Smart City Network Development

Conditions for Effectiveness of The European Innovative Partnership on Smart Cities and Communities

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Abstract

Urbanization in one of the main challenges of the world we live in. More people than ever before live in cities, which leads to problems with future sustainability. The Smart City concept addresses this problem of urbanization. With the use of technology, a sustainable environment can be created. In this research, the focus is on Smart City networks that are in place to share knowledge and to bring together actors. The research was conducted with a mixed method approach. The first goal of this research is to assess if the conditions for effectiveness defined in the evaluative framework are the right conditions to use when looking at effectiveness of Smart City networks. All these conditions are important; however, some are more important than others in Smart City development's current phase. The second goal of this research is to assess if the European Innovative Partnership on Smart Cities and Communities meets the conditions for effectiveness. In conclusion, the conditions legitimacy and triple helix are present; however, the condition accountability is not yet present.

Introduction

Urbanization is rapidly increasing. On average, more than 50 percent of the world population is situated in cities, and the expectation is that, in the year 2050, between two-thirds and three quarters of the world population will be living in cities (Caragliu et al., 2011; Directorate General for Internal Policies, 2014; Eurostat, 2012; Kroes, 2013; UN, 2014). To keep cities sustainable in the future, it is important to deal with the problems that accompany this growing urbanization.

The Smart City concept is a new way of addressing these urbanization problems. A Smart City is a way of developing innovations with the use of modern urban technology and techniques to create a sustainable environment for future living in cities (Caragliu et al., 2011). The Smart City concept concerns many different subjects of innovation. These subjects vary from sustainable energy resources to citizens' participation and from a sustainable development of the industrious city to big data security (ITRE, 2014; *Rijksoverheid,* 2014).

In this research, the networks that bring together actors in Smart City development are the main focus. These networks are set up in a highly dynamic environment of cities that deal with Smart City development in their own way. The cities are all in different stages of the Smart City development and invent new initiatives and innovations for a more sustainable future. However, these innovations are mostly isolated projects (ITRE, 2014). Therefore, networks are created at regional, national, and international levels to bring these projects together. The problem found when reading literature on these networks is that none of these networks have been evaluated on their effectiveness. Many networks are in place, but no one knows how democratic these networks are, how they fit into the ideas of Smart City development, and how the actors involved value these

networks (DSA, 2012; EBU, n.d.; EIP-SCC, 2013; Platform31, n.d.). Therefore, this research's goal is to discover the conditions for effectiveness of Smart City development and to assess these conditions for a particular network: The European Innovative Partnership on Smart Cities and Communities [EIP-SCC].

The first goal of this research, to assess the conditions for effectiveness, is a small part of the research in which, with the use of quantitative data, the theoretical framework is assessed. Smart City development is a new area of expertise. Therefore, it is important to determine the attitudes of actors working in Smart City networks toward the conditions used in this research.

The second and main goal of this research is to evaluate whether the conditions for effectiveness formulated in a theoretical framework are present in the EIP-SCC. The European Commission created the EIP-SCC based on two problems: Knowledge sharing and finding stakeholders. Knowledge sharing on Smart City development lagged behind because of the level of individuality the Smart City projects had. The EIP-SCC provides contact between actors and promotes knowledge sharing among them (European Commission, 2014a). Furthermore, the problem with stakeholders is that actors involved in Smart City development cannot always find a suitable partner with which to work. By involving them in one network, this search is easier (European Commission, 2014a).

As mentioned in both the research goals, a theoretical framework of the conditions for effectiveness is created in this research. The theories used to make this framework derive from the new modes of governance theory (Bellamy & Castiglione, 2011; Eberlein & Kerwer, 2014; Føllesdal, 2011; Héritier & Lehmkuhl, 2011; Kröger, 2009; ; Smismans, 2008) and innovation network theory (Levin et al., 2002; Shazi et al., 2014). In new modes of governance [NMG] literature, the democratic aspect is the most important condition of effectiveness. To be effective, the modes need to have a democratic basis in being legitimate and accountable (Barcevicius et al., 2014; Büchs, 2007; Føllesdal, 2011; Héritier & Lehmkuhl, 2011; Kröger, 2009; Radulova, 2007; Smismans, 2008; Weale, 2011). The conditions for effectiveness within innovation theory are the presence of the triple helix actors (Arranz & Fdez de Arroyabe, 2012; Keast & Hampson, 2007; Leydesdorff & Deakin, 2011; Lombardi et al., 2011), even quadruple helix actors (Arnkil et al., 2010) and contour conditions (Lombardi et al., 2011).

The research was conducted using a mixed method design. The strength of this method is the combination of quantitative and qualitative research methods (Axinn & Pearce, 2006; Teddlie & Tashakkori, 2009). This research used a mixed method design because there is little information on the effectiveness of Smart City networks. Therefore, it is necessary to first ask general questions in a quantitative questionnaire before more in-depth interviews could be held to gain deeper

explanations to the answers already given in the questionnaire. In this sense, the mixed method design used is a sequential design (Teddlie & Tashakkori, 2003; Teddlie & Tashakkori, 2009).

The research only includes respondents from Dutch organisations. The focus is on only one country because of the complexity of the dynamic environment of Smart City development. Furthermore, Smart City development is especially interesting for the Netherlands because it is a fairly new concept in the world of technological development of cities, and the concept is of increased importance in the urbanized world. For the Netherlands, with a limited country size, urbanization is an important matter. The Dutch government is trying to be at the centre of the innovations that compliment increased urbanization. The government aspires to increase quality of life in Dutch cities and increases the competitiveness of Dutch businesses (*Rijksoverheid*, 2014).

This introduction provides a brief overview of the article. The research is structured as follows. First, the EIP-SCC will be focused on. Among others, the main goals and purpose of the EIP-SCC will be explained. The next section will elaborate on the different theories concerning the conditions for effectiveness of the EIP-SCC network. This section is followed by a method section, which will elaborate on the mixed method design and will present an operationalization of the main concepts. After the operationalisation, the results of the research will follow. In the results section, the two goals of this research will be assessed. The last section of the study consists of a conclusion, which will answer the main questions of this research and will present the limitations.

The European Innovative Partnership on Smart Cities and Communities

The EIP-SCC is one of five European Innovative Partnerships [EIPs] established by the European Commission. All EIPs focus on different topics that concerns innovation: Healthy aging, agriculture, water, raw materials, and Smart Cities. The main goal of the EIPs is to streamline, simplify, and improve coordination of existing innovation instruments and to challenge actors to come up with new actions. The main benefits of these partnerships, compared to already existing innovations, are better and faster results. The different partnerships have the same basis, but flexibility is important within the specific area of expertise (European Commission, 2014b). Furthermore, EIPs are not funding institutions, but they are in place to coordinate the cooperation of the government and stakeholders (EIP-SCC, 2013).

The main focus of the EIP-SCC is to bring together citizens, industry, and governments and promote innovation and knowledge sharing within these groups (European Commission, 2014a; European Council, 2013; EIP-SCC, 2014). The European Commission created the EIP-SCC in response to the challenges of urban transformation. With this initiative, the Commission tries to guide the different approaches of Smart City development in cities throughout Europe. The global competitiveness of the EU, in general, is an important motif for better guidance of these approaches of the different European cities (EIP-SCC, 2013).

Functionally, the EIP-SCC is a stakeholder-driven initiative, with the European Commission, in a mediating and facilitating role (EIP-SCC, 2013). The Commission cannot dictate what a Member State should do, but in this mediating function, it can guide Member States to improve innovation opportunities.

The structure of the EIP-SCC contains different groups: The High level group, Sherpa group, and the Market Place or Action Clusters. The High level group includes leading people in the Smart City field. These people support, promote, and implement the actions set up in the Strategic Implementation Plan made for the EIP-SCC, as well as review the progress made in the partnership. They are supported by the Sherpa Group, who guides the practical course of events in the EIP-SCC (EIP-SCC, 2013). The Sherpa Group consists of people involved in Smart City development who can practically support the stakeholders involved in the Market Place or the Action Clusters. The Market Place was where all Smart City initiatives that where gathered by a call for commitment combined. Such a call for commitment is an invitation from the EIP-SCC to the actors concerning Smart City innovation to be actively involved in the network. In February 2014 a call for commitment was opened (European Commission, 2014). This call was an invitation to register projects concerning Smart Cities. If projects are registered, it is easier for other actors to join. Knowledge sharing becomes easier because there is more transparency of knowledge (European Commission, n.d.). Recently, the Market Place is no longer in use, and the EIP-SCC works with the more structured Action Clusters. In these clusters Sherpas lead a group of actors involved with the same topics of Smart City development (EIP-SCC, n.d.). In Figure 1 both situations are presented in a diagram. The main difference is that the Market Place was one large area in which all different commitments were combined. In the new situation, these commitments are classified under different action clusters, which makes it easier for both the Sherpas and the actors involved to determine where to focus their actions because they are brought in contact with likeminded actors.

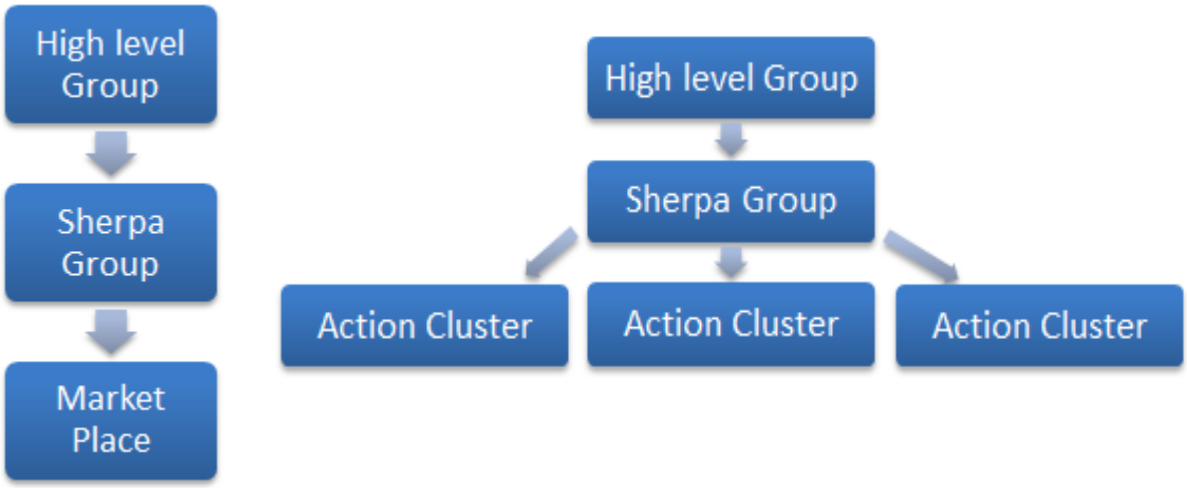

Figure 1. Left: the old EIP-SCC situation; right: the new situation.

Evaluative framework

Before defining the conditions for effectiveness, it is important to understand in what way effectiveness is defined. Effectiveness is defined as a measurement of goal attainment (Clarke & Dawson, 2012; Hoogerwerf, 1983). The EIP-SCC attains its goal when it contributes to innovation and knowledge sharing. It is expected that the conditions formulated result in goal attainment. Therefore, whether these conditions are present within the network must be assessed. This section will develop an evaluative framework based on new modes of governance [NMG] theory and innovation network theory to set up the conditions for effectiveness. Figure 2 displays the conditions for effectiveness selected for this research. The following sub-sections first elaborate on the NMG theory, where legitimacy and accountability are mentioned as important conditions. Afterward, innovation network theory will be used to elaborate on the conditions for effectiveness as mentioned in the triple helix model and its additional theories.

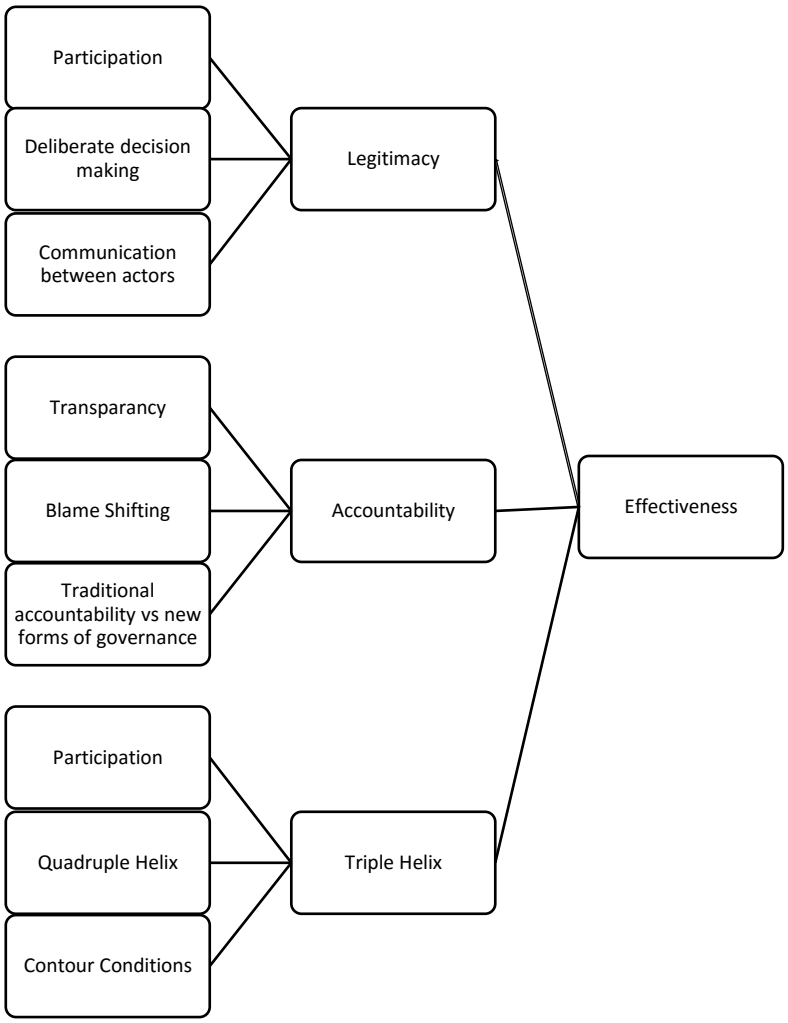

Figure 2. Conditions for effectiveness.

New modes of governance theory

New modes of governance [NMG] theory is a fairly new theoretical field within public administration research (Bellamy & Castiglione, 2011; Kröger, 2009; Smismans, 2008). The theory concerns decision making outside traditional democratic-representative government (Eberlein & Kerwer, 2014; Føllesdal, 2011; Hértier & Lehmkühl, 2011). NMG theory comprises different modes. The Open Method of Coordination [OMC] is one of these modes. The main focus of the OMC is the deliberative basis of governance. Every relevant actor, both state and non-state needs to be present in the decision-making process (Barcevicius et al., 2014; Føllesdal, 2011; Radulova, 2007; Smismans, 2008). Furthermore, the search for a best practice and new initiatives are important within the OMC (Eberlein & Kerwer, 2014; Héritier & Lehmkühl, 2011). The EIP-SCC matches these characteristics, namely in their focus on a broad network with different actors and their innovative character (EIP-SCC, 2013). Therefore this theory is relevant for this research.

According to NMG theory, the most important condition for effectiveness is the new modes being democratic (Føllesdal, 2011; Héritier & Lehmkuhl, 2011; Radulova, 2007; Smismans, 2008; Weale, 2011). NMG are not subjected to the control mechanisms usually used for the government. However, they also need to be legitimate and accountable in their behaviour. If NMG are not legitimate and accountable, they mostly are not perceived as effective as regular forms of government. Legitimacy and accountability are, therefore, necessary conditions for effectiveness (Büchs, 2007; Føllesdal, 2011; Héritier & Lehmkuhl, 2011; Radulova, 2007; Smismans, 2008). These conditions are highlighted and broken down into more specific aspects in the following sub-sections.

Legitimacy

The first condition for effectiveness of the EIP-SCC is legitimacy. NMG and the OMC evolved from the idea of establishing a new deliberative basis for EU governance. The idea is that governance based on multiple actors who discuss a problem leads to a more effective process of decision-making (Radulova, 2007). Legitimacy can be broken down into several aspects that more specifically explain how a network can be effective: Participation, deliberative decision making, and communication. These aspects are discussed below.

The first aspect of legitimacy is *participation*. A network is legitimate if everyone who should be included is included in the process (Büchs, 2007; Radulova, 2007; Schout & Jordan, 2005). Therefore, it is important to determine whether every actor involved in Smart City development is present within the network. In particular the inclusion of non-state actors is essential for the legitimacy of the network (Barcevicius et al., 2014; Smismans, 2008). Some authors question whether it is possible to include everyone of importance in the process (Büchs, 2007; Radulova, 2007; Schout & Jordan, 2005; Weale, 2011). This research focuses on the

presence of every actor group that, according to EIP-SCC policy, should be involved in Smart City development, not on every individual actor.

The second aspect of legitimacy is *deliberative decision making*. Arguably, NMG are effective when the interaction is based on problem solving rather than on bargaining (Büchs, 2007; Føllesdal, 2011; Radulova, 2007). Furthermore, NMG are more effective than other forms of governance because networks and private actors have more experience and respond more speedily than in a network consisting of only public actors (Føllesdal, 2011).

A third aspect of legitimacy is *communication between actors*. NMG are effective when social communication creates core changes in actors' preferences (Büchs, 2007; Kröger, 2009; Townsend, 2013; Radulova, 2007). Communication between actors is not always at its optimum because of various barriers, such as absence of shared vision, unclear guidelines and recommendations, and bureaucrats lacking decision-making power who join the network instead of political elites (Kröger, 2009). Since it is not generally accepted that NMG succeed in creating the right circumstances to be effective in all these aspects (Radulova, 2007), it is important to assess these aspects in relation to Smart City development.

Accountability

The second condition for effectiveness of the EIP-SCC is accountability. Accountability deals with questions concerning responsibilities of actors within a network (Føllesdal, 2011; Héritier & Lehmkuhl, 2011; Smismans, 2008; Weale, 2011). Accountability is difficult to assess when examining NMG since these modes are not incorporated inside the classic democratic circuit (Héritier & Lehmkuhl, 2011). The most important difference is that most actors involved are not elected. Actors have fewer regulated responsibilities, which leads to problems with the accountability of the network. The different aspects of accountability refer to specific problems with accountability that could be present within a network. These aspects are transparency, blame shifting, and traditional accountability versus new forms of governance.

The first aspect of accountability is *transparency*. Transparency firstly deals with the question of clarity of the different roles actors play within the network. This clarity in roles is necessary to decide who is responsible for what (Benz, 2007; Büchs, 2007; Føllesdal, 2011). Furthermore, the complexity of transparency in a network situation can be explained by the principal-agent theory. In a network situation there are many principles who make decisions and many agents that need to be coordinated. The amount of principles and agents has consequences mainly in terms of a greater information asymmetry and the coordination of decision-making becoming vague (Benz, 2007). It is important to minimize this information asymmetry to be transparent.

The second aspect of accountability is *blame shifting*. Blame shifting concerns the lack of responsibility for choices made collectively (Büchs, 2008; Kröger, 2009; Weale, 2011). Actors shifting blame onto another actor and not wanting to be responsible creates a problem for effective accountability. Blame shifting is also related to principal-agent theory. When there are many agents that share decision-making power, it is easy to play a blame-game. Actors do not feel responsible and blame other actors for possible mistakes (Benz, 2007).

The third aspect of accountability is made on basis of the contradiction of *traditional accountability* versus *new forms governance*. Traditional accountability can be divided into three strands: Control by electoral democratically accountable representatives; control by functional representatives, such as stakeholders; and control by civil society organisations. If one of these strands is not functioning optimally, then it is hard to achieve accountability because these strands interact in a complex way (Føllesdal, 2011). For NMG, which is a new form of governance, it is hard to achieve the first strand, having electoral accountable representatives; without these electoral representatives, the network is supposed to be less effective (Héritier & Lehmkuhl, 2011; Smismans, 2008; Weale, 2011).

Innovation network theory

The second theory used in this research is innovation network theory. The EIP-SCC matches innovation network theory through the main goal of the institution: To bring together cities, industries, and citizens with the intention of creating a network where innovation and knowledge can be shared to benefit the development of Smart Cities (European Commission, 2014a). In essence, this is what an innovation network does: Brings together actors and shares knowledge and innovation (Shazi et al., 2014; Levin et al., 2002).

The triple helix model is the most important model concerning innovation network theory. The triple helix model emphasizes the need for a multi-disciplinary network with a focus on interactive knowledge production in order to be effective (Arranz & Fdez de Arroyabe, 2012; Keast & Hampson, 2007; Klijn & Koppenjan, 2012; Leydesdorff & Deakin, 2011; Lombardi et al., 2011).

Figure 3. Triple Helix model (Tusur, n.d.).

Triple helix model

The triple helix model expresses which actors are needed in an innovation network to make the network effective. The model is constructed in the form of helices because of the complicated interaction between the three actor groups. Figure 3 shows this interaction by the way the three strings circle each other. The idea of the triple helix model is based on the helix figures of DNA to show the complex the interaction between the different actors. In the triple helix theory, three actor groups represent the helices: Private firms, government, and knowledge producers. These helices need to work together to create the most beneficial situation for innovation to occur (Keast & Hampson, 2007; Klijn & Koppenjan, 2012). For the Smart City networks, these helices are more precisely formulated as wealth creating industries, democratic government, and the intellectual capital of universities (Leydesdorff & Deakin, 2011; Lombardi et al., 2011). For an effective process within the EIP-SCC, it is important that all these actors are present within the network and that they have the possibility to work together. Therefore this aspect of the triple helix model is called *participation in helices*. This research assesses both the presence of different actors and the importance of these actors within the network.

This triple helix model is not the definitive model in this field. The model has been expanded with the use of two additional theories. One is called the quadruple helix model. The other theoretical expansion is concerned with contour conditions present in the network's environment. These two theories will be explained further.

In addition to the three helices already mentioned, the *quadruple helix model* adds another helix to the model. This helix can contain different actors depending on the field of innovation. Within Smart City development, the end-users of innovations make up this fourth helix. Innovation is moving toward a more user-centric innovation policy. However this policy is not yet widely used (Arnkil et al., 2010). Increased user-friendliness would mean that citizens are involved in the process early on. End-users can be involved in Smart City development by

societal organizations. However, it is always difficult to assess if all interests concerned are involved because civil society organisations only focus on a specific part of the population (Bellamy & Castiglione, 2011; Héritier & Lehmkuhl, 2011).

The second addition to the model is the *contour conditions* surrounding the helices (Etzkowitz & Leydesdorff, 2000). Not all authors agree that the triple helix model creates the most beneficial situation for innovation. Several other conditions need to be present. The idea of these conditions is that not only the actors need to be present, but a favourable context for innovation is also needed (Arranz & Fdez de Arroyabe, 2012; Leydesdorff & Deakin, 2011; Lombardi et al., 2011). The context presupposes that the three helices operate in a complex environment. In this research this environment is examined by the inclusion of the importance of learning ability and availability of knowledge in the network (Lombardi et al., 2011).

Methods and data

Mixed Method Design

This research composes an evaluation with use of a mixed method design. Mixed method research combines the strengths of different research methods and counterbalances the weaknesses (Axinn & Pearce, 2006; Teddlie & Tashakkori, 2003; Teddlie & Tashakkori, 2009). Teddlie and Tashakkori's (2003) definition of mixed method research is central in this research. They define a mixed method research as "a design in which both qualitative and quantitative approaches are used in types of questions, research methods, data collection and analysis procedures, and/or inferences" (Teddlie & Tashakkori, 2003).

The advantages of using a mixed method design are that one can use whatever methodological tool necessary, different methods lead to cumulative results, and mixed method research overcomes the weaknesses of both qualitative and quantitative methods, which leads to stronger inferences (Morse & Niehaus, 2009; Teddlie & Tashakkori, 2009). In this research the advantages lead to considerable freedom in designing the research and give the opportunity to ask in-depth questions after a more general questionnaire.

Different forms of mixed method research can be defined. In this research sequential mixed method use is central. The qualitative research chronologically follows the quantitative research (Teddlie & Tashakkori, 2003; Teddlie & Tashakkori, 2009). The quantitative research encompasses a questionnaire distributed to people involved in Smart City development, followed by the qualitative design, which focuses on further research into the provided answers. The remainder of this section will first describe the quantitative research, followed by the qualitative research.

Quantitative research

With the use of quantitative research two different goals were researched. The first goal of this research is to assess the theoretical framework and the second goal is to assess the condition for the EIP-SCC. In this sub-section both these goals are considered. A differentiation will be made on some points to indicate their differences.

Sampling

According to the Dutch government (2014), municipalities are the most important actor regarding Smart City development. An active government forms the basis of this development, both in a facilitating and initiating role (Slegh, 2013). Some of the most important tasks for Smart City development, such as making zoning plans and planning infrastructure, lay with the municipality (*Rijksoverheid*, 2014). Furthermore, municipalities are important because they can initiate public-private cooperation at the local level. These cooperatives are important for Smart City development (EIP-SCC, 2014).

Municipalities are not the only actors involved. In the EIP-SCC Strategic Implementation Plan (2013), the most important actors are defined: Actors from cities and regions, industries, Small and Medium Enterprises [SMEs], and research units. The actors from cities and regions contain a broad range of actors. This research includes civil society organisations, provinces, national government, and European institutions as stakeholders. All these different actors engage in, for instance, infrastructure within a city or a region. The actors are involved with the use of random sampling. In the data collection, this random sampling is further explicated.

Data collection

A questionnaire was distributed to collect data for this portion of the research. A questionnaire is suitable because of the quantity of different theoretical aspects measured and the multitude of actors. It is an efficient way to collect these data (Teddlie & Tashakkori, 2009). Importantly, in a questionnaire, questions need to be specific and clear for a respondent to answer (Sapsford & Jupp, 2006). To avoid problems with clarity, the questionnaire was first sent to test people involved in Smart City development, which led to some small changes in the way questions were asked.

De Digitale Steden Agenda (Digital City Agenda) helped distributing the questionnaires. This organization is a platform that brings together different actors involved in Smart City development and focuses mostly on the role of municipalities but also tries to involve business organisations, research units, provinces, and the national government in the process (DSA, 2012). *De Digitale Steden Agenda* distributed the questionnaire by including it in the organization's newsletter, putting a link on its website, and promotes it via Twitter. This led to a variety of actors that could complete the questionnaire, which was beneficial. However, this publicity has a flaw: Anyone could complete the questionnaire. To only include those involved in Smart City networks, some questions were asked in the beginning of the questionnaire to decide whether the respondents fit the criteria.

Operationalisation

In this section, the conditions for effectiveness are operationalised. The same conditions are used in both the questionnaire on the first goal, assessing the conditions, and on the second goal, assessing the EIP-SCC, but the operationalisation is not always the same. Therefore, a differentiation is made when discussing the conditions.

Two different Likert scale sizes were used to measure attitudes in the research. The questionnaire concerned with the assessment of the conditions consisted of questions on a 10-point scale because, in this section, the importance of the questioned aspects ranged from "very unimportant" to "very important". When asking for the importance, a large scale gives a more specific measurement. Almost all items in the assessment of the EIP-SCC were measured using a five-point scale. This choice was made because the answer categories varied from "highly disagree with" to "highly agree with". A five-point scale is sufficient to give enough information within this range of answers. Only the aspects participation and participation in triple helix were measured with a 10-point scale because in these questions, again, importance was measured. In the following paragraphs, each aspect is explained further.

The first aspect of legitimacy, participation, was measured by questioning how involved actors were in the EIP-SCC, so this question was not asked for the first goal. The different actors that could be chosen were societal organisations, business organisations, research units, municipalities, provinces, national government, and European institutions. The second aspect of legitimacy, deliberative decision making, involved questions concerning bargaining and problem solving and questions on the difference between public and private actors. This aspect was measured in both goals. The last aspect of legitimacy, communication, measured the communication between actors in general. Furthermore, for the second goal specifically, the communication between the respondent and the Sherpa group was assessed.

Then the first aspect of accountability, transparency, was measured mainly with questions on information asymmetry. Information asymmetry is quite a hard concept to grasp; therefore, it was described as the fact that only a small group of people has access to important information, and the network does not function optimally because of this lack of information. Furthermore, for the assessment of the EIP-SCC, questions about the clarity of the respondent's own role and the roles of other actors were asked. The second aspect of accountability, blame shifting, measured for the first goal, whether everyone had the same responsibilities and whether it should be investigated who was to blame when mistakes were made. For the second goal, the questions were more specific to the responsibility for failure of the respondents themselves and of their organisations. The third aspect of accountability, traditional accountability versus new forms of governance, measured the three strands to be sufficiently present.

The first aspect of the condition triple helix, participation, was measured for both the triple helix and the quadruple helix model. The main question is "How important do you think involvement of these actors is within the EIP-SCC or in Smart City networks?" The actors of the triple and quadruple helix were included: Industries, democratic government, universities, and end-users. The actor-group industry was measured by looking at both large businesses and small and medium enterprises (SMEs). Democratic government consists of municipalities, provinces, national government, and European institutions. The group universities was expanded in this research; not only universities are important, but also research units, such as TNO. The last group, end-users, was difficult to operationalize because everyone can be an end-user. Within this research, the involvement of societal organisations that represent citizens was examined. The second aspect, contour conditions, was measured by asking whether there was knowledge sharing and whether the possibility of learning exists. Also, finances were included in the research because the policy papers showed that financing Smart City projects is hard (ITRE, 2014; *Rijksoverheid,* 2014). The assessment of the conditions was completed by determining the importance of these conditions and the assessment of the EIP-SCC by determining whether these conditions are sufficiently present within the network.

Validity and reliability

Validity and reliability were important to assess before the questionnaire was distributed. To increase the reliability of the questionnaire, scales are used. On each aspect, multiple questions were asked, which led to less misinterpretation of the aspect. Multiple questions are also beneficial because a more precise measurement of the aspect is possible (Swanborn, 1998; Litwin, 1995). Other criteria for formulating a questionnaire are that questions should be accurately formulated, as short as possible, uniformly asked, and both negative and positive (Swanborn, 1988). All these criteria were taking into consideration when developing the questionnaire.

One of the ways to assess the reliability of the questionnaire is by measuring Cronbach's alpha. Cronbach's α measures the internal consistency of the questionnaire[1] (De Heus et al., 1995; SPSS, 1999). Importantly, when subscales are used, such as the different aspects in this research, the Cronbach's α needs to be measured for each subscale. Furthermore, reversed items should be recoded before measuring Cronbach's α (Field, 2005).

Concerning validity in this research, both internal and external validity need to be assessed. Internal validity concerns the validity of the research itself. The causal-effect relationships between the conditions and effectiveness are researched when assessing the internal validity (Onwuegbuzie,

[1] The rules of thumb using Cronbach's α are not for every author the same, however it can be said that in general $\alpha > 0.80$ is a good scale, $0.60 < \alpha < 0.80$ is tolerably and a scale of < 0.60 gives a bad reliability (De Heus et al., 1995).

2000). One of the main threats for the internal validity is to not have enough responses to the questionnaire, which leads to invalid outcomes. Furthermore, the observational bias and the researcher bias need to be taken into account.

External validity refers to the possibility to generalize outcomes to and across populations, settings, and times (Onwuegbuzie, 2000). In this research the first goal, especially, focuses on generalization because it is the assessment of the theory for Smart City networks in general. The second goal of the research only includes one case; therefore, the generalizability of these outcomes is low.

Methods of analysis

The main method of analysis for the quantitative portion of the research was univariate descriptive analysis. Univariate descriptive analysis is concerned with summarizing the characteristics of a phenomenon in terms of distributions of variables (Blaikie, 2003; Bryman & Cramer, 1997). For this research, a frequency analysis was performed. Mean and median are important measurements to assess the average in a distribution. The mean was the most important measurement in this research because this research is interested in average scores. With this measurement, the average outcome of all respondents together to one question was assessed. To prevent outliers having too much influence on the outcomes, the median was also considered (Blaikie, 2003; Bryman & Cramer, 1997).

Qualitative research

The main purpose of the qualitative research was to find more in-depth information about the answers given in the questionnaire. The main method of research was interviewing respondents. This portion of the research only focused on the second goal of the research: The assessment of the EIP-SCC.

Sampling

In this research, a sequential design of mixed method analysis was conducted. After the quantitative research, a qualitative study followed. Eventually, these designs needed to come together and needed to have added value over a single method design (Teddlie & Tashakkori, 2009). The quantitative portion of the research provided the answers necessary for more in-depth research through interviews. The qualitative portion of the research would not have enough input without the quantitative part, and therefore, there was added value in a mixed method design over a single method design.

Data collection

Qualitative research can be conducted through observations, interviews, and documents. Interviews were suitable for this research because they provide the opportunity to ask open-ended questions in which the respondents' opinions on and attitudes about conditions can be asked in detail (Patton, 2002). The interviews were semi-structured. Questions were prepared based on the answers given in the questionnaire, and there was still opportunity to question during the interviews (Sapsford &

Jupp, 2006; Silverman, 2006). The interviews were prepared based on the answers in the questionnaire; therefore, a standard question format could not be made. However, in all interviews, all conditions for effectiveness were included.

Validity and reliability

Also within this portion of the research, reliability and validity were considered. In qualitative research, there is no hard measurement of reliability and validity, but there are some points that must be taken into account to make the research as reliable and as valid as possible. First, the plausibility and the credibility of the outcomes need to be considered. Plausibility and credibility concern the extent to which a claim seems likely to be true (Sapsford & Jupp, 2006). In this research, these claims were considered by comparing different respondents' answers. When answers are quite similar, the likeliness of being true increases. Furthermore, the context can alter the responses a respondent gives (Sapsford & Jupp, 2006). In this research the knowledge of Smart Cities was considered by questioning how involved the respondents were in Smart City development. Furthermore, it is important to be unbiased as researcher. The interviewer needs to be neutral, especially with an open-ended character, such as the semi-structured interviews of this research (Patton, 2002; Sapsford & Jupp, 2006; Teddlie & Tashakkori, 1998). This neutrality was preserved by keeping the questions focused on the theory, not on personal experience. The final point made is one of reliability. The combination of quantitative and qualitative data makes the research reliable. The quantitative data is checked on reliability, after which the qualitative data confirms these answers in more detail (Teddlie & Tashakkori, 1998).

Method of analysis

The data were analysed with the use of axial coding. Different steps are important. First, the interviews were developed in more detail with the use of audio recordings. Afterward, the data needed to be structured. With the use of the different aspects explained in the theoretical framework, the data was structured into different categories. Within these categories, data were compared and the essential outcomes were recorded (Sapsford & Jupp, 2006). This categorizing and comparing was difficult because of the open-ended character of the interviews (Patton, 2002).

Results

In total 19 people participated in the questionnaire: 12 for the first goal of the research and 7 for the second goal. Ten 10 people participated in the interviews. In the quantitative portion, one respondent only answered three questions, so this respondent was removed. Also, other respondents did not answer all questions. To deal with this missing data, a pairwise deletion of missing values was executed. Pairwise deletion only deletes the values for questions that respondents did not answer. The respondents stay in the dataset because deleting respondents would have a great impact on such a small sample. The missing value could also not be replaced by

the mean because of the small sample. Outliers could have too much influence on the mean. Even without taking respondents out of the dataset, the sample is rather small, which leads to shortcomings in this research. The small sample makes it impossible to calculate Cronbach's alpha (an attempt was made with little result; see Appendix), which leads to a lack of reliability of the results. Furthermore, many different actor groups are involved in Smart City development. A small sample means that actor groups are not evenly researched. The actor groups' provinces and European Institutions were not involved in the questionnaire or the interviews because of the non-response of these groups. No generalisations can be made. The information given by these actors can only be used in this specific case. First, the results will be shown on the first goal of this research in order to assess the conditions. Then, the results will be shown for the second goals in order to assess the EIP-SCC.

Assessing the conditions

Table 1 presents the outcomes of the questionnaire concerning the first goal of this research: to assess if the conditions for effectiveness in the evaluative framework are the right conditions to conduct research on Smart City development. All different conditions with their most important aspects will be briefly mentioned.

Starting with the condition legitimacy, Table 1 shows that deliberative decision making is an important aspect. The respondents mention the importance of problem solving (7.42) rather than bargaining techniques (5.75) of action within a network[2]. The second aspect, communication, is an important condition for an effective Smart City network (8.25), and therefore, it is an important condition to be measured when examining Smart City networks. Overall, the aspects of legitimacy are rated as important conditions in evaluating a Smart City network.

The second condition, accountability, is assessed as quite important. Firstly, when examining the transparency rate, a clear division in roles is slightly important (6.33). However, this item is not as important as most of the other items already seen in the legitimacy condition. The respondents agree with the necessity of equal knowledge sharing (7.67). Interestingly, few respondents score this items low; mostly high scores are found, with a median of 9. When looking at the importance of the aspect transparency equal knowledge sharing is seen as important (7.67); inherent with the complexity of the Smart City concept is information asymmetry. In assessing the importance of blame shifting, seeking who to blame is seen as slightly important (6.75). The last aspect is traditional accountability versus new forms of governance. The assessment of the importance of this aspect shows that all different types of electoral accountability are seen as important, but the involvement of citizens through electoral representatives is only slightly important (5.50), which shows that, in Smart City networks, hard-to-achieve electoral representation becomes less important than the

[2] The significance of this difference cannot be calculated because of the small sample size.

other forms of representation. The condition accountability is not as important as the other conditions in this theory; however, there is still importance for measuring this condition in Smart City networks.

Table 1. Assessment of conditions, n = 12

Condition	*Aspect*	Importance of:	Mean	Median
Legitimacy	*Deliberative decision making*	Bargaining	5.75	6.50
		Problem solving	7.42	8.00
	Communication	Good communication	8.25	8.50
Accountability	*Transparency*	Clear division of roles	6.33	6.50
		Equal knowledge sharing	7.67	9.00
	Blame shifting	Seeking who is responsible	6.75	7.00
	Traditional accountability vs new forms of governance	Involvement of citizens through electoral representatives	5.50	5.50
		Involvement of functional representatives	7.91	9.00
		Involvement of citizens through societal organisations	6.83	7.00
Triple Helix	*Participation*	Societal organisations	7.91	9.00
		Business organisations	7.91	9.00
		Research units	7.64	7.00
		Municipalities	7.55	6.00
		Provinces	5.18	5.00
		National government	6.64	7.00
		European institutions	6.55	7.00
	Contour conditions	Availability of knowledge	8.25	9.00
		Ability to learn	8.42	9.00
		Sufficient finances	6.58	7.00

The last condition is the triple helix model. Respondents rate business organisations (7.91) and research units (7.91) as equally important to be actively involved in Smart City networks. This result agrees with the triple helix theory, where these items are seen as vital helices. On democratic governments, the importance differs per government. Municipalities are seen as important (7.55), and provinces (5.18), national government (6.64), and European institutions (6.55) are seen as quite important. Furthermore, societal organisations added in the quadruple helix model are seen as important actors within Smart City networks (7.91). The last part to research involves the contour

conditions. Respondents indicate the availability of knowledge (8.25) and the opportunity to learn (8.42) as important aspects of a Smart City network and, therefore, agree with the theory. They rate Smart City finances as less important than the other conditions (6.86). Based on these outcomes, the condition triple helix is important to include in Smart City research.

Assessing the EIP-SCC

In this section of the research, the outcomes of both quantitative and qualitative research will be combined per condition. In the qualitative research, some explanations are based on Smart City networks, in general, and not specifically on the EIP-SCC. However, the EIP-SCC evolves as most Smart City networks do, and therefore, these explanations are also important to take into consideration.

Legitimacy

Participation

The first aspect of the condition legitimacy is participation. Participation is most effective when no actor is left out of the decision-making process (Büchs, 2007; Radulova, 2007; Schout & Jordan, 2005). Therefore, this aspect focuses on which actors participate in the EIP-SCC. Respondents could also mention when actors were not involved at all in the network, but no respondent answered this positively. Table 2 shows that there is variation in how involved different actors are. Involvement of societal organisations (5.5), provinces (4.67), and the national government (5.83) are lower than involvement of other actors. It is interesting that, in the results, the involvement of provinces varies from 2 to 10, which means province involvement varies from “not involved” to “very much involved”, which could be explained by several different comments in the interviews.

The first comment is that there is a difference between Dutch provinces and other regional actors in Europe. Generally, there are many regional actors involved in the EIP-SCC; however, the Dutch provinces are an exception and are not really involved (respondent 4). A second comment is that the Dutch provinces differ from each other in their roles. Some are extremely active, while others are not (respondent 8, respondent 1, & respondent 5). A third comment is that Dutch provinces do not have a real structure for Smart City development; people are mostly involved in Smart City development because of their own passions (respondent 9).

In addition to the involvement of different actors, the theory on legitimacy states that the inclusion of non-state actors, especially, is important. Societal organisation, business organisations, and research units fall within this category. Business organisations (7.76) and research units (8.00), especially, are sufficiently involved in the process, as shown in Table 2.

Involvement of actors is sufficient in the EIP-SCC. However, not all actors are equally involved. The difference in answers on the involvement of provinces is especially interesting. These differences are explained by differences the Dutch and European levels and by the differences within

the Dutch provinces themselves. Furthermore, the survey shows that non-state actors are sufficiently involved in the EIP-SCC.

Table 2. Participation, n = 6

Participation	Actors	Mean	Median
Involvement of	Societal organisations	5.50	6.00
	Business organisations	7.67	8.00
	Research units	8.00	8.00
	Municipalities	7.33	7.50
	Provinces	4.67	4.00
	National government	5.83	6.00
	European institutions	8.50	8.00

Deliberative decision making

The second aspect of the condition legitimacy is deliberative decision making. The idea is that interaction within a network should be based on problem solving rather than bargaining and that private actors respond more speedily in a network situation than public actors (Büchs, 2007; Føllesdal, 2011; Radulova, 2007). Firstly, the focus is on problem solving and bargaining. After assessing whether this aspect is present in the EIP-SCC, the following outcomes are found. The respondents do not all agree with the problem solving capacity (3.25) of the network. However they do not see more bargaining than problem solving (3.75), as can be seen in Table 3.

In the interviews three different explanations are given on the unclear outcomes of the difference in problem solving and bargaining concerning the EIP-SCC. Firstly, a respondent mentions that, in the EIP-SCC, a mixture of problem solving and bargaining is seen. This mixture is caused by the many different reasons why a company enters the network. Many companies use the network to explore future options of Smart City development, which leads to more bargaining and less problem solving for the actors that present their issues with Smart City development (respondent 4). Secondly, networks experiment with how they could fit in Smart City development; therefore, the networks are changing too much to be in stable problem solving phases (respondent 3). Lastly, networks concerning Smart Cities can be characterized as knowledge networks and not cooperation networks. Within this context, the question of problem solving or bargaining is less of a problem when only knowledge transfers are made (respondent 6).

Furthermore Table 3 shows the second aspect of deliberative decision making: The difference between private and public actors. All respondents agree highly with the benefits of non-state actors in the EIP-SCC (4.5). However, they do not place private actors above public actors (2.27).

In the interviews two explanations are given why private actors are not placed above public actors. The first explanation is because of the difference between private actors themselves. SMEs do not have the resources to spend time in Brussels to gain experienced with Smart City development, whereas large companies do have this possibility (respondent 4). Therefore, decision making is not always faster when SMEs are involved. Second, the addition of business organisations to a Smart City network can be a disadvantage for municipalities in the fact that business organisations are seen as cooperation partners with more speed (respondent 7).

No evident difference is seen between bargaining and problem solving. Three different factors are important: The different intentions of companies entering the network, the developmental phase of most Smart City networks, and the network being more like a knowledge network than a cooperation network. The addition of private actors is seen as beneficial for the EIP-SCC, but private actors are not placed above public actors. There is a difference in private actors in terms of resources. Furthermore, private actors have more speed.

Table 3. Deliberative decision making, n = 5

Deliberative decision making	Question	Mean	Median
Bargaining vs problem solving	Focus of the network is on problem solving	3.25	3.00
	Mostly bargaining, no real problem solving in the network	3.75	4.00
Non-state actors	The network benefits from non-state actors	4.50	5.00
	The decision-making is faster with non-governmental actors involved	2.75	3.00
	Private actors have more experience than public actors in network situations	2.27	2.00

Communication

Communication is the third aspect of the condition legitimacy. Good communication enables actors to learn from each other (Büchs, 2007; Kröger, 2009; Radulova, 2007; Townsend, 2013). Furthermore, various barriers for communication within networks can be defined (Kröger, 2009). In Table 4, the answers to questions of communication are given.

The respondents rate communication with the Sherpa group (3.25) and communication with other actors as slightly above average (3.75). They slightly agree with the fact that there is good communication within the network. In the interviews, no additional comments are made on good communication in the EIP-SCC.

In the literature, barriers that can strain communication are also formulated. The first barrier is absence of shared vision (Kröger, 2009). The respondents answered the question related to a

shared vision within the EIP-SCC neutrally (3.0). In the interviews, different views on the need of a shared vision within Smart City networks are given. A shared vision is generally seen as an important precondition for the functioning of a Smart City network (respondent 2, respondent 5, & respondent 8). However, some respondents have different opinions. A different vision is not necessarily bad. These differences create the opportunity for a discussion necessary to develop the Smart City concept (respondent 10). However, it when there are too many different visions, it is not possible to work toward a general outcome. Therefore, it is important to have a mixture of different visions to fully explore the Smart City concept (respondent 9).

The second barrier of communication focuses on unclear guidelines and recommendations (Kröger, 2009). The quantitative research showed that no uniform answer is given to the statement "the EIP-SCC had clear rules for participating in the network". This distribution of answers could be based on the fact that the guidelines may be clearly formulated but are not known by all participants within the network. In the interviews, no additional comments were made on this barrier.

The final barrier focuses on the involvement of bureaucrats lacking decision-making power instead of political elite in the EIP-SCC (Kröger, 2009). There is a slight disagreement with the statement that political elites are not involved (2.5). In the interviews, it was stated that, in general, a solid connection is established between civil servants and politicians on the municipality level concerning Smart City development (respondent 1 & respondent 8). However this connection is not automatically in place on the network level. The model of Smart City development is technocratic on the network level, and political issues may not be most important (respondent 6).

The respondents slightly agree with the fact that there is good communication in the EIP-SCC. The barriers mentioned in the theory, however, cannot be confirmed or contradicted as present within the EIP-SCC. Some commends can be made on the barriers when examining the interviews. The first barrier, which expresses the need for a shared vision, may not be important within Smart City development because of the discussion needed to develop the concept. Furthermore, the final barrier may be hard to assess because of the technocratic character of Smart City networks.

Table 4. Communication, n = 5

Communication	Question	Mean	Median
Between actors	There is a lot of communication with the Sherpa group.	3.25	3.00
	Communication between different actors within the EIP-SCC is good.	3.75	3.50
Barriers	Barrier 1: There is a shared vision on goals within the EIP-SCC	3.00	3.00
	Barrier 2: The EIP-SCC has clear rules about participating in the network.	3.00	3.00
	Barrier 3: The political elites are not involved in the network, only civil servants are.	2.50	2.50

Accountability

Transparency

The second condition for effectiveness of the EIP-SCC is accountability. Transparency is the first aspect of this condition. There are two ways to measure if a network is transparent. Firstly, the clarity of different roles within the network is important (Benz, 2007; Büchs, 2007; Føllesdal, 2011), and secondly, the amount of information asymmetry (Benz, 2007) is important. The results of the questionnaire are displayed in Table 5. First, the focus is on different roles. The respondents disagree with the role of other actors being unclear (2.00); however, they also disagree with their own roles being clear (2.00).

Their own roles being unclear can be explained by the notion that actors are still searching for their roles within Smart City development (respondent 9). In particular, provinces and the national government are searching for their roles because they do not have natural roles in the development of Smart Cities (respondent 3 & respondent 5). Smart City development is mostly based on the role of municipalities and of the European playing field. One of the main tasks respondents see for the national government, together with European institutions, is to remove obstructions for Smart City networks (respondent 3, respondent 4, & respondent 9). These obstructions could be removed by clearer regulations on sustainable development (respondent 3 & respondent 4).

The second element of transparency is information asymmetry. In the EIP-SCC information asymmetry is in place (3.75). The knowledge is only with a few actors within the network (3.75). These answers are interesting because respondents think that there is enough knowledge within the network (4.00; see Table 10).

The most logical explanation for these contradicting answers is that the Smart City concept is extremely complicated. Knowledge is necessary for technology, ICT, and the specific situation, as well as how cities are organized and evolve. Every actor holds one part of the knowledge (respondent 3 & respondent 4). However, when actors work together closely and share knowledge sufficiently, information asymmetry does not have to be limiting to networks, such as the EIP-SCC (respondent 3).

The development of Smart City networks is fully in progress, which makes it sometimes unclear to participants of the EIP-SCC what their own roles are in the network. Furthermore, the Smart City concept is complex, which leads to information asymmetry. It is not possible for all actors to have all necessary information even if enough knowledge is available within the network.

Table 6. Transparency, n = 4.

Transparency	Question	Mean	Median
Clarity of roles	The role of my organisation in the EIP-SCC is clear to me.	2.75	2.00
	It is unclear to me what the role of other actors in the network is.	2.00	2.00
Information asymmetry	There is information asymmetry within the network.	3.75	3.50
	The knowledge on Smart Cities is only with a few actors, which leads to not optimal functioning of the network.	3.75	3.50

Blame shifting

The second aspect of accountability is blame shifting. Blame shifting is the lack of responsibility for collective choices (Büchs, 2008; Kröger, 2009; Weale, 2011). In Table 7, the results of the question on this aspect are represented. The respondents do not feel responsibility for the choices made within the network, both of their organisation (1.75) and of their own (2.0). Furthermore, they answer about average on the questions if they are to blame for faults (2.75).

The interviews show that it is difficult to assess if there is blame shifting in the EIP-SCC because the EIP-SCC is in an early stage of cooperation, as most Smart City networks are (respondent 6). The network has not yet entered a decision-making stage but is in an exploring phase (respondent 4 & respondent 6). Another argument for the difficult assessment is that the management side of new technology is usually unknown. Without evidence on costs and future developments of technology, actors are not eager to take on responsibilities (respondent 2 & respondent 8).

It is too early in the process to assess if there is blame shifting within the EIP-SCC because the process has not entered the decision-making phase. Furthermore, with new technologies, it is difficult to take responsibility because of the unknown costs. Perhaps the European Commission could take a role in this matter and embed the question of reliability in the network.

Table 7. Blame Shifting, n = 4

Blame shifting	Question	Mean	Median
Responsibilities	My organisation is responsible for the choices made in the network.	1.75	2.00
	When things go wrong in the network, it's not the fault of my organisation.	2.75	2.50
	I feel personally responsible for the choices made in the network.	2.00	2.00

Traditional accountability vs new forms of governance

The last aspect of accountability is the difference between traditional accountability and new forms of governance. Three different types of accountability are distinguished (Føllesdal, 2007). Within new forms of governance, electoral representation, especially, is hard to achieve (Héritier & Lehmkuhl, 2011; Smismans, 2008; Weale, 2011). The outcomes show, in Table 8, that the electorate (4.00) is sufficiently involved. On the involvement of business organisations the respondents are neutral (3.00). Furthermore, the involvement of societal organisations is not sufficient (2.25).

On these last two outcomes, comments are made in the interviews. The neutral position on the involvement of business organisations could be due to a large difference in the type of organisations present in the EIP-SCC. Both SMEs and large companies should be present. However, SMEs cannot spend much time and resources on Brussels meetings, so they need to be selective (respondent 4). Furthermore, the lack of involvement of societal organisation can be explained by the fact that there are rules that hamper bottom-up initiatives in sustainable development (respondent 4). Representation of citizens is seen as a key factor for Smart City development (respondent 10). However, it is difficult to find the right societal organisations for the specific projects (respondent 7). Moreover, societal organisations do not represent all citizens, usually just a selective part. It is important that not just one interest is served, but rather the interests of all citizens (respondent 9).

In the EIP-SCC, a neutral position is taken on the representation of business organisations. Furthermore, societal organisations are hampered in their involvement, and it is difficult to find the right societal organisation that represents all citizens. Therefore, it cannot be confirmed if this aspect is present within the EIP-SCC.

Table 8. Traditional accountability vs new forms of governance, n = 4

Traditional vs new	Question	Mean	Median
Sufficient involvement	Actors that are chosen by the electorate are sufficiently involved in the EIP-SCC.	4.00	4.00
	Business organisations are sufficiently involved in the EIP-SCC.	3.00	2.50
	Societal organisations are sufficiently involved in the EIP-SCC.	2.25	2.50

Triple Helix

Participation

Triple Helix is the last condition to be discussed. Participation is the main aspect, this aspect is already assessed in the legitimacy section, however with a different focus. In this section the focus is on: The importance of different actors in the triple helix model. The three helices important for Smart City development in the triple helix model are industries, democratic government, and research units (Leydesdorff & Deakin, 2011; Lombardi et al., 2011). In this section, the three helices will be assessed separately, focusing on the first research question on effectiveness of this condition.

The first helix, industries, is measured by examining the importance of business organisations in the EIP-SCC. Business organisations are on average, seen as extremely important (9.00), with a median of 9.5. In the EIP-SCC, two types of business organisations are present: Large companies and SMEs. It is seen as important for both these types to be present within the EIP-SCC. However, it is difficult to involve SMEs (respondent 4). SMEs mostly lack resources to be active in the network on the European level, which leads to less involvement (respondent 4 & respondent 6).

The second helix, democratic government, involves municipalities, provinces, national government, and European institutions. Municipalities are seen as extremely important (9.00). National government (6.50) and European institutions (6.83) are seen as slightly important, and provinces are seen as not important (4.17). Furthermore, all actors in this helix are slightly less important than the actors in the helices industries and universities. It is important to keep in mind that, before the triple helix model, the government was seen as much more of a provider of tasks and businesses as executers of tasks. Now, the roles are much more equal (respondent 6). The next paragraphs provide additional insights into the roles of the different governmental actors within the network.

Municipalities have a special position in the Smart City network because of the political legitimacy municipalities have in decision making in the Smart City field (respondent 1). Eventually, the city council needs to agree with changes on the local scale. Furthermore, there is a difference in the approach of Smart City development between municipalities, and provinces and the national government. Municipalities embed Smart City development increasingly in the bureaucratic structure; the other actors not so much. No longer only people with passion are involved, but Smart City development penetrates in management and politics (respondent 9), which leads to more people structurally working with Smart City development.

The role of the provinces is already elaborated on extensively in the legitimacy section. This section will focus on the importance, and not on the involvement, of actors. Also, the provinces are not particularly important in Dutch Smart City networks. One of the reasons is the existence of other regional co-operations between different cities, which are valuable for Smart City development

(respondent 5 & respondent 8). One role that could be important for the provinces is that they could stimulate other actors to join Smart City networks (respondent 8).

The questionnaire revealed that the role of the Dutch national government is quite important in the EIP-SCC. This role mostly encompasses removing obstructions for Smart City development, which can be accomplished in changing legislation or regulation and in stimulating knowledge sharing (respondent 3 & respondent 4). The national government is already more visible than it was in the beginning of Smart City development; however, the involvement is fragmented (respondent 9). It seems that the individual ministries are working separately and that there is no coherent national policy (respondent 4). Another respondent asked the question of whether the national government should become more important within the network. Smart City development focuses on small regional development. National developments and international projects are too far away to have influence on these local developments (respondent 10). Furthermore, Europe and the municipalities are becoming more important, and the national government is just a layer in between that is possibly not useful in Smart City development (respondent 1).

The final democratic government to address are the European institutions. Currently, the European institutions do not actively play a role in the EIP-SCC or other Smart City networks. The difficulty with the EIP-SCC is that the European Commission only wants to play a guiding and supportive role. However, by the withdrawal of their responsibility, no one feels ownership of the problem (respondent 5), which leads to vague and difficult network situations with no real outcomes. European institutions are situated far away from the local problems tackled with Smart City development. The question should be asked whether Europe should even play a role in Smart City development (respondent 5 & respondent 9). The role the European institutions could play is in regulation and standardisation of the Smart City concept (respondent 9). Furthermore, the major role they play in financing, for instance, with Horizon2020, is important (respondent 5 & respondent 8). However, this role could be filled outside the network structure.

The third helix consists of research units. The respondents involved in the EIP-SCC rate research units as important (8.33). Many actors see research units as an extremely important partner to work with because of the innovative knowledge they can share (respondent 5, respondent 8, and respondent 10). For research units themselves, the EIP-SCC can have benefits in the form of contacts with different actors, especially with municipalities and businesses. Furthermore, they can have contacts with other research units throughout Europe, which gives them the benefit of being able to keep up with European development (respondent 4).

All helices are important to be actively involved in the EIP-SCC. Industries and research units are the most important. Within the helix industries, it is important that both large companies and SMEs are present. Democratic government differs, per level, in how important they are. Municipalities are important because of their decision-making power. Provinces are less importance

because of other regional cooperation among others. For the national and European level, mostly their guiding role is wanted.

Table 9. Importance of actors, n = 5

Participation	Actors	Mean	Median
Importance of:	Societal organisations	8.33	8.50
	Business organisations	9.00	9.50
	Research units	8.33	8.50
	Municipalities	9.00	9.50
	Provinces	4.17	3.50
	National government	6.50	7.00
	European institutions	6.83	6.50

Quadruple helix model

In addition to these three helices, another helix can be defined within the model. In Smart City development this helix focuses on the end-user (Arnkil et al., 2010). In this research involvement of the end-user can be found when examining the involvement of societal organisations in the EIP-SCC. Table 9 shows that respondents rate societal organisations as important actors within Smart City networks (8.33). Not in all Smart City networks are all four helixes involved; mostly, a Smart City network focuses on one or two of the four helices. In particular, end-users are often left out (respondent 9). In the EIP-SCC, societal organisations are only a little involved because of the rules that hamper bottom-up initiatives (respondent 4). Therefore, the fourth helix is an important helix, but it is sometimes difficult really involve the fourth helix actors.

Contour conditions

Another addition to the triple helix model is the description of the contour conditions. The two conditions of importance for the development of Smart Cities are knowledge sharing and learning (Lombardi, et al., 2011). Table 10 shows the scores of questions concerning contour conditions. Respondents confirm that there is enough knowledge available in the network (4.00), and they agree that the EIP-SCC has enough possibilities to learn (3.75). However, knowledge is not always shared as freely as possible. There is competition between the different cities as to who is the smartest. Cities want to create profiles different than other cities and want to be unique in their smart city development (respondent 10). The processes of knowledge sharing and learning are negatively affected by this competition.

Another precondition not mentioned in this literature is the financing of Smart City projects. Respondents involved in the EIP-SCC slightly agree with the fact that the EIP-SCC should help finance

Smart City projects (3.50). Financing is a difficult matter. The easiest way for Smart City projects to be funded is by the national government or by European funds. However, the chance to be funded is small (respondent 1), and this funding is only project based, not for future developments (respondent 8), which leads to an unsustainable situation. The use of business cases would improve the sustainability (respondent 8 & respondent 10). Ideally, the costs of investment are shared by everyone who benefits from the investment (respondent 2 & respondent 7). Another way of financing Smart City development is by examining the management funds that are already in place. Smart City development is seen as a luxury; however, it should be a standard for city development (respondent 9). By better use of the money already available for infrastructure and innovations, Smart City development can be financed (respondent 1, respondent 5, and respondent 9). When examining the EIP-SCC specifically, the financing is also difficult. All actors involved in the EIP-SCC are involved voluntarily, even the ones in the roles of Sherpa or High level group (respondent 4). The organisations themselves need to have the finances to attend meetings in Brussels and to begin new Smart City projects. Many the projects in the EIP-SCC are financed with use of Horizon2020. However, when joining the EIP-SCC, it is not evident that European funds are available.

In the interviews, other preconditions for an effective Smart City network came forth. Mostly, a focus was on the willingness of actors to invest time and money in the development of Smart Cities (respondent 5 & respondent 7). When they invest too little in the long-term, no real changes can be made to infrastructure in the city. Another precondition mentioned is that actors need to have the willingness to lead (respondent 5, respondent 8, & respondent 9). Usually, actors within the network focus on governmental actors to take a leading role. This focus is on governmental actors because of the risk of losing resources. Furthermore, actors expect the government to take a lead because this is how it always has worked. It could benefit the network if other actors took on this leading role.

The contour conditions add extra dimensions to the triple helix model. Knowledge sharing and learning are negatively affected by competition between cities. In addition to knowledge sharing and learning, there are other contour conditions not mentioned in the literature. The most important one is financing. Ideally, a business model is set up, where Smart City project costs are shared by all participants. Furthermore, money already spent by the municipalities on infrastructure can be better managed and also used for Smart City developments.

Table 10. Contour conditions, n = 4

Contour conditions	Question	Mean	Median
Knowledge	There is enough knowledge within the EIP-SCC to innovate.	4.00	4.00
	In general, there is enough knowledge on Smart Cities in and outside of the network to innovate.	4.00	4.00
Learning	There are great opportunities to learn within the EIP-SCC	3.75	4.00
Financing	The EIP-SCC should fund Smart City projects	3.50	3.50

Conclusion

The outcomes of this research have some serious limitations, it is important to first view these limitation before concluding anything. The most important limitation is the little respondents in the quantitative part of the research. There are little Dutch organisations really involved in the EIP-SCC, which led to little response. Only 4-6 respondents answered the questions on the EIP-SCC. The respondents concerning the first goal were 12, which is also too few to draw valid conclusion. The qualitative interviews are also more based on people not involved in the EIP-SCC, but more a general view on Smart City networks. To have valid outcomes of the research more respondents are needed. A second limitation is that due to the limited data available no tests could be done on the reliability of the data and the significance of the results found. The generalizability (external validity) of the data is non-existent; the data can only be used in this particular case. The internal validity of the research is also affected by the little response on the questionnaire. However it can be said that the internal validity of this research is still quit high because of the use of mixed method research. By using both qualitative and quantitative methods the weaknesses of both methods are counterbalanced.

This research formulated two main goals in the introduction. These goals were to find out how actors involved in Smart City development assess the conditions for effectiveness and to assess if the conditions for effectiveness as mentioned in the theory are present within the EIP-SCC. In the analysis both of these goals were taken into consideration.

Starting with the first goal in summary the research found that most of the conditions for effectiveness mentioned in the framework are seen as important conditions when assessing the effectiveness of Smart City networks. However there are some interesting outcomes. The different aspects of accountability for instance are not seen as important as the other conditions mentioned. Especially blame shifting and traditional accountability are not important in networks on Smart City development. This could be due to the fact that the networks have not entered the decision-making phase yet, but are still in earlier stages of development. A second interesting finding concerns the position of provinces; they are not seen as important actors within the process. This can also be

found in the second goal of the research. The last interesting finding is based on the contour conditions for the triple helix model. It is interesting that next to knowledge and learning also finances within and outside the network are regarded as an important condition to meet.

Then the focus is on the second goal, the conditions for effectiveness of the EIP-SCC, these are the main findings per condition. The condition legitimacy is definitely present within the network, especially when looking at participation and communication. All actors mentioned are participating in the network. However the involvement of Dutch provinces is low. Furthermore the communication in the network is good, but the different barriers for good communication cannot be confirmed or contradicted to be present. When looking at deliberative decision making it cannot be said if the network focuses rather on problem solving than on bargaining. This could be due to the fact that the network is still in a developmental phase or that the network could be defined as knowledge network rather than cooperation network.

The second condition is accountability. This condition is not fully present within the EIP-SCC. The EIP-SCC is a transparent network; however actors do not always have a clear view on their own role within the network. Furthermore in the EIP-SCC there will always be information asymmetry due to the complex characteristics of Smart City development. Blame shifting is not an issue yet, the process has not yet entered the decision making stage. Furthermore traditional accountability cannot always be seen within the network. However it is interesting that the most difficult strand to involve in the new forms of governance, namely the involvement of the electorate, is sufficient according to the EIP-SCC actors.

Lastly the condition triple helix is assessed; this condition is definitely present within the network. All helices are important including the involvement of a fourth helix, namely societal organisations. The involvement of this fourth helix in the EIP-SCC is sometimes difficult because of rules that hamper bottom-up initiatives. The contour conditions knowledge sharing and learning are important in the EIP-SCC. Furthermore other conditions are also formulated, with finances as the most important one.

In summary it can be stated that the conditions legitimacy and triple helix are present in the EIP-SCC in the stage the network is in now. The condition accountability is not present yet, but maybe it becomes important when the network enters a different stage of the decision making process.

This research is concluded with some ideas for further research. One of the main findings of this research is that it is very early to do research on effectiveness of Smart City networks, because the networks are still in a developing stage. Therefore it is recommended to do research once more when the networks have entered the decision making phase. Another recommendation when the networks have entered the decision making phase is to look at theory concerning trust in innovation networks. In earlier stages of the research the framework also included theoretical ideas on trust

within innovation networks. However it became clear that it was too early to include these theoretical ideas in this study on conditions for effectiveness. When the networks are in a later stage these theoretical ideas may be relevant once more. The last recommendation is to do research on more Smart City networks. Within Smart City development there are a lot of different networks created to bring together actors on different levels. In this research the EIP-SCC is looked at, which operates at an international level. It is also interesting to look at networks on a national and regional level.

End-note

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Appendix

Cronbach's alpha

The Cronbach's alpha of the questionnaire is not to be calculated, because there are too little respondents in the questionnaire. This is a problem with the alphas of all different aspects. However in this part the Cronbach's alphas are calculated to show how these invalid outcomes look. In table 11 the results are shown.

The Cronbach's alpha of the questionnaire of the respondent assessing the conditions for effectiveness is 0.951. This alpha is very high, which indicated high reliability. The aspect legitimacy with its subscales and the aspect triple helix with its subscales are all very reliable. Only accountability is not reliable. Even with deletion of different items it is hard to get the reliability above 0.6. With deletion of items the content of the measurements is affected. And therefore it is never a good choice to delete too much items. Conclusion is that accountability is not measured in a reliable way.

For the second goal of this research the overall alpha could not be calculated. In table 11 the alphas of the different subscales are provided. Only the subscales 'deliberative decision making', 'communication', 'participation in helices', and 'contour conditions' are reliable. Especially the aspect accountability was hard to measures. The negative outcomes in these tests can partly be explained by the recoding of some items. When these items were recoded, they did not fit in with the other items. This can be a case of response set.

Table 1: Cronbach's alpha

Aspect	Cronbach's alpha first goal	Cronbach's alpha second goal
Legitimacy	0.923	0.337
Participation	-	*
Deliberative decision making	0.792	0.830
Communication	0.898	0.671
Accountability	0.500	0.224
Transparency	-	*
Blame shifting	-	0.583
Traditional vs new governance	-	*
Triple Helix	0.868	**
Participation in helices(+quadruple)	0.868	0.921
Contour conditions	0.920	0.800

* These subscales had a negative covariance between the items and therefore the reliability cannot be measured

** Triple helix could not be measured, because the amount of respondents was too low

- There was no measurement for these subscales for the first goal. With participation the presence in the EIP-SCC is measured. For the different subscales of accountability reliability is not measured, because these subscales only consisted of two questions each.