the municipality we provided general information at several events set up for entrepreneurs about for example the subsidies the municipality provides. Furthermore, we developed a tailor-made approach in which we actively approached the top 100 businesses owning the largest vehicle fleet in Amsterdam, to ask them to think about transferring to electric vehicles. (R13, 2019)*

Additionally, a demand exists for the naming and framing of initiatives to stakeholders involved to increase awareness about initiatives (R8; R13, 2019), this is in accordance with the third aspect of the communicator role.

4.3.4.4 Realisator

The facilitator role is according to Kolkman et al. (2003) and Visser and Kansen (2018) characterized by the following aspects: (1) tender/purchase; (2) self-production; and (3) self-construction.

The role of realisator is underexposed in the outcomes of the empirical research as the second and third aspect of the realisator role are primarily focussing on actions taken by the government. The first aspect has potential to further stimulate the development of initiatives by granting initiatives with a tender. *'I do not believe in a government that takes the role of entrepreneur. A government must initiate initiatives and protect investments. The latter implies that the initiator should be rewarded by the government, this could be done by winning a tender of by strong maintenance of rules in favour of the sustainable initiative. Additionally, the government must create a clear roadmap with steps in order to reach the goal and facilitate a positive business-case by acting as launching customer. (R12, 2019).'*

A disadvantage of a tender is that it concerns a procedure that is often related to public works, whereas initiatives developing in the logistics sector are developed by private parties. Therefore, a discrepancy between the realisator role and the other three roles of the government can be distinguished, the question that arises is if the realisator role is suitable for this transition?

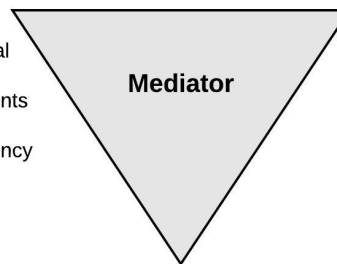
4.3.4.5 Towards a new role

From the above can be derived that to a certain extent an interplay exists between the four roles. Especially between the facilitator and communicator role, a ‘mediator’ role seems to exist for the connection of stakeholders. A critical view on the conceptual model and the specific aspects of the four roles raises the question if the outcomes of this research correspond with these aspects.

An aspect that is difficult to categorize within the four roles and that is remarked by several respondents is stimulation. Stimulation can be established in various manners, both financial and non-financial. The facilitator role is focusing on financial incentives. However, the outcomes of the empirical research

Facilitator

- voluntary and stimulating financial incentives
- voluntary agreements
- connecting parties
- increase transparency



Stimulator

- leading by example and launching customer
- stakeholder participation

Communicator

- providing information
- benchmarking
- naming and framing
- propagating vision

Figure 4.2: Distinction based on characteristics between the facilitator, stimulator and communicator role (author, 2019)

indicate that there is a demand for non-financial incentives such as ‘leading by example’ or ‘launching customer’ and the creation of a stimulating environment (R2; R5; R6; R7; R11; R12, 2019). Besides, a demand exists for the stimulation of participation processes between public and private parties by the government to further increase support and commitment among stakeholders (R14, 2019). The overlapping nature in practice of the facilitator and communicator role result in a fuzzy area in which it is unclear what the exact role of the government is. Including a fifth role, the stimulator (figure 4.2), has potential to reduce fuzziness and create order. In this construction, the facilitator will create the environment for individual initiatives to develop, whereas the communicator is responsible for the promotion and information concerning developments in the environment. The stimulator role has potential to further stimulate developments of initiatives and participation among the various stakeholders involved. Furthermore, a mediator is accountable for the internal coordination between the three roles.

4.4 From government to governance

The preceding section elaborated on the role of the government in the transition towards sustainable city logistics. One significant issue that can be derived from the result is the demand for strict regulation and maintenance as part of the regulator role. Regarding the implementation of policy concerning regulation, the key to success is dependent on the consistency and commitment of measures taken across the chain of stakeholders involved. Therefore, it can be concluded that the transition-process as part of transition management is as strong as the weakest link in the chain.

The government is the most important and defining stakeholder in this transition as the government possesses the mandate to establish policy frameworks and, subsequently, is responsible for maintenance of established policies. Nevertheless, the position of the

government in the transition cannot be regarded as easy and straightforward as the government has to deal with a width spectrum of stakeholders. A width spectrum of involved stakeholders has potential to generate dilemmas concerning prioritization of different and potential conflicting stakeholder interests. This reflects the importance of governance in the transition towards sustainable city logistics as governance can assist government in making correct, traceable and consistent decisions.

Although, the government has several direct and indirect relations with the involved stakeholders. This offers potential for policy implementation as related policy areas could be involved in implementation and maintenance. A prerequisite is that the stakeholders involved should be involved in these policy areas and should be integral component in governance. Specifically, their role would concern supplementing prerequisites for stakeholders apropos of other policy aspects.

Concerning the transition towards sustainable city logistics, additional requirements regarding the granting of authorizations could be considered. An example of this is the granting of precarious rights for terraces for the hotel and catering industry. This permit can be linked to requirements for the suppliers or the delivery times and methods of delivery. If these requirements are not met (by the stakeholder and/or his certified supplier), the precarious right can be refused or withdrawn. This creates additional importance for both the policy area concerned. In the example, the catering establishment will have an interest in his supplier complying with the rules as this constitutes a risk and at the expense of the catering establishment's business operations. An indirect form of enforcement arises here. This extends the aforementioned chain and the leverage for direct enforcement by the government is complemented and strengthened by indirect enforcement by the stakeholders themselves. The above reflects the regulator role of the government focusing on prohibitions. Concerning the other roles of the government as mentioned in section 4.3.4 similar governance measures could enhance the transition process focusing on stimulation.

4.5 Stakeholder comparison

This section exists of a comparison between the involved stakeholders and their attitude towards central elements derived from the analysis of the results of this research. The comparison provides an overview of opinions between and within the subsectors related to the logistic sectors as can be derived from table 4.3. As the stakeholders included in this research all have a different position on the market and a different background, thorough comparison and strong conclusion cannot be drawn.

Several reasons exist among cities in the Netherlands to start the transition towards sustainable city logistics. Where some cities such as Amsterdam are confronted with decreasing air quality levels, other cities, such as Groningen, aim to reduce the traffic flows in city centres in order to increase the liveability and attractiveness of city centres. A discrepancy seems to exist between the aim for a reduction in traffic flows and increasing liveability and attractiveness as the latter is related to an increase in leisure-activities in cities demanding for supplies of goods resulting in increasing traffic flows leading to a less attractive city. Furthermore, the expectation exists concerning further growth of e-commerce in cities resulting in increasing traffic flows. In order to control the traffic flows in city centres, municipalities

implemented types of regulation such as time windows, restricting vehicles from entering city centres during certain timeframes. Column 7 and 8 in table 4.3 indicate that all stakeholders included in this research share a positive attitude towards regulation and maintenance of regulation. However, discussion about this exists among the stakeholders. On the one hand provide time-windows cities with an opportunity to centre traffic flows to specific moments in time. As logistics operators are confronted with their internal logistics processes this has potential to result in an increase in traffic flows as the following quote indicates:

'In case we are currently entering an area with one vehicle between 8 am and 5 pm and the time windows changed to noon with maintenance, we will enter the city centre with two vehicles as the volume will not change (R4, 2019).'

Another problem concerning the supplier sector is that opening hours of restaurants and bars do not correspond with the time windows in some cities. On the other hand, broad time windows will provide an opportunity for the logistic sector to plan themselves and traffic flows will be spread over the day. This option, however, results in traffic flows throughout the day resulting in a less attractive city. Furthermore, stakeholders are not triggered to invest in sustainable alternatives as long as there are not benefits related to access to city centres. An additional question to the latter, is the efficiency question. Which time window option result in the most efficient manner of delivery, as efficiency is related to traffic movements? Currently, a contradiction exists between the perspective of the municipalities and the other stakeholders included in this research concerning regulation and maintenance. The municipalities presume to actively work on this topic whereas the other stakeholders perceive this as not. An example that was often mentioned by the stakeholders was the option to obtain a dispensation for fossil-fuel based vehicles. Coherence among stakeholders exists on the fact that as long as the municipality provide the logistic sector with these dispensations, the sense of urgency for the transition does not exist and action taken is based on intrinsic motivation.

A further point of discussion, which is an upcoming topic in this sector is the zero-emission zones that cities have to implement by 2025. A weakness retrieved from the interviews held and a document-analysis is lacking technology. Zero-emission vehicles currently available on the market are confronted with a relatively small operating radius (Altenburg et al., 2017). This results in the further point of discussion, is it possible to replace all fossil-fuel based vehicles for zero-emission vehicles? Currently, light electric vehicles (LEVV's) are available and can be perceived as a step in the right direction but these vehicles are confronted with a reduced loading capacity, resulting in more traffic movements to meet the volume needs. Concerning the freight transport, zero-emission vehicles are currently underdeveloped and not suitable for B2B or perishable food transport. Another drawback of the electric vehicles available is the relative high purchasing costs. Subsidies have potential to partly cover these costs. This marks the second point of discussion among the involved stakeholders as can be derived from column 9 in table 4.3. Especially, the logistic sector has a positive attitude towards subsidies. The carrier sector included in this research consists of large players in the sector with large assets available and a strong objective concerning sustainability. They admit that subsidies would help to reduce the costs they make in respectively the pre-development as the take-off phase. Subsidies could in the first support the development process and reduce future costs through economies of scale. In the latter, subsidies have potential to reduce purchasing costs which is, especially for small players with small assets, a manner to change to zero-emission

vehicles (Balm & Ploos van Amstel, 2018). Discussion exists about the effect of subsidies as for example Ploos van Amstel (2016) and Quak et al. (2014) claim that a prerequisite for success is a positive business-case, which should not depend on subsidies.

From the above can be derived that the additional costs related to electric vehicles are an obstacle for stakeholders as customers are not willing to pay for the extra costs related to the usage of electric vehicles. Carriers and suppliers are confronted with these extra costs, and without the aforementioned lack of benefits regarding electric vehicles, this can be regarded as another barrier (Ploos van Amstel, 2016; Zschocke & Verduijn, 2016). An alternative mentioned during the interviews was price-agreements within the sector. By increasing the price, additional cost for the transition and purchase of electric vehicles could be partly covered, making the transition more attractive. However, not every stakeholder involved has a positive attitude towards cooperation with rivals and agreed with price-agreement, as can be derived from column 5 in table 4.3. Furthermore, former research indicates that some small parties are obstructed by the unwillingness to cooperate of the large players as these parties define the market. This can obstruct sustainable initiatives from entering the market and further accelerate the transition (Zschocke & Verduijn, 2016). Especially these small parties, can obtain benefits from cooperation with the government, which forms an additional stimulation to work on public-private cooperation.

Stakeholder group	Stakeholder /initiative	Support of the government ¹	Support ²	Ideal role of the government ³	Cooperation with government ⁴	Cooperation with rivals/others ⁵	Regulation and maintenance by the government ⁶	Regulation ⁷	Maintenance of regulation ⁸	Subsidy ⁹	Phase ¹⁰
Carriers	<i>DHL Express</i>	✗	N/A	R1, F	✗✓	✗✓	✗	✓	✓	✓	1,2
	<i>DHL Parcel</i>	✗	N/A	R1	✓	✗✓	✗	✓	✓	✓	2
	<i>PostNL</i>	✗✓	Change in law	R1, F, C	✓	✗✓	✗✓	✓	✓	✓	2
	<i>Cycloon</i>	✗	N/A	R1, F	✓	✓	✗	✓	✓	✓	1
Suppliers	<i>Sligro Food Group</i>	✗	N/A	R1	N/A	✗	✗	✓	✓	N/A	N/A
	<i>Hanos</i>	✗	N/A	R1	N/A	✗	✗	✓	✓	N/A	N/A
Initiatives	<i>SimplyMile</i>	✗	N/A	R1, F, C	N/A	✓	✗	✓	✓	✗	N/A
	<i>Slimme Laaden Losplek</i>	✓	Starting pilot	R1	✓	N/A	✗	✓	✓	✓	1,2
	<i>EVAnet</i>	✗✓	Tender	R1,F,R2	✓	✓	✗	✓	✓	✗	N/A
Municipality	<i>Amsterdam</i>	N/A	N/A	R1, F, C	N/A	✓	✓	✓	✓	✓	1,2
	<i>Groningen</i>	N/A	N/A	R1, F, C	N/A	✓	✓	✓	✓	✗✓	1,2
	<i>Leeuwarden</i>	N/A	N/A	R1, F, C	N/A	✓	✗✓	✓	✓	N/A	N/A
Entrepreneurs	<i>Groningen</i>	N/A	N/A	R1, F, C	✓	N/A	✓	✓	✓	✗	N/A
	<i>Leeuwarden</i>	N/A	N/A	R1, F, C	✓	N/A	✗	✓	✓	✗	N/A

Table 4.3: Comparison of involved stakeholders

¹ Stakeholder/initiative received support by the government during the establishment of the initiative

² Form of support

³ Ideal role of the government according to the stakeholders or initiative (R1 = regulator, F = facilitator, C = communicator, R2 = realisor)

⁴ Open for cooperation with the government

⁵ Open for cooperation with rivals or others

⁶ Current action taken by the government concerning regulation and maintenance

⁷ Attitude towards regulation

⁸ Attitude towards maintenance of regulation

⁹ Attitude towards subsidy

¹⁰ Most suitable phase for subsidy (1 = pre-development, 2 = take-off, 3 = acceleration, 4 = stabilization)

Chapter 5: Synthesis

Chapter 4 outlined the main results of this research. This chapter connects these findings to the theories as described in chapter 2. Section 5.1 elaborates on the position of the initiatives as introduced in section 4.3.1 on the transition S-curve of the multi-phase concept as described in section 2.2.1. Section 5.2 reflects on the position of public-private cooperation on the multi-level perspective as described in section 2.1.2. Subsequently, the roles of the government (section 2.2.2) are reflected on the phases of the multi-phase concept (section 2.1.1). This chapter concludes with section 5.4 in which the outcomes of this research are reflected upon the transition management cycle (section 2.1.3).

5.1 Multi-phase concept

The multi-phase concept of the transition theory distinguishes four different phases in a transition: (1) pre-development phase; (2) take-off phase, (3) acceleration phase; (4) stabilization phase. Chapter 4 discussed the sustainable city logistic initiatives included in this research individually and determined the current position in the transition S-curve. In figure 5.1 all individual sustainable city logistics initiatives are combined.

From figure 5.1 can be concluded that these initiatives currently operating in all four phases of the multi-phase concept. However, being critical on figure 5.1 and the definition of the four phases, this overview can result in a distorted

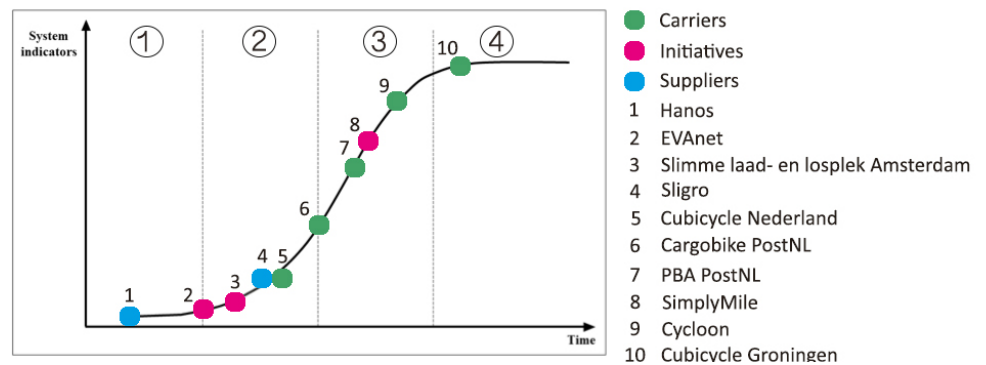


Figure 5.1: Overview of position of initiatives on transition S-curve (Author, 2019)

view. For example, number 10 indicates that the initiative is operating in the stabilization phase (4). This is partly true as the Cubicycle is for 90-95% autonomously operating in the city of Groningen. Nevertheless, in other cities the Cubicycle (number 5) is operating in the take-off phase (2). Therefore, a general overview can be provided but the initiatives must be critically reflected on the specific context of different cities. Additionally, from figure 5.1 can be derived that, in general, the initiatives taken within the carrier sector are one step ahead of the supplier sector. This is partly due to the technology available to both sectors. Carriers can be divided into B2B, B2C and C2C. Results show that especially in the B2C and C2C, initiatives are taking place due to the (smaller) volumes they transport. B2B and suppliers are often dependent on trucks and quality-requirements (suppliers) whereas B2C and C2C use vehicles for which electric variants are to a large extent available.

5.2 Public-private cooperation

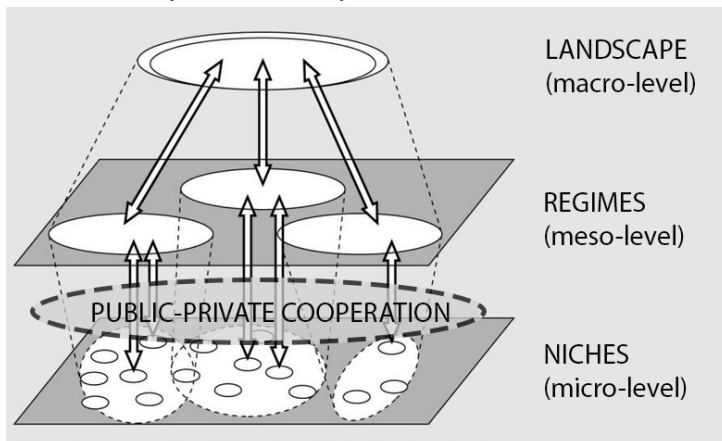


Figure 5.2: Location of public-private cooperation in the multi-level perspective (Author, 2019 based on Van der Brugge et al., 2005)

can be derived from figure 5.2.

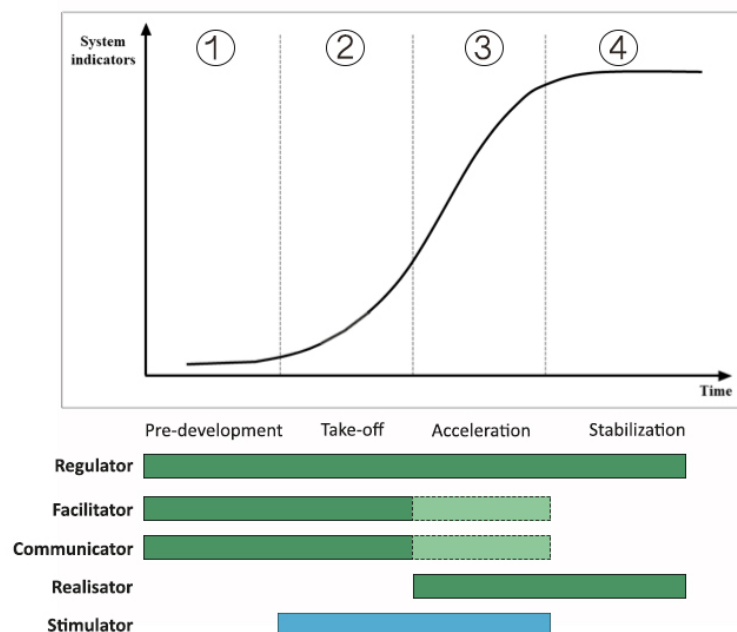
It is crucial to acknowledge that every initiative is unique and therefore a standard format for a public-private cooperation cannot be established. However, as the private side of a public-private cooperation is hard to define due to the unique character of every initiative, the public side of the cooperation is in this research centred around four roles of the government: (1) regulator; (2) facilitator; (3) communicator; (4) realisator (see section 2.2.2 for explanation).

5.3 Role of the government

Chapter 4 indicates the role the government should take according to each individual initiatives. Figure 5.3 shows the four roles of the government reflected on the different phases of a transition in the transition-S-curve.

The first role of the government is the role of regulator. As a government, it is important to perform this role from the beginning of the transition until the transition is accomplished. The main aspect of the regulator role is developing clear and unequivocal regulation. Furthermore, the developed regulation

Figure 5.3: The four roles of the government reflected on the transition S-curve (Author, 2019)



should be maintained consequently. The combination can initiate a sense of urgency among the stakeholders involved as is the first defined as the first prerequisite that can accelerate the transition according to the initiatives based on the outcome of this research. An increased

sense of urgency stimulates stakeholders to take initiatives due to, for example, (future) access-restrictions in city centres. Furthermore, it is important that the government develops a clear action plan including steps for reaching the objective.

The second role of the government is the role of facilitator. An example of an aspect of the facilitator role is the provision of subsidies. Subsidies have potential to stimulate the development of initiatives in the pre-development phase and a pilot of the initiative in the take-off phase. The acceleration phase has proven successful for subsidies, although the extent of the subsidy is dependent on the exact stage of the acceleration phase. An example of a subsidy that is proven successful in the acceleration phase is the subsidy-program for the purchase of electric vehicles in Amsterdam (R13, 2019). The intention of this subsidy-program was to support local entrepreneurs in the purchase of an electric vehicle. The subsidy was provided during the pre-development and take-off phase and in the beginning of the acceleration phase. Meanwhile, technological development resulted in lower purchase costs and the largest effect of the subsidy disappeared reaching a cost-benefit tipping point. Therefore, the municipality of Amsterdam decided to phase out the subsidy-program. (R13, 2019)

The third role of the government is the role of communicator. As a government it is important to be transparent in decision-making processes. Stakeholders should be included in these processes as part of public-private cooperation. Communication from the government about future policies and plans can generate insights in what to expect and stimulate stakeholders to take initiatives. An example of this is the communicator role the municipality of Amsterdam took. As part of the aforementioned subsidy-program, the municipality actively visited entrepreneurs to make them aware about the possibilities the municipality offered. These communications take place in the first two phases but can also be used in the acceleration phase, until the cost-benefit tipping point is reached. This is specifically focused on specific information. The municipality should always take on the communicator role when it comes down to the provision of general information.

The fourth and final role of the government is the role of realisator. This role is applicable to initiatives operating in a sector that is part of official tender procedures. An example of this is the EVAnet initiative, aiming for 'pakketautomaten' in public places such as public transportation hubs. It can be argued that an initiative such as EVAnet should be part of official tender procedures which is related to the realisator role. The realisator should than be taken on in the acceleration phase and the stabilization phase of the transition S-curve. (R12, 2019)

The fourth and final role of the government is a role that is not covered extensively in this research since most initiatives included in this research are operating within the private sector and not part of official tender procedures.

Section 4.3.4.5 introduced a fifth role of the government, the stimulator role. This role can be seen as a cooperation between the communicator and facilitator role. The stimulator role of the government contains the launching-customer. This role potentially starts in the take-off phase and further develops in the acceleration phase as this can only be performed as an initiative is in operation. The location of the stimulator role reflected on the transition S-curve can be derived from figure 5.3.

5.4 Transition Management

As multiple public and private parties are involved in a transition, transition should be managed. The multi-actor nature forms the basis of the transition management theory focussing on the process of a transition (Van der Brugge et al., 2005). Three different levels can be distinguished, followed by the fourth level of evaluation and learning. The transition management cycle is shown in figure 5.4.



Figure 5.4: Transition management cycle (Author, 2019 based on Van der Brugge et al., 2005)

The first level of the transition management cycle is the strategic level. Characteristics of the strategic level are a multi-actor network that is organized wherein a long-term goal is formulated, processes of visions are developed and a strategic discussion is held (Kemp et al., 2007; Van der Brugge et al., 2005). Within this research, the strategic level is defined by the (concept-) climate agreement of the national government and the thereto-related objectives of the government that are established in cooperation with the logistic sector (Green Deal, 2014).

The second level of the transition management cycle is the tactical level. This level is characterized by the development of sustainable visions and transition agendas (Kemp et al., 2007; Van der Brugge et al., 2005). This level corresponds to the actions taken at the regime level as defined within this research. The outcomes of this result suggest that there is a difference concerning the position of the three municipalities included in this research within the transition management cycle. The municipalities of Amsterdam and Groningen developed a vision for 2025 in cooperation with stakeholders and furthermore a tactical action plan was developed that is in operationalisation.

The operationalisation of the conducted action plans at the tactical level occurs at the operational level. This level is characterized by the mobilization of actors and the execution of projects and experiments (Kemp et al., 2007; Van der Brugge et al., 2005). The municipalities of Amsterdam and Groningen are, in cooperation with private parties, utilizing pilot projects of developed initiatives from the niche-level. The pilot projects are monitored and evaluated in order to determine the success factors and potential bottlenecks of the initiatives. The output of these evaluations are subsequently used as input for the acceleration of the transition. (R11; R13, 2019)

This research shows that the municipality of Leeuwarden is not operating at the same stage of the transition management cycle as the municipalities of Amsterdam and Groningen. The municipality of Leeuwarden is positioned at the second level of the transition management cycle as they are working on a specific action plan together with involved stakeholders (R14, 2019).

Chapter 6: Conclusion & Discussion

This chapter will elaborate on the main conclusions of this research. First, the sub-questions will be discussed individually. Subsequently, the main research question is answered. Last, recommendations for further research are provided.

6.1 Towards the main conclusion

The aim of this research is to provide insight into the prerequisites of public-private cooperation for triggering a transition towards the liveable city based on sustainable city logistics and in historical G40 cities in the Netherlands. The results provide insights into the perspective of the initiatives on the niche-level and the municipalities on the regime-level. As a transition towards sustainable city logistics demands for a cooperation between the public, municipalities, and private, the logistic sector the question is how this cooperation should be shaped to maximize the efficiency of the transition process. The main research question therefore is:

Under what prerequisites can public-private cooperation trigger a transition towards a liveable city based on sustainable city logistic initiatives in historical G40 cities?

Four sub-questions have been formulated to answer the main research question. First, these sub-questions will be discussed, subsequently the results are discussed in a wider context and recommendations and suggestions are provided.

(1) In what phase of the transition are sustainable city logistics initiatives currently operating according to the multi-phase concept as part of the transition theory?

The multi-phase concept of the transition theory distinguishes four different phases in a transition: (1) pre-development phase; (2) take-off phase, (3) acceleration phase; (4) stabilization phase.

The initiatives are currently operating in all four phases of the multi-phase concept, however the carrier sector seems to be a step ahead of the other sectors involved in this transition. Being critical on the definition of the four phases, this overview can result in a distorted view. First, the intention of the multi-phase concept is to reflect on the position of a society in a transition whether in this research, the multi-phase concept has been used for determining the position of initiatives in the transition. Furthermore, the position of the initiatives on the transition S-curve is determined in cooperation with the respondents and is therefore subjective. These respondents were all provided with information containing the characteristics of the four phases. As there are four phases for a whole transition process, the differences between the phases can be regarded as large. The result of this is that several initiatives are located within a phase whereas they show large differences. The question that arises is if the current format of the multi-phase concept is the correct way to define the position of initiatives in a transition or that this should be adjusted to more phases with smaller gradations between the phases. As the phases are in this research related to the roles of the government and thereby related to taken measures, incorrect usage of the combination of the multi-phase concept and the roles of the roles of the government could result in rather decelerate than accelerate a transition as a mismatch could occur between the context and the implemented measures.

(2) What barriers and opportunities are sustainable city logistics initiatives facing in reaching the subsequent step in the multi-phase concept within the transition towards the liveable city based on sustainable city logistics?

The analysis of the outcomes of the interviews with sustainable city logistics initiatives identified four opportunities and four threats. The opportunities that were considered beneficial for a transition towards sustainable city logistics were (1) public-private cooperation due to the potential of tailor-made support based on participation in the decision-making process; (2) clear and unequivocal regulation concerning access to city centres and time windows. An important prerequisite related to clear and unequivocal regulation is the maintenance of the regulation. This opportunity has potential to transform into a barrier when this is not executed completely. As this research indicates, urgency and necessity is a prerequisite for initiatives to start. A clear and unequivocal regulation could positively increase the urgency and necessity. (3) a holistic approach within municipalities is an opportunity as different departments within a municipality are cooperating and adjust plans based on the whole. (4) incremental steps are identified as last opportunity as a transition is often a long and non-linear process. Therefore, a clear goal should be formulated and the incremental steps towards this goal has potential to correspond with the non-linear nature of transitions.

The barriers that were identified, in the operationalization of the results referred to as 'threats', are elements that are considered obstructive for the transition towards sustainable city logistics. The four identified barriers are: (1) increasing volumes demand for high capacity vehicles. Eventually, increasing volumes will reach the tipping point in which sustainable initiatives are no longer viable. Besides, (2) the technological capacity is identified as barrier as the current operating radius does not correspond to the required operating radius. This especially is the case in the B2C and C2C market. For the B2B market technology has not been developed to meet the needs of the B2B market. (3) the attitude of the government is identified by initiators as barrier as currently the aims and willingness the municipalities presented do not correspond to the actual action taken by the municipalities as perceived by the initiatives. A discrepancy can be remarked on this point between the vision of the municipality and the initiators. This also corresponds to the second opportunity identified concerning regulation. As long as municipalities do not take any action, incentives to start acting for stakeholders are lacking. However, the municipalities opinion is that they are actually taking effort concerning taking action, another discrepancy can be seen on this point. Finally, (4) consumer behaviour is defining the market and the market is defining the rules for the logistic sector. As long as consumer behaviour does not change, a window-of-opportunity will not arise from the market-side of this issue. This issue can be remarked as the most challenging for the transition as municipalities and the transport sector can exert pressure and steer consumers into the correct direction but this potentially negatively impacts their business, and is therefore not the best solution to tackle the problem.

(3) Which prerequisites can be identified as essential for a sustainable city logistics initiative to develop?

The aim of this research is to identify prerequisites that can trigger a transition. Four prerequisites and relating opportunities are identified. The first prerequisite is a green ambition of the municipality resulting in a pro-active attitude towards sustainable initiatives providing a positive context for initiatives to develop. Second, as introduced in the conclusion of the second sub question as opportunity and potential barrier, the sense of urgency. Creating sense of urgency results in pressure on the sector to change their internal processes concerning logistics. An often-mentioned measure on the operational level is the introduction of time windows that is clear and unequivocal and at the expense of fossil fuel-based vehicles combined with extended time windows for sustainable logistics. The third prerequisites derived from this research is the support during the development of an initiative. Support can be given in various forms. An often-mentioned example of support is the provision of subsidies in the pre-development phase. These subsidies could remove the non-profitable part related to the development process. Important is that the business-case of initiatives remain independent of subsidies as initiatives prove unsustainable as subsidy-provision discontinuous. Last, the four prerequisites, more related to the underlying decision of starting initiatives is the stop-density of the target market. A positive-business case is dependent on the stop-density as this defines the costs of using an initiative. The higher the stop-density is the higher the potential and viability of the initiative.

(4) Which role should the government take in a public-private cooperation per phase of the multi-phase concept according to the sustainable city logistic initiatives in order to accelerate the transition towards the liveable city based on sustainable city logistics?

The theoretical framework elaborated on the roles of the government. The four roles of the government identified based on literature are: (1) regulator; (2) facilitator; (3) communicator; and (4) realisor. These roles of the government are reflected on the transition S-curve as part of the multi-phase concept of the transition theory. Public-private cooperation is identified as a cooperation between the regime-level and the niche-level. From the results of this research can be concluded that all four roles of the government are essential in public-private cooperation to a different extent in the four phases. The first role of the government is the role of regulator. This role is the main role of the government and is reflected in every phase of the transition S-curve. The regulator role defines the context by incorporating rules and regulation. Initiatives develop in this context. A change of this context can have either a positive or negative impact on the development of initiatives and can therefore be regarded as essential for defining the transition process towards sustainable city logistics.

The second role of the government is the role of facilitator. This role is reflected in the pre-development phase and take-off phase and in to a diminishing extent in the acceleration phase. The government in the facilitator role is responsible for the creation of a window-of-opportunity for niche-level developments by actively supporting initiatives at the niche-level. An often-mentioned example in this research concerning the facilitator role is the provision of subsidies in the pre-development phase to remove the non-profitable part of the development process. Another example of the facilitator role is connecting parties to cooperate in the development

of initiatives. However, to avoid a conflict of interest, the government should develop clear guidelines for facilitation that is uniform and available for everyone. The government should avoid the creation of initiatives themselves. This is not regarded as the role of the government and could be regarded as a conflict of interests.

The third role of the government is the role of communicator and is reflected in the pre-development phase and take-off phase and to a diminishing extent in the acceleration phase. The government should develop a clear vision in order to reach the goal. This vision should be thoroughly communicated to the public as is the case with every available support of the government in the facilitator role. Communication is essential in triggering a transition as 'knowledge is power'. Therefore, municipalities can control the process of a transition.

The fourth role of the government is the role of realisor. This role is reflected in the acceleration phase and the stabilization phase of the multi-phase concept and concerns the purchase of public goods. This could be either the provision of goods for the government or the purchase of public infrastructure in combination with sustainable initiatives. The government can decide whether they want to operate in the realisor role, this is not mandatory but can accelerate a transition.

Based on the description of characteristic of the roles, a grey area exists between the facilitator and communicator role. This research suggest that a fifth role can create clarity in the fuzziness. This new role is identified as the stimulator role and has potentially to ease the take-off phase and the acceleration phase of the transition. As the facilitator, communicator and stimulator role are focussing on similar measures, a mediator role could be introduced to create order and contain an overview of the status quo.

6.2 Main conclusion and generalization

The sub-questions show which elements are crucial to take into account in the transition towards sustainable city logistics. These elements are applicable to the niche-level, the regime-level as well as to public-private cooperation that is situated between the regime-level and niche-level. As the objective of this research is to identify the prerequisites for public-private cooperation it can be concluded that these four prerequisites identified in this research are interrelated. Incorporating several prerequisites has potential to further stimulate the transition compared to incorporating one of the prerequisites. The same accounts for the roles of the government. The extent of the success of the transition is dependent on the specific context of each city as these are unique. Therefore, this research can provide general guidelines for cities but cannot provide deep recommendations. Public-private cooperation has potential to establish tailor-made policies in which perspectives of stakeholders are included. Furthermore, the facilitator role can be coordinated based on input from stakeholders reflecting the specific demands of these stakeholders. However, important is that the collaboration and cooperation processes are often regarded as time-consuming trajectories. As identified above, the main role of the government is the role of regulator. Therefore, it is important that the government take the lead in the transition as they are responsible for defining the context for initiatives to develop. Cooperation in defining the context is likely to increase the success of the transition but the time-consuming character of collaboration counteracts this. As this is context specific, municipalities should decide what the right moment is to interfere and establish regulation that creates a sense of urgency among stakeholders. It can therefore be

concluded that the government dominates the transition-process towards sustainable city logistics. However, a level playing field should be created to assure that this transition can be fulfilled. The easiest way to start the transition is with the 'low-hanging fruits', as these are generally tasks that are easy to achieve due to increased willingness. However, it should be acknowledged that the system as a whole has to change and that time and effort should be taken to include the points of resistance. In order to meet the 2025 objectives, efforts on this should be taken simultaneously with the working on the 'low-hanging fruits'.

The above corresponds to the theories incorporated in this research. These theories can consider to be valid and useful for this research. The multi-level perspective as part of the transition theory states that windows-of-opportunities at the regime-level create the possibility for niche-level developments to break through to the regime-level. This research confirms that this is true in the case of the transition towards sustainable city logistics as the regime-level defines the context and therefore has an enabling role in the provision of the context wherein niche-level developments break through. Furthermore, eventually, the practices on the regime-level could change the landscape level as is the objective for 2025. What is absent in academic literature is the combination between theories on governance and the transition theory, specifically the prerequisites and the role of the government in a transition is lacking. This research attempted to fill this knowledge gap. However, this research provides a direction, but the context is the decisive factor for the operational level of the transition management theory. The operational level is dependent on the urge and problems identified in cities, as some cities are confronted with decreasing levels of air quality whereas other cities aim for a liveable city, not every initiative is a solution for the specific context.

In 2020, all municipalities part of the G40 are required to define the specific zero-emission zone that will start operating in 2025. In order to create coherence within city centres and urgency and necessity it is recommended to include the whole city centre into the zero-emission zone as this has potential to decrease confusion and the perception of unfairness. Furthermore, all stakeholders involved should act in accordance with the rules and regulations. This could avoid the displacement of the problem towards the areas that are excluded from the zero-emission zone.

6.3 Recommendations for further research

The outcomes of this research provide an indication of the experienced opportunities and barriers, prerequisites and the role the government should take in the transition. This can be regarded as valuable for practice as this provides general guidelines for taking action. However, as cities are unique the value is limited to general. It is therefore recommended that cities do research into the specific situation and bottlenecks concerning the city.

Another question about the applicability of the outcomes is the fact that the logistics sector consists of five subsectors, this research focussed on the subsector deliveries. The other four sub-sectors were not included in the scope of this research. However, it is likely that these four will be confronted with similar rules and regulations. To establish a comprehensive view on the issue, these sub-sectors should be included in a public-private cooperation. Nevertheless, these subsectors have their own prerequisites for a public-private cooperation which should not be based on the perspective of the delivery sector. Therefore, further research on the

prerequisites of the other subsectors is recommended in order to establish a comprehensive view on this issue.

Chapter 5 questions the applicability of the multi-phase concept as part of the transition theory for guiding a transition. The main reason to be critical on this is the fact that the four phases part of the multi-phase concept are prone to the subjectivity of, in this case, the researcher or a third party. The multi-phase concept, in this research, has been applied in a different manner compared to the theory, as it included the positioning of initiatives rather than the positioning of society in a transition. This led to a decreased applicability of the four phases as part of the multi-phase concept. Furthermore, malpractice of the multi-phase concept could result in incorrect assumptions and therefore harm the transition process. Research into the phases of the multi-phase concept could contribute to academia as this could lead to adjustments within the transition theory, such as a diversification in the applicability of the multi-phase concept. These adjustments could include the creation of more specific elements to the four existing phases or an extension of the number of phases. This could reduce subjectivity related to the usage of this concept and therefore increase applicability.

Chapter 7: Reflection

This chapter provides a general academic reflection. Generally, approached stakeholders in this research were enthusiastic about the topic of this research and were willing to cooperate. In this research, three cities were selected as cases on the regime-level. Unfortunately, the approached representatives of the municipality of Groningen did not respond to the various interview requests. Therefore, information about actions taken on the regime-level of Groningen are missing. This gap is partly covered by official published documents by the government as part of the document-analysis. Furthermore, the chairman of the Groningen City Club (GCC), cooperates intensively with the representatives of the municipality of Groningen and provided this research with some additional information.

For the analysis of the cities of Amsterdam and Groningen, multiple official documents were available. Unfortunately, this was not the case in Leeuwarden where only one document was made available. As documents give an indication of the policies in these cities it was valuable to include this in this research. This information is missing for the city of Leeuwarden, which makes the statements made concerning Leeuwarden less applicable for practice as this could not be reflected on official governmental documents.

The roles of the government are reflected on steering mechanisms derived from academic literature. Operational roles of the government were not included in academic literature and are therefore derived from an institution focussed on public administration founded by the universities of Leiden and Rotterdam. These operational roles are reflected on the steering mechanisms as derived from academic literature.

The following stakeholders have been included in this research: municipalities, carriers, suppliers, entrepreneurs and initiatives. It could be argued that citizens of city centres are an important stakeholder as well. Theories on governance show variations concerning the inclusion of citizens as third party in cooperation. Since this research focusses on public-private cooperation within a transition, the citizen-perspective is not included in this research as the focus is on prerequisites for public-private cooperation based on the perspective of sustainable city logistics.

Despite the inadequacies described above, the use of multiple methods resulted in a convincing outcome. The multiple research methods in combination with the perspective of different stakeholder resulted in the identification of prerequisites for public-private cooperation. These can assist in the design of the transition towards sustainable city logistics.

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Appendix I

A: interview guides

I: Interview guide for interview with initiatives

Onderwerp	Vragen
Korte introductie	<ol style="list-style-type: none"> 1. Wie ben ik en wat is mijn achtergrond? 2. Wie bent u en wat is uw achtergrond en precieze functie? 3. Wat is het doel van het onderzoek? 4. Wat gebeurt er met de uitkomsten van het onderzoek?
Initiatief	<ol style="list-style-type: none"> 5. Zou u het kort het initiatief slimme laad-los plek kunnen introduceren? 6. Hoe is het initiatief tot stand gekomen? 7. Welke redenen waren er om voor stad X te kiezen om uw initiatief te testen/introduceren? 8. Welke randvoorwaarden zijn nodig om een initiatief als dat van u op te kunnen zetten? 9. In hoeverre heeft u hulp gehad van de overheid bij het opzetten van dit initiatief? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm heeft u hulp gekregen van de gemeente?</i> 10. In hoeverre bent u belemmerd door regelgeving van de overheid in het opzetten van uw initiatief? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm heeft de gemeente uw initiatief belemmerd?</i> b. <i>Hoe zou de regelgeving eruit moeten zien om van deze belemmering een kans te maken?</i> 11. Wat zijn maatschappelijke factoren in de afgelopen jaren waardoor uw initiatief nog steeds bestaat? 12. Zijn er andere partijen die een rol hebben gespeeld bij de totstandkoming van uw initiatief?
Transitie	<ol style="list-style-type: none"> 13. Als we kijken naar de transitie-curve zoals afgebeeld in <u>bijlage 1: transitie theorie</u>, waar op de curve zou u uw initiatief op dit moment plaatsen? 14. Welke randvoorwaarden zijn nodig om uw initiatief in de volgende fase te krijgen? 15. Welke rol zou de overheid op zich kunnen en moeten nemen om uw initiatief in de volgende fase te krijgen? 16. Zijn er daarnaast nog randvoorwaarden die aan derden opgelegd zouden kunnen worden om uw initiatief in de volgende fase te krijgen? 17. Wat had er het afgelopen jaar gebeurd moeten zijn zodat het nu al een stap verder zou zijn geweest?
Overheid	<ol style="list-style-type: none"> 18. Als we kijken naar de rollen van de overheid zoals afgebeeld in <u>bijlage 2: rollen overheid</u>, welke rol van de overheid past op dit moment bij uw initiatief? 19. Welke kenmerken/beleidsinstrumenten van die rol zijn belangrijk voor uw initiatief? 20. Welke rol zou de overheid aan moeten nemen om uw initiatief in de volgende fase van de transitiecurve te laten komen? 21. Welke kenmerken van die rol zijn daarvoor doorslaggevend?
Afsluiting	<ol style="list-style-type: none"> 22. Korte samenvatting van het gesprek 23. Welke boodschap zou u mij en de lezer van deze scriptie mee willen geven? 24. Heeft u eventueel een aanbeveling om met iemand ver te praten over dit onderwerp?

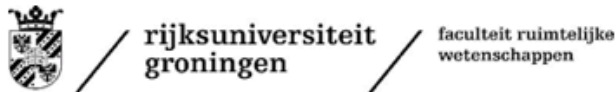
II: Interview guide for interview with carriers

Onderwerp	Vragen
Korte introductie	<ol style="list-style-type: none"> 1. Wie ben ik en wat is mijn achtergrond? 2. Wie bent u en wat is uw achtergrond en precieze functie? 3. Wat is het doel van het onderzoek? 4. Wat gebeurt er met de uitkomsten van het onderzoek?
Initiatief (per initiatief)	<ol style="list-style-type: none"> 5. Welke initiatieven zijn binnen uw bedrijf tot stand gekomen? 6. Wat is de reden dat dit initiatief tot stand gekomen is? 7. Hoe is dit initiatief tot stand gekomen? 8. Welke redenen waren er om voor stad X te kiezen om uw initiatief te testen/introduceren? 9. Welke randvoorwaarden zijn nodig om een initiatief als dat van u op te kunnen zetten? 10. In hoeverre heeft u hulp gehad van de overheid bij het opzetten van dit initiatief? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm heeft u hulp gekregen van de gemeente?</i> 11. In hoeverre bent u belemmerd door regelgeving van de overheid in het opzetten van uw initiatief? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm heeft de gemeente uw initiatief belemmerd?</i> b. <i>Hoe zou de regelgeving eruit moeten zien om van deze belemmering een kans te maken?</i> 12. Wat zijn maatschappelijke factoren in de afgelopen jaren waardoor uw initiatief nog steeds bestaat? 13. In hoeverre heeft u ondersteuning gehad vanuit de klanten/andere partijen in het opzetten van uw initiatief?
Transitie (per initiatief)	<ol style="list-style-type: none"> 14. Als we kijken naar de transitie-curve zoals afgebeeld in <u>bijlage 1: transitie theorie</u>, waar op de curve zou u uw initiatief op dit moment plaatsen? 15. Welke randvoorwaarden zijn nodig om uw initiatief in de volgende fase te krijgen? 16. Welke rol zou de overheid op zich kunnen en moeten nemen om uw initiatief in de volgende fase te krijgen? 17. Zijn er daarnaast nog randvoorwaarden die aan derden opgelegd zouden kunnen worden om uw initiatief in de volgende fase te krijgen? 18. Wat had er het afgelopen jaar gebeurd moeten zijn zodat het nu al een stap verder zou zijn geweest?
Overheid	<ol style="list-style-type: none"> 19. Als we kijken naar de rollen van de overheid zoals afgebeeld in <u>bijlage 2: rollen overheid</u>, welke rol van de overheid past op dit moment bij uw initiatief? 20. Welke kenmerken/beleidsinstrumenten van die rol zijn belangrijk voor uw initiatief? 21. Welke rol zou de overheid aan moeten nemen om uw initiatief in de volgende fase van de transitie-curve te laten komen? 22. Welke kenmerken van die rol zijn daarvoor doorslaggevend?
Afsluiting	<ol style="list-style-type: none"> 23. Korte samenvatting van het gesprek 24. Welke boodschap zou u mij en de lezer van deze scriptie mee willen geven? 25. Heeft u eventueel een aanbeveling om met iemand ver te praten over dit onderwerp?

III: Interview guide for interviews with municipalities

Onderwerp	Vragen
Korte introductie	<ol style="list-style-type: none"> 1. Wie ben ik en wat is mijn achtergrond? 2. Wie bent u en wat is uw achtergrond en precieze functie? 3. Wat is het doel van het onderzoek? 4. Wat gebeurt er met de uitkomsten van het onderzoek?
Initiatief	<ol style="list-style-type: none"> 5. Hoe kijkt u aan tegen opkomende initiatieven in uw stad met betrekking tot verduurzaming van de binnenstedelijke logistiek? 6. Welke initiatieven zijn in uw ogen het meest succesvol of kansrijk? 7. Welke redenen zijn er volgens u dat initiatieven kiezen voor uw stad om een pilot te starten? 8. Welke randvoorwaarden biedt uw gemeente om initiatieven een kans te geven? 9. In hoeverre ondersteunt uw gemeente opkomende initiatieven? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm biedt u als gemeente hulp?</i> 10. In hoeverre belemmert uw gemeente opkomende initiatieven? <ol style="list-style-type: none"> a. <i>Op welke manier/in welke vorm heeft u als gemeente een initiatief belemmerd?</i> 11. Welke maatschappelijke factoren in de afgelopen jaren hebben volgens u gezorgd voor een opkomst van initiatieven?
Overheid	<ol style="list-style-type: none"> 12. Als we kijken naar de rollen van de overheid zoals afgebeeld in <u>bijlage 2: rollen overheid</u>, welke rol vervult de overheid op dit moment als het gaat om (opkomende) initiatieven? 13. Welke kenmerken/beleidsinstrumenten van die rol zijn belangrijk voor initiatieven? 14. Hoever is uw gemeente in het bereiken van de ZE-zone in 2025? 15. Welke stappen zet de overheid om te voldoen aan de eisen om in 2025 een ZE-zone te hebben? 16. Welke rol zouden initiatieven volgens u kunnen spelen om de 2025 ZE-zone te bereiken?
Transitie	<ol style="list-style-type: none"> 17. Als we kijken naar de transitie-curve zoals afgebeeld in <u>bijlage 1: transitie theorie</u>, wat is volgens u de rol van de overheid per fase? 18. Welke randvoorwaarden kan de overheid bieden om initiatieven naar de volgende fase te helpen? 19. Hoe gaan jullie om met bestaande regels en normen zoals bijvoorbeeld venstertijden als het gaat om duurzame initiatieven? 20. Wat had er de afgelopen jaren gebeurd moeten zijn zodat de transitie naar ZE-zones nu al een stap verder zou zijn geweest?
Afsluiting	<ol style="list-style-type: none"> 21. Korte samenvatting van het gesprek 22. Welke boodschap zou u mij en de lezer van deze scriptie mee willen geven? 23. Heeft u eventueel een aanbeveling om met iemand ver te praten over dit onderwerp?

B: Informed consent interviews



Toestemmingsformulier deelname interview

Doel van het onderzoek

Door middel van interviews wordt achterhaald hoe duurzame initiatieven met betrekking tot verduurzaming van de binnenstedelijke logistiek tot stand zijn gekomen, welke randvoorwaarden hierbij van belang zijn en wat de rol van de overheid is bij de totstandkoming en groei van onderzochte initiatieven.

Interview

Tijdens het interview heeft u het recht om vragen niet te beantwoorden of het interview af te breken. Aangezien het interview vrijwillig is kunt u altijd besluiten zich terug te trekken als deelnemer. Van het interview wordt een geluidsopname gemaakt. Deze geluidsopname wordt in een afgesloten en beveiligde ruimte bewaard en na afloop van het onderzoek vernietigd.

Het interview wordt getranscribeerd en zal naar u opgestuurd worden. Mocht u het niet eens zijn met de inhoud dan wordt dit naar uw wens gewijzigd.

Data

De data verkregen uit de interviews wordt geanalyseerd en gebruikt in het onderzoek voor bovenstaand doel. Het onderzoek is openbaar toegankelijk via de Rijksuniversiteit Groningen. Er zal vertrouwelijk met de data omgegaan worden. Deze zal dan ook anoniem verwerkt worden in het uiteindelijke onderzoeksrapport. U zal in het onderzoek aangeduid worden als initiatiefnemer in het gebied.

Ik heb bovenstaande voorwaarden gelezen en ga hiermee akkoord:

Datum:

Handtekening deelnemer:

C: Overview of codes used in ATLAS.ti

Code	Code groups	Definition
Acceleration	Transition phase	Third phase of the transition S-curve
Background information	Additional information	Information about the company
Barrier	Additional information	Barrier for reaching the subsequent phase
Carriers	Stakeholders	Stakeholder, mainly concerned with deliveries from third parties
Citizens/customers	Stakeholders	Inhabitants of cities or consumers
City	Additional information	Characteristics of a city
Communicator	Role of the government	Identified role of the government
Cooperation	Additional information	Cooperation between two or more stakeholders within or between stakeholder groups
Entrepreneurs	Stakeholders	Stakeholder, mainly concerned with running a business in the city centre
Facilitator	Role of the government	Identified role of the government
Initiative	Additional information	Information about the content of a sustainable initiative within the sustainable city logistic sector
Maintenance	Mechanisms	Maintenance of regulation
Municipality	Stakeholders	Stakeholder, public institution mainly concerned with everything that is going on in both projects and policy.
Opportunity	SWOT	External factor that is helpful in triggering a transition
Origin	Origin	Establishment of an initiative
Pilot	Additional information	Testing phase of an initiative
Policy	Mechanisms	Official public document or regulation that defines the effective rules and regulations
Pre-development	Transition phase	First phase of the transition S-curve
Prerequisite	Additional information	Elements or factors that are perceived as essential conditions for triggering a transition or reaching the subsequent phase of the transition S-curve

Problem	Origin	Problem that is underlying the transition in cities
Process	Additional information	Potential way of design of the process of establishing the transition
Realisator	Role of the government	Identified role of the government
Regulation	Mechanisms	Official institution of the government
Regulator	Role of the government	Identified role of the government
Roles of the government	Role of the government	Possible roles of the government
Societal factors	Additional information	Societal factors that are affecting initiatives in a positive or negative manner
Stabilization	Transition phase	Fourth phase of the transition S-curve
Strength	SWOT	Internal factors that is helpful for triggering a transition
Suppliers	Stakeholders	Stakeholder, mainly concerned with deliveries from their own company
Take-off	Transition phase	Third phase of the transition S-curve
Technology	Additional information	Technology concerning the electric vehicles
Threat	SWOT	External factor that is harmful for triggering a transition
Urgency/necessity	Origin	Existing need for solving a problem
Venstertijden	Mechanisms	Defined periods of access to city centres
Weakness	SWOT	Internal factor that is harmful for triggering a transition