

# eParticipation in climate change adaptation

An investigation into the role of eParticipation in local climate  
change adaptation



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Master's Thesis

MSc. Sustainable Development – Earth System Governance

Utrecht University, Faculty of Geosciences

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## **Colophon**

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## Abstract

Cities in Europe and around the world are facing significant risks from climate change, causing problems to their populations, communities and infrastructure. There is a consensus that some part of climate change is already irreversible, even if global greenhouse gas emission would be substantially reduced today. Therefore, cities are increasingly adopting strategies to cope with the anticipated effects of a changing climate. At the local level, planning at all spatial scales, from the metropolitan to the neighbourhood, has premised to some degree on the presumption that public participation and community engagement are key ingredients of success. With the current advancement Information and Communication Technologies (ICTs), new possibilities have emerged to scale up such participation efforts and engage citizens in decision-making processes in new ways. This type of ICT-facilitated public participation is called eParticipation. Though eParticipation may have great potential to transform public participation in the field of climate change adaptation, till date, there have not yet been investigations into the role that ICTs play in this area. This thesis sets out to fill this gap through the answering of the following research question: *What is the role of eParticipation in climate change adaptation governance in cities and under what conditions can successful eParticipation be achieved?*

A review of the literature revealed that eParticipation design could be described based on five characteristics: *targets, levels, target groups, timing, and instruments*. Besides, 12 factors, divided into three categories – technological, administrative/organizational, and contextual, were identified that influence the degree of eParticipation adoption by municipal entities. The literature review also revealed 23 success factors for eParticipation initiative design.

In order to explore eParticipation and the required underlying conditions for its successful manifestation, a qualitative multiple case study methodology was employed. The municipalities of Groningen and Zwolle have been selected for further in-depth investigation. The first part of the research question is answered through a combination of interviews with municipal practitioners and document analysis. The second part of the research question is answered by employing a survey to gain insight into how a broader group of municipal practitioners rate the importance of the 23 success factors identified in the literature.

The analysis shows that that currently, in the municipalities Groningen and Zwolle, eParticipation in the field of climate change adaptation is predominantly limited to the

informing and consulting levels of participation. However, although still in the initial phase, examples of ICT-facilitated deliberation activities in the field of climate adaptation have been observed in both municipalities. The most important factors that influence eParticipation adoption were found to be political will and support, leadership, employee training, sufficient funding options, the municipalities' ability to capitalize on already existing software and externally-induced windows of opportunities, such as the current COVID-19 crisis. Results from the survey indicate that for eParticipation initiatives to be successful, it is essential that its design is revolved around its target groups. The importance is highlighted of designing online participation in climate adaptation in such a way that it generates value for citizens, meets user needs and expectations, is fully inclusive and guarantees user privacy. Other, but somewhat less, important factors include drafting clear and realistic goals, appropriately coordinating new initiatives with the organization structure, and ensuring political will and commitment.

## Acknowledgements

Writing this thesis during the unfolding of a new reality in light of the COVID-19 outbreak has been challenging, occasionally difficult, but mostly inspiring. In a time where most social contact takes place online, the relevance of digital participation has become all the more apparent.

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Boy Luiks  
Purmerend, June 2020

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# 1. Introduction

## 1.1 Introduction to the sustainability issue

Cities in Europe and around the world are facing significant risks from climate change, causing problems to their populations, communities and infrastructure (IPCC, 2018; Araos et al., 2016). These vary from increased exposures to flood, extreme precipitation, and discomfort due to urban heat, depending on their geographical locations and settings. According to the IPCC (2012), climate modelling projects more frequent, more prolonged and more intense heatwaves or warm spells and more frequent warm days and nights, occurring in all parts of Europe but with the most considerable increase in Southern and Central Europe. Concerning extremes in precipitation, more frequent events of high precipitation and fewer events of moderate or low precipitation are expected across Europe with drier conditions in the South and wetter in the North. Furthermore, an increase of extreme coastal events from sea-level rise (SLR) and flash floods are expected to affect several European cities. The Netherlands is also susceptible to climate change risks, especially to water-related risks, given large parts of the country lie below sea level and its location in a river delta. Climate risks in the Netherlands are expected to be manifold, ranging from less likely events with significant consequences such as flooding due to primary dyke failure to more frequent events with more limited consequences such as railway and road transport disruptions due to heat (Ligtvoet et al., 2015; KNMI, 2015).

There is a consensus that some part of climate change is already irreversible, even if global greenhouse gas emission would be substantially reduced today. Therefore, cities are increasingly adopting strategies to cope with the anticipated effects of a changing climate. The Intergovernmental Panel on Climate Change defines climate change adaptation as: “adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2007, p.6). Climate change adaptation involves intervention in our physical environment, with a particular role reserved for spatial planning at the local scale (Biesbroek, Swart and Knaap, 2009). Furthermore, empirical evidence suggests that adaptation is highly context-specific and that socioeconomic characteristics, social networks, local knowledge, and non-climatic pressure all play critical roles in shaping adaptation measures (Ford and Berrang-ford, 2011). Given these characteristics of climate change adaptation, as well because of a more general tendency towards more democratic decision-making, there has been a growing recognition of the need of greater public participation in the field of climate adaptation. This has indeed been

prominently displayed in several major policy documents that are concerned with the development of adaptive responses to climate change. For instance, Article 6 of the 1992 United Nations Framework Convention on Climate Change calls for Parties to promote and facilitate ‘public participation in addressing climate change and its effects and developing adequate responses’ (UNFCCC, 1992, p.10). In the Third Assessment Report of the Intergovernmental Panel on Climate Change, the conditions listed for enhancing adaptive capacity include ‘active participation by concerned parties, especially to ensure that actions match local needs and resources’ (Smit *et al.*, 2001, p.899). Besides, public participation forms are a critical component of the United Nations Development Program (UNDP) guidelines for Climate Change ‘Adaptation Policy Frameworks’, emphasizing stakeholder engagement at all levels (Lim and Spanger-siegfried, 2004).

At the local level, planning at all spatial scales, from the metropolitan to the neighbourhood, has premised to some degree on the presumption that public participation and community engagement are key ingredients of success. Involving the public is expected to make climate adaptations more relevant and better suited to local needs and conditions, while also increasing the legitimacy of selected adaptation measures and enhancing democratic governance in general (Schroter, Polsky and Patt, 2005; Sarzynski, 2015; Wamsler, 2017). On top of that, greater participation and engagement is also believed to offer benefits to those citizens who choose (or are chosen to) participate (Burton and Nalau, 2016). Hence, it is argued that climate change adaptation would benefit from public participation by citizens in the different stages of the adaptation planning process, from decision-making to implementation and maintenance (Sarzynski, 2015).

## **1.2 Problem definition and knowledge gap**

Traditionally, public participation has been realised through public meetings of which the public and interested parties are priority notified via public notices. These face-to-face contacts have long been considered the most effective participatory approach. However, spatiotemporal constraints are often presented as a significant factor that affects the value of such public contributions. Distance factors, as well as conflicting schedules, can prevent some interested groups or individuals from participating in public meetings, limiting their effectiveness. However, with the advancement of information technology, especially the World Wide Web and Information and Communication Technologies (ICTs), new possibilities have emerged to engage citizens in decision-making processes and scaling up participation efforts (Macintosh,

2004). This new type of ICT-facilitated public participation is called eParticipation, which can be defined as “the use of information and communication to engage citizens, support the democratic decision-making processes and strengthen representative democracy” (Macintosh and Whyte, 2006, p.2). In this new eParticipation paradigm, several tools and models are employed to create electronic variants equivalent to traditional participation activities. For instance, voice conference, e-newsletter, emails, online polling and feedback, video chatting, online notification, and online discussion forums are new forms of public meetings, neighbourhood notification, fax, opinion surveys, awareness campaigns, telephone interviews, among others. This development has reached an even further push with the widespread evolution and adoption of Web 2.0 tools such as wiki, blogging, and social media.

Though eParticipation may have great potential to transform public participation in the field of climate change adaptation, till date, there have not yet been investigations into the role that ICTs play in this area. Although some advancements have been made in the fields of urban planning (Damurski, 2012; Bugs et al., 2010) and urban water governance (Mukhtarov, Dieperink and Driessen, 2018), there is still limited existing literature and empirical evidence on how public engagement and participation in climate change adaptation can be achieved in practice through online tools and Web 2.0. Furthermore, as previous studies on eParticipation point out, the emerging adoption of ICTs by governments can be very disruptive, but initiatives often fail to deliver the expected outcomes (Toots, 2019). As a result, a plethora of studies is concerned with the factors that drive the adoption of eParticipation at the user-side (Naranjo Zolotov, Oliveira and Casteleyn, 2018). Limited research, however, has focused on factors to account for successful eParticipation at the supply-side. To fill these gaps and explore the potential of eParticipation in climate change adaptation governance, this thesis sets out to provide an in-depth investigation into the role that eParticipation plays in local climate adaptation in the Netherlands and what factors account for its successful manifestation.

### **1.3 Research Framework**

The research objective is to explore the potential of eParticipation in the field of climate change adaptation. More specifically, this research is concerned with the conditions under which successful eParticipation can be achieved in this domain. The main research question is: *What is the role of eParticipation in climate change adaptation governance in cities and under what conditions can successful eParticipation be achieved?*

Given that both eParticipation and climate change adaptation are relatively new and emerging themes, manifestations of online public participation are not expected to be frequent in this field. For this reason, this research is not of evaluative nature. However, it instead sets out to describe the factors that account for the degree of adoption of eParticipation by local governments, as well as for the successful design of eParticipation initiatives, both prerequisites for the successful outcome of eParticipation endeavours.

In order to answer the main research question, as a first step, a literature review of public participation, eGovernment, and eParticipation theory will be conducted. This results in an analytical framework containing the possible types of eParticipation initiatives and factors (drivers and enablers) underlying the degree of adoption and successful design of such initiatives. Then, for two Dutch municipalities (case selection procedure is explained in the next section) the role and design of eParticipation in climate change adaptation are assessed as well as the factors that account for the degree of adoption by these governments. After that, given the expectations that eParticipation in the field of climate adaptation is still in its infancy, the success factors for its design will be presented to municipal practitioners of multiple Dutch municipalities utilizing a survey to gain insight in what they perceive to be important factors for success when setting up eParticipation initiatives. The research steps are depicted in Figure 1 below.

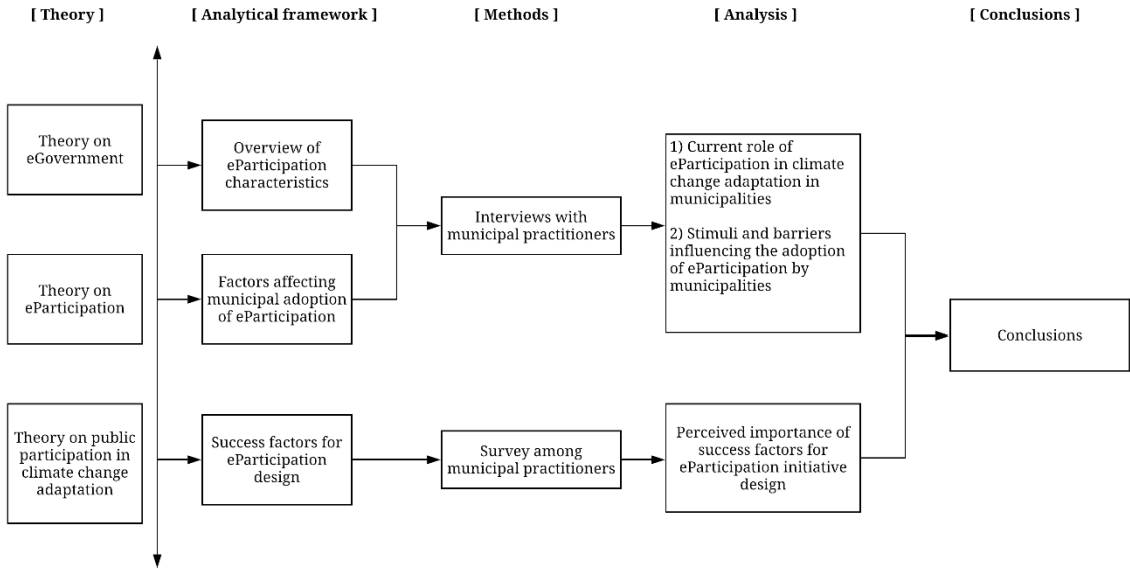


Figure 1: Research Framework

To aid in successfully conducting the research based on these steps, the main research question is accompanied by six sub-questions. Answering these questions will result in the answer to the main research question. The sub-questions are as follows:

1. What are the characteristics of eParticipation?
2. Which factors are responsible for the extent to which local authorities are involved in eParticipation?
3. What factors contribute to the successfulness of eParticipation according to the literature?
4. How does eParticipation in the field of climate adaptation manifest itself in Dutch municipalities?
5. What are the contributing factors and barriers to eParticipation adoption by Dutch municipalities?
6. What are the contributing factors to the successful design of eParticipation initiatives in climate adaptation governance in Dutch municipalities?

#### **1.4 Thesis outline**

Having introduced the knowledge gaps and resulting research goal and questions, this thesis continues as follows: Chapter 2 discusses the literature on public participation and eParticipation specifically. This results in an analytical framework that summarises what is theoretically known about eParticipation and what will be empirically investigated. In this chapter, the first three sub-questions are answered. Subsequently, chapter 3 presents the methodology applied in this research and elaborates on the case study selection. Chapter 4 provides a brief introduction to climate change adaptation in the Netherlands, which contributes to putting the results into context. The empirical results are presented in chapters 5, 6, and 7. Chapters 5 and 6 systematically presents the results of the two case studies, where chapter 7 presents the results of the survey. Finally, chapter 8 concludes this research in two sections. First, section 8.1 answers the central research question. Thereafter section 8.2 discusses the finding of the research in relation to existing literature, reflects on the research approach, and provides suggestions for future research.

It is important to note that to increase the readability of the thesis often-used concepts that comprise of multiple terms were often indicated with single or double terms. For example, the following terms were frequently used interchangeably: [climate change adaptation] – [climate adaptation – [adaptation] and [municipal practitioner] – [practitioner]. Also, the terms [eParticipation], [online participation] and [digital participation] are considered the same and therefore used interchangeably.

## **2. Theoretical Framework**

### **2.1 Introduction**

In this chapter, the theories, models and key concepts relevant to this research project will be discussed and defined. The aim of this chapter is to provide a theoretical basis regarding what precisely eParticipation initiatives entail and what factors may contribute to the successful manifestation of such endeavours. By doing so, an analytical framework will be drafted that summarises what is theoretically known about eParticipation and what will be empirically investigated in the cases. The analytical framework also assists in the development of indicators, while pinpointing what data to collect, and what to look for in data analysis.

Scientific literature was used as a source, which was found using scientific literature databases Scopus and Google Scholar and the Web (Google). To aid in the search for relevant literature, various keywords were used, as well as various search techniques such as the use of Boolean operators, inclusion/exclusion criteria, and the tracking of references and citations.

The inquiry is guided by the answering of the first three sub-questions. To begin with, the concept of public participation will be discussed, including its manifestation in climate change adaptation practice. In doing so, the potential of public participation to improve climate change adaptation governance will be reflected. Then, the concept of eParticipation is analysed to gain insight into the characteristics of digital public participation practices. Thereafter, eGovernance and co-production literature is examined that identifies success factors for eParticipation initiatives. Lastly, as described before, these aforementioned steps will serve as input for the analytical framework that will guide the empirical part of this research. This analytical framework will be presented in the last section of this chapter.

### **2.2 Public participation**

Since the 1960s public participation has been the main instrument to democratize, legitimate and enhance the quality of the policymaking. However, a glance at the literature on public participation makes it evident that there is no unambiguous approach to the concept at hand. Public participation has been alternatively termed and is sometimes used interchangeably with 'citizen participation', 'stakeholder engagement', 'stakeholder involvement', 'community engagement', or 'civic engagement'. As such, the concept is not consistently conceived or

defined. Generally, participation is the idea that citizens should have a voice in the decision-making process. Such participation can take many forms, from community meetings to citizen advisory committees, administrative law and, more recently, the idea of citizens as customers. Whatever the form, though, the idea of participation rests always on a sharing of power between the governed and the government.

In her famous and often-cited article ‘A Ladder of Citizen Participation’, Arnstein (1969) made a substantive contribution to the conceptual clarity regarding participation. According to Arnstein (1969), citizen participation refers to the redistribution of power from the authority to the citizen. She categorises the level of authority according to eight types of participation that can be presented as a ladder (see Figure 2): (i) manipulation, (ii) therapy, (iii) informing, (iv) consultation, (v) placation, (vi) partnership, (vii) delegated power, and (viii) citizen control. These eight steps are grouped into three categories. The first two steps correspond to the non-participation, which main objective consists in enabling power holders to educate the participants. The rungs 3, 4 and 5 represent degrees of tokenism and allow citizens to hear and to be heard, however without any power to ensure that their views will be taken into consideration. The last three steps of the ladder correspond to the degrees of citizen power, allowing citizens to exercise their power through a public-authority partnership democratically.

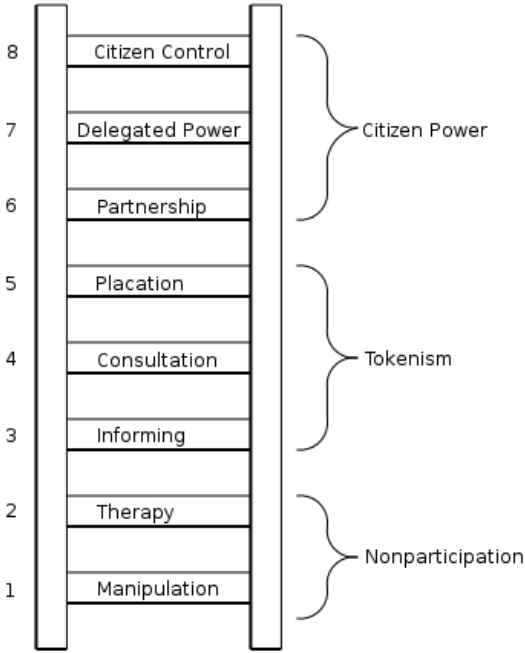


Figure 2: Ladder of Citizen Participation (source: Arnstein, 1969)



Arnstein's ladder has been adopted and modified widely. In 2001, the OECD introduced another classification of government-citizen relations that incorporates the following levels of participation: *information*, *consultation* and *active participation*. Information is a one-way relationship in which information essentially flows in one direction from the government to citizens. Consultation is a limited two-way relationship between government and citizens, in which citizens provide feedback on policy-making as requested by the government. Active participation is an advanced two-way relationship where government and citizens are partners in decision-making, but where the responsibility for final decisions stays at the governmental level. Six years later, the International Association for Public Participation (IA2P) further specified the level of active participation by dividing it into three levels: *involve*, *collaborate* and *empower* (Table 1). Involve constitutes working directly with the public to ensure that public concerns and aspirations are consistently understood and considered. Collaborate represents government partnering with citizens in each aspect of the decision, including the development of alternatives and the identification of the preferred solution. Empower is to place the final decision-making in the hands of the public (IA2P, 2007).

**Table 1:** Spectrum of Public Participation (source: IA2P, 2007)

<b>Level of public participation</b>	<b>Objective</b>	<b>Promise to the public</b>
Inform	To provide the public with balanced and objective information to assist it in understanding the problem, alternatives, opportunities and/or solutions.	We will keep you informed.
Consult	To obtain public feedback on analysis, alternatives, and/or decisions.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision
Involve	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.

Collaborate	To partner with the public in each aspect of the decision, including the development of alternatives and the identification of the preferred solution.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
Empower	To place final decision-making in the hands of the public.	We will implement what you decide.

Going up the levels of public participation, in both the *Ladder of Citizen Participation* and the other two classifications, the level of authority and the role of the citizen gradually changes. In the stage of non-participation, which has no equivalent in the OECD and IA2P classifications, citizens are merely consumers of public decisions without any right to be heard and exercise power over decisions-making. The levels of tokenism (information and consultation in the other two classifications) represent citizens taking on the role of passive agents who are being informed and consulted but do not have any decision-making power. At the degrees of citizen power (active participation in the OECD classification, and involvement, collaboration and empowerment in the IA2P classification) an actual control of the decision-making process is held, at least partly, by citizens themselves. Here, citizens are considered active agents in the decision-making process that is enabled with advanced two-way mechanisms of information flow.

**2.2.1 Rationale for public participation**

Many scholars have articulated in literature the ways in which public participation can add benefit to environmental governance and democracy in general. These arguments for public participation are commonly centred on its positive contribution to governance outcomes, as well as its benefits to the process itself. Multiple researchers distinguish between three rationales for public participation: instrumental, substantive, and normative (Wesselink and Paavola, 2011; Glucker et al., 2013). The instrumental rationale is about the ability of public participation to facilitate project implementation by generating legitimacy and contributing to the identification and resolution of conflict. The substantive rationale is about the potential of public participation to improve the quality of decision-making output. It is about increasing the breadth and depth of information available to decision-makers, which in turn can help

them to make more informed decisions. Public participation can provide decision-makers with additional relevant local, experimental, and value-based knowledge, and the ability to test the robustness of information they have already obtained from other sources. The normative rationale is about democratic ideals favouring maximum participation. It argues that public participation is imperative in order to enable those that are affected by a decision to influence that decision. In addition, it can improve people's democratic capacity, induce social learning, and empower former marginalized individuals and groups to exercise active citizenship.

While generally desired, there are also voices that call into question the effectiveness of public participation in environmental governance (Wamsler et al., 2020; Newig and Fritsch, 2009; Irvin and Stansbury, 2004; Bulkeley and Mol, 2003). They do not by definition question the relevance of public participation but point to the current structural conditions, such as lack of organizational flexibility and support, that lead to punctual, isolated and often counterproductive participation efforts (Mees et al., 2019; Wamsler et al., 2020). Understanding of these conditions remains vital if we are to avoid ineffective environmental policy outcomes and improve current approaches to democratic governance. This is especially true since some form of public participation is inevitable given legal requirements, while decision over future land use inherent to climate adaptation must seek legitimacy through a certain level of social acceptance among the public (Burton and Mustelin, 2013).

### **2.2.2 Participation in climate change adaptation policy**

The importance of public participation in the formulation of adaptive responses to climate change has been explicit, if not always prominent, in several major policy documents on climate change. Article 6 of the 1992 United National Framework Conventions on Climate Change outlines the Parties' responsibilities to 'promote and facilitate public participation in addressing climate change and its effects and developing adequate responses' (UNFCCC, 1992, p.10). In the Third Assessment Report of the Intergovernmental Panel on Climate Change the requirements for the enhancement of adaptive capacity are listed, which includes the 'active participation by concerned parties, especially to ensure that actions match local needs and resources' (Smit et al., 2001). Also, participation plays a crucial role in the 'Adaptation Policy Frameworks' for the formulation of climate change adaptation strategies produced by the United National Development Programme. It is stated that 'stakeholder involvement, at different levels and stage, is crucial to the success of an adaptation project' (Lim and Spanger-

siegfried, 2004, p. 25). Furthermore, Public participation is also a core element of the 'Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters' of the United Nations Economic Commission for Europe, signed by European member nations in Aarhus, Denmark in 1998. At the local level, the relevance of participation is articulated in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, stating that the 'long-term effectiveness of local adaptation hinges on the inclusion of all stakeholders' (Barros *et al.*, 2014, p. 1473). Theoretically, participation at the local level, and particularly for cities, is embedded in 'good urban governance for climate change adaptation', which is characterized by '(1) decentralisation and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support' (Tanner *et al.*, 2009, p.9-11).

Public participation has been widely discussed in the academic literature on environmental planning (Few, Brown and Tompkins, 2007; Burton and Mustelin, 2013; Sarzynski, 2015; Glucker *et al.*, 2013). There is general agreement that public participation, certainly in environmental decision-making, is beneficial. Years of literature stresses multiple ways in which public participation could benefit the decision-making process, e.g. in establishing acceptance of and support for decisions (Runhaar, 2009; Petts, 2003), increasing procedural justice (Rayner and Cantor, 1987), collecting local knowledge and expertise (Stewart and Sinclair, 2007; Lieske, Mullen and Hamerlinck, 2009), or inducing social learning (Webler, Kastenholz and Renn, 1995; Fitzpatrick and Sinclair, 2003).

It is recognized that participation can be especially instrumental for realising climate change adaptation initiatives, given the spatial nature of such interventions. Adapting to climate change requires intervention in public space and thus, the immediate living environment of citizens. Such interventions can be radical in design or require assistance from the public for maintenance (Uittenbroek *et al.*, 2019). Involving the public in such instances can be fruitful, as they might possess local expertise on the impacts of climate change as well as the use of public space. However, because a great part of the land in cities is private property, measures taken solely by local governments in the public space might not be sufficient for the expected to climate change related impacts. Therefore, the active involvement of citizens in adapting cities to climate change is imperative, whether this is by stimulating them to adapt their own properties (private space) or making sure that they do not contribute to maladaptation in public spheres.

## 2.3 eParticipation

### 2.3.1 Introduction

The active use of ICTs and the Internet has given rise to a new form of public participation, called eParticipation. It is widely recognised that ICT, and especially internet-based ones, have the potential to support and enhance public participation in government decision-making and public policy-making. The OECD defines eParticipation as “ICT-supported participation in processes involved in government and policy-making” (p.). It is seen as “the extension and transformation of participation in societal democratic a consultative processes mediated by information and communication technologies (ICTs), primarily the Internet” (Sæbø, Rose and Skiftenes, 2008, p. 400-40). Ideally, eParticipation involves technology-mediated interaction between civil society on the one hand and formal politics, and the public administration, on the other hand. According to Sæbø, Rose and Skiftenes (2008), this can either be government-driven participation, where eParticipation is the responsibility of the government, and it is also primarily enacted by governmental entities and citizen-driven participation which means that the online participation is initiated by citizens. In this direction, Macintosh and Whyte (2006) suggest that eParticipation concerns the use of ICT for supporting either the provision of information and the ‘top-down’ engagement of citizens, e.g., via initiatives promoted by the government, or ‘ground-up’ efforts that enable citizens, organisations of civil society and other democratically established groups to convey their needs and opinions to elected representatives, so that they can act as ‘producers’, rather than just consumers, of policy.

As a sub-field of participation, eParticipation is seen as necessary both for intrinsic reasons and for instrumental reasons. Intrinsic reasons are based on the idea that participation (online or offline) is a desirable goal, which contributes to inclusive societies both directly and through increased civic engagement. Instrumental reasons focus on the role that eParticipation mechanisms can play in increasing government accountability, making public services more responsive to citizens’ needs, and improving the quality of policies and legislation. Broader goals include strengthening the legitimacy of governments and citizens’ trust in public institutions. In addition, eParticipation is also analysed from a technology viewpoint as a way to enhance digital governance, for example, for smart cities, and move towards digital societies.

eParticipation activities are not new, but rather an evolution of many already existing public participation activities. This evolution sparked a debate about whether this new digital form of

participation is merely an extension of the conventional participation methods or if it is able to produce actual new forms of participation. Gibson and Cantijoch (2013) state that online participation cannot be conceived as a new and independent mode but that it links and blends with existing forms. In line with this, Pina, Torres and Royo (2017) concluded that integrating eParticipation with traditional offline tools for citizen participation is required to produce effective participation efforts. Nevertheless, literature also points to several opportunities and potential added value to the role of ICTs in stimulating public participation. Overall, it can be stated that online participation is easier, faster, more convenient and cheaper. By using the Internet users can both easily send and receive information. It enables a wide range of users to access, store, transfer, manage and disseminate huge amounts of information, and has the potential to reach large audiences given it merely requires having access to the Internet. Next to providing a platform for information exchange, the Internet has the potential to function as a communication platform or virtual public sphere for discussion (Polat, 2005). The main perceived advantage of online participation is its potential to motivate and engage a broader and more inclusive audience. In modern society, people have less predictable time schedules, experience having less free time, while many actors are competing intently for our attention through the media. eParticipation is location and time-independent. This means that citizens are not bound to a specific location and time to join a participation process, but can do so from wherever they want, whenever they want (for the duration of the process). This substantially lowers the threshold of participating. Moreover, according to Macintosh (2008), other main advantages of the use of ICTs in democratic decision making processes include: (i) providing citizens with diverse technical and communicative skills; (ii) providing relevant information in a format that is both accessible and understandable to the target audience and that enables informed contributions; (iii) enhancing engagement with a broad audience to enable profound contributions and support deliberations, and (iv) enabling more effective analysis of unstructured information provided by citizens. Furthermore, some argue having more time to think and anonymity within online political discussion may be liberating for some people in articulating their views, thereby leading to a more genuine exchange of ideas (Polat, 2005). ICT also has the ability to attract new participation by citizens who are not yet represented in the current political system. This includes citizens who are geographically dispersed and those who cannot get about easily (disabled, single mothers). Also, eParticipation is expected to serve to attract more young people into political decision-making. However, it should be noted that the extent to which eParticipation can be inclusive is highly dependent on access to technology and one's individual skills in using it. Citizens that are less digitally and

technologically savvy, such as the elderly or those who cannot afford a smartphone, may lose out and actually risk of becoming less well represented in decision-making processes (He et al., 2017). This implies that when designing participation processes, it should be borne in mind that choosing a particular strategy (offline or online) has a direct impact on which sections of the population can more easily participate.

### 2.3.2 eParticipation design

eParticipation has been subject to various conceptualizations. Many of these are limited to capturing eParticipation in legislation and policy formation and does not include contextual factors that may influence the design, form and success of eParticipation initiatives. As discussed before, in the field of climate change adaptation, the involvement of the public is not merely reduced to the drafting of governmental policies and programs. It includes modifications to the built environment, the stimulation of citizens to alter their own properties, and household preparation and evacuation planning. Here, on the basis of a literature review, an integrated framework is drawn up that covers the various characteristics of eParticipation initiatives. The framework is shaped on the basis of five characteristics that describe the design of participatory processes as identified by Dietz and Stern (2008) 'goals' (why), 'influence' (what), 'breadth' (who), 'openness' (when), and 'intensity' (how).

#### Why: eParticipation targets

In order to be able to capture the goals and reason why a particular eParticipation initiative is initiated I draw upon the work done by Wirtz, Daiser and Binkowska (2018), who identified six key targets of eParticipation: (1) increase overall participation, (2) enhance information provision, (3) improve quality of public policies, (4) strengthen public trust, (5) improve and share responsibility for policymaking, and (6) raise public awareness and understanding for policy issues.

The overall increase of participation in the decision-making process is a frequently named target of eParticipation initiatives (Macintosh, 2004; Bataineh and Abu-Shanab, 2016). This is about both increasing the opportunities to participate as well as lowering the entry threshold by facilitating access through the use of ICT. As discussed before, eParticipation has the potential to activate more people to participate due to the ease of use and its location and time-independent character. Another target of eParticipation is the enhancement of information provision. This is not only about increasing the quantity but also the quality of

available information. eParticipation can be used to disseminate more information more effectively and get it to the right people in a time and cost-efficient way. eParticipation initiatives also aim to improve the quality of public policies. It is expected that drawing upon valuable input and expertise of stakeholders has the opportunity to increase the quality of public policies. In turn, higher quality of policies is expected to strengthen citizen acceptance, leading to a more efficient implementation of policies and projects. Another target of eParticipation initiatives is the strengthening of public trust in governments and public administrations. For quite some time, modern democracies have been facing a trend of declining confidence in politics and key public institutions. eParticipation can be an effective channel for enhancing trust in government through government accountability and the empowerment of its citizens. The provision of more information in a timelier fashion is expected to increase the transparency of governments and empower citizens to monitor government performance more closely. The last two targets of eParticipation are to improve and share the responsibility of policymaking and to raise awareness and understanding of policy issues.

#### [What: eParticipation levels](#)

Work in the field of eParticipation draws on the here before discussed, and widely cited categorization of public participation developed by the International Association of Public Participation (IAP2). The Spectrum of Public Participation is a widely-accepted, sophisticated spectrum that captures five levels of interaction between the government and the public. It helps to clarify the role of the public in planning and decision-making, and how much influence the community has over planning or decision-making processes. The five levels are: (1) inform – providing the public with objective and balanced information to assist them in understanding problems and solutions, (2) consult – obtaining public feedback and expertise, (3) involve - considering public concerns and aspirations by working directly with the public, (4) collaborate – partnering with the public in each aspect of the decision-making process, and (5) empower – putting the final decision-making in the hands of the public (IAP2, 2007). Taking into account IAP2's classification of public participation, Tambouris, Liotas and Tarabanis (2007) transferred it to the electronic dimension, resulting in e-informing, e-consulting, e-involving, e-collaborating, and e-empowering levels of eParticipation. E-informing is a form of one-way communication that provides citizens with online information concerning policies, projects, and citizenship. E-consulting is a limited two-way channel that has the objective of collecting public feedback and alternatives. E-involving is about working



online with the public throughout a process to ensure that public concerns are understood and taken into consideration. E-collaborating is a more enhanced two-way communication between the government and citizens, and a full partnership that enables citizens to actively participate in the development of alternatives and the identification of preferred solutions. E-empowering is about using technology to empower citizens and support active participation and facilitate bottom-up ideas to influence the political agenda.

Similar to public participation, when going up the eParticipation levels, the citizen’s role changes from the information consumer to the active decision-maker. Besides, the purpose of the ICTs’ use is also changing: (i) in the e-informing stage ICTs are used to obtain information concerning policy-making initiatives promoted by the government; (ii) in the e-consulting stage ICTs allow citizens’ opinions collection on the topic(s) defined by a government authority; and finally (iii) in the higher eParticipation levels; e-involving, e-collaborating and e-empowerment ICTs support citizens in their willingness to collaborate with the government (G2C and C2G) and between one another (citizen to citizen – C2C). In Table 2 below the five levels of eParticipation are summarised along with their objectives and promise governments make to the public.

**Table 2:** Levels of eParticipation (based on IAP2, 2007)

Level of public eParticipation	Objective	Promise to public
E-informing	To provide the public with balanced and objective information to assist it in understanding the problem, alternatives, opportunities and/or solutions.	We will keep you informed.
E-consulting	To obtain public feedback on analysis, alternatives, and/or decisions.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision
E-involving	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and

		provide feedback on how public input influenced the decision.
E-collaborating	To partner with the public in each aspect of the decision, including the development of alternatives and the identification of the preferred solution.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
E-empowering	To place final decision-making in the hands of the public.	We will implement what you decide.

[Who: eParticipation target groups](#)

The characteristic eParticipation target groups has to do with everyone that is directly involved in and addressed by eParticipation initiatives. Who should be engaged during public participation endeavours is a question that has been subject to substantive discussion. The question that is often asked is whether public participation implies the participation of everybody or only ‘stakeholders’ who are believed to represent ‘the public’. Among those scholars who address this question, there seems to be a broad consensus that ‘the public’ refers to anyone interested in or affected by a decision. For instance, Burton (2004) states that ‘everyone affected by a decision’ has the right and should be able to participate in public decision-making’ (p.194). Doelle and Sinclair (2006) go further than that by stating that the public should be defined broadly to make sure not to “eliminate parties who could not possibly contribute constructively to the public process. Anyone who may have something to contribute must be permitted to participate” (p.196). In line with this, Dietz and Stern (2008) that by stating that participants could be anyone, aside from the decision-makers invested with legal authority to make public decisions, who may have an interest in the decision-making process. Here, they suggest making a distinction between different segments of the public: ‘the general public’ and ‘stakeholders’. The former refers to the broader collective of individuals who are not directly affected by a decision but may have some interest in it. The latter involves “organized groups that are or will be affected by or that have a strong interest in the outcome of a decision” (Diets and Stern, 2008, p.15). Ultimately, who participates may be evaluated by the ‘breadth’ of participation, ranging from narrow (decision-makers only; decision-makers plus expert advisors) to moderate (including the directly-affected public) to broad (including any interested parties).

Participants in eParticipation initiatives can thus be manifold. To conceptually divide between various participants I follow the categorization of the e-government value activity system model, which classifies them into citizens, private organizations, and public organizations (Wirtz and Daitzer, 2015, as cited in Wirtz, Daiser and Binkowska 2018). To this, I add ‘non-citizens’, since a person that is not an inhabitant of a particular city should not per definition be excluded from a city’s participation process as they also might offer valuable contributions. Thus, participants might be private citizens (or their agents), corporate or non-profit sector employees (or their agents), public-sector employees (or their agents) without a direct role in decision-making, or non-citizens (or their agents). Which people are addressed by certain eParticipation initiatives strongly relates to the objectives of these initiatives as the primary purpose of an initiative is to raise public awareness, as many people as possible should be involved. If an initiative is primarily aimed at improving the quality of public policies, it is sufficient to involve people with relevant knowledge and expertise. However, it is rather challenging to determine who these people are, and even more challenging, which people do not possess such relevant knowledge and expertise. What is clear is that since people are the primary focus of eParticipation initiatives, the success of these initiatives stand and falls with their engagement.

#### [When: eParticipation timing](#)

The characteristic of eParticipation timing relates to when to participate. It is about the number of opportunities people get to influence the decision-making process. Macintosh (2004) described that eParticipation in policy-making processes might occur in one or more of the five stages of the policy cycle: (1) agenda-setting, (2) analysis, (3) policy creation, (4) policy implementation, (5) monitoring. Since climate change adaptation is not limited to policy change, Sarzynski (2015) has outlined the “openness” of the participation process with regards to local climate adaptation. She states that stakeholders participation might occur during a pre-planning phase (when initial information is being collected, and decisions are made about who will plan); a planning phase (when actors are developing medium- to long-term climate adaptation plans); an action development phase (when actors are selecting which specific adaptation actions will be taken in the near-term); an implementation phase (when adaptation plans and actions have been selected and are being implemented); and an evaluation and/or maintenance phase (when reviewing impacts of previous actions taken) (Sarzynski, 2015). When talking about changes in the built environment, involving citizens during the development of spatial projects can also be a legal obligation. For instance, in the Netherlands,

upcoming legislation on the development and management of the living environment (“Omgevingswet”, expected entry into force: 2021) requires municipalities to set up early participation. Many authors acknowledge the importance of involving the public as early as possible, with sustained engagement during multiple stages of decision-making (Rowe and Frewer, 2000; Newig et al., 2018). Participation up to and including the phase of implementation enables people to exert meaningful influence over and opposition to decisions, in a way that they can still be changed or even blocked. Participation later in the planning process will be bounded to information provision and consultation (Uittenbroek et al., 2019).

Another characteristic of eParticipation timing is the duration of eParticipation initiatives. It considers for what period of time the initiative lasted. The eParticipation initiative can be a one-off pilot, part of a series of experimental studies, a regular participation exercise or an on-going well-established initiative. The actual duration of an eParticipation process directly influences people’s opportunities to participate. The longer the initiative, the more chances people have to participate. It is crucial that initiative allows sufficient time for responses, so that it is less likely that certain people are excluded from the process because of personal time constraints.

#### [How: eParticipation instruments](#)

Over the years many ICTs have emerged to serve eParticipation purposes, e.g., ranging from websites, online surveys and polls, electronic newsletters, to geographic information systems and other visualization technologies, and virtual meeting places. Different authors have tried to identify and categorise available technologies and tools. In a handbook, the Organization for Economic Co-operation and Development (OECD, 2001) listed a number of technologies that could be used for three different purposes: tools for information, tools for consultation, and tools for active engagement or participation in policy-making. Fraser *et al.* (2006) list 25 eParticipation tool categories divided into three clusters: core tools, tools extensively used in, but not specific to, eParticipation, and basic support tools. Tambouris, Liotas and Tarabanis (2007) carried out an eParticipation tool assessment, identifying 17 tools and 17 technologies important for the domain of eParticipation. To raise clarity on the usefulness and employability of different tools and technologies for eParticipation, authors started to categorise them related to different eParticipation levels and objectives. Sobaci (2010) proposed a framework for the appropriate ICT tools according to different eParticipation

objectives and the features desired to attain these objectives. In line with this, Phang and Kankanhalli (2008) developed a framework presenting four eParticipation objectives and the appropriate ICT tools that provide the desired features related to these objectives. Moreover, Abu-Shanab and Al-Dalou (2012) set up a framework covering three levels of eParticipation – e-informing, e-consulting, e-involving – and the suitable technical tools needed for each level. The authors also introduced a list of performance indicators related to each level of eParticipation. In later work (Al-Dalou and Abu-shanab, 2013) the framework was extended with two more levels of eParticipation – e-collaborating and e-empowering. To my knowledge this framework is the most comprehensive display of ICT-tools that can be used for eParticipation to date. For this reason, for the characteristic eParticipation instruments I refer to this framework. This does not mean that the framework is exhaustive, as the eParticipation field is relatively new and constantly changing. The framework is presented in Table 3 below.

**Table 3:** Overview of ICT-tools fitted to the different levels of eParticipation

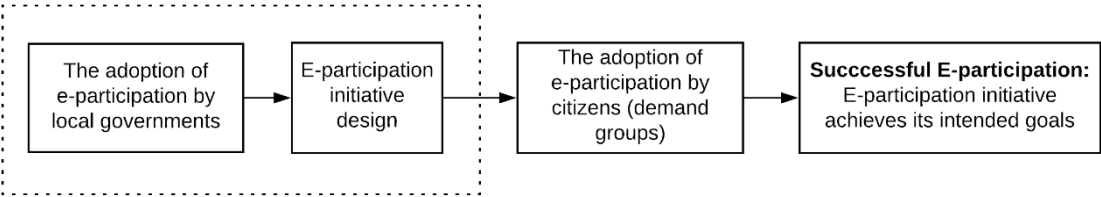
eParticipation Levels	ICT-Tools	
E-informing	E-mail (mailing list) Virtual communities (social networks) Mobile phones/devices GIS-tools Online newsletter Web portals Video conferencing Wikis Social media	E-meetings Chat rooms Webcasts RSS feeds FAQs Weblogs Alerts Podcasting
E-consulting	E-survey Feedback forms E-mail E-polls (quick polls) Newsgroups Weblogs Mobile phones/devices Virtual communities Consultation platforms	Text-to-speech technology E-panels Podcasting Wikis Chat rooms Video conferencing E-referenda Instant messaging
E-involving	E-mail Virtual e-meetings	Online virtual communities Mobile phones/devices

	Chat rooms Discussion forums/boards Video conferencing	Consultation platforms Online citizen juries
E-collaborating	E-debates Virtual e-meetings Online communities networks (social networks)	Decision-making games Virtual communities
E-empowering	E-petition E-polls Virtual e-meetings Virtual communities Argument Visualization tools Natural Language Interfaces	E-voting tools E-bulletin boards Chat rooms Discussion forums/boards E-panel

In this sub-section, the different characteristics of eParticipation design have been described. The next sub-sections sets out to gain insight into the success factors underlying eParticipation endeavours.

**2.4 eParticipation success factors**

In this research, as already describes in the introduction, eParticipation initiatives are considered to be successful when they achieve their intended goals. Various factors can contribute to achieving this, in which a distinction can be made between three phases of eParticipation, as depicted in Figure 3 below.



**Figure 3:** Assumed relationships of eParticipation successfulness

Firstly, the adoption of eParticipation by local governments is a prerequisite for the actual existence and development of eParticipation initiatives. Factors influencing the adoption of e-government and eParticipation have been thoroughly researched in literature. Secondly, the design of eParticipation initiatives impacts the outcomes of eParticipation. Various advancements have been made that discusses the success factors of eParticipation design.

Lastly, it is often argued that the successfulness of eParticipation initiatives stands or falls with the adoption by the demand groups it was designed for. As a result, a significant strand of literature focuses on the factors that influence citizen adoption of eParticipation. Factors affecting citizens' eParticipation usage include sociodemographic characteristics, internet usage and savviness, political perceptions, offline political activities, as well as factors related to the technology, such as technology accessibility, (perceived) ease of use, an and effective two-way communication interface. Although widespread adoption by citizens is a prerequisite for active participation and thus successful and meaningful eParticipation processes, it is not within the scope of this research. This because eParticipation in the field of climate change adaptation is still in its infancy and advanced eParticipation initiatives might be non-existent. Time constraints also play a role in this decision. For this research, it is assumed that effective eParticipation initiative design leads to high adoption of these initiatives by citizens.

Subsequently, the next sub-section continues to explore the factors that contribute to whether or not local governments are active agents of eParticipation. After that, the attention shifts towards investigating what the success factors are for designing successful eParticipation initiatives.

#### **2.4.1 Factors affecting the adoption of eParticipation by governments**

In order to understand how eParticipation initiatives come about and what influences the adoption of eParticipation initiatives by local governments in the field of climate adaptation, existing e-governance and co-production literature is reviewed that examines and identifies barriers, facilitators and challenges (drivers) to eGovernment initiatives, among which eParticipation initiatives.

For governments, existing research has discussed both departmental, governmentwide and external barriers and drivers for e-governance. At the organizational level, relating to technology, a factor that influences the adoption of e-governance is the departmental capacity for new technology (Meijer, 2015). This is about both the readiness and availability of the technological infrastructure (Wirtz, Daiser and Binkowska, 2018; Norris, 2006; Sæbø, Rose and Skiftenes Flak, 2008) as well as the availability of technical staff and expertise (Norris, 2006). Melitski *et al.* (2011) state that research has suggested that “the presence of an IT champion within the organization is a major factor leading to the adoption of e-government” (p.455). The latter is in line with other mentions of leadership (Eynon and Margetts, 2007) and political

support (Karkin, 2014; Meijer, 2015) as being important factors for e-governance adoption. Furthermore, other intra-agency factors are personnel support (Schwester, 2009), financial resources (Meijer, 2015; Norris, 2006), and the organizations’ ability to address legal (Meijer, 2015; Moon, 2002; Mergel, 2018) and privacy and security issues (Sæbø, Flak and Sein, 2011; Norris, 2006). Furthermore, other sources highlight the importance of the openness of agencies to relinquish their autonomy (Eynon and Margetts, 2007; Eynon and Dutton, 2007). Lastly, Schwester (2009) suggests that the level of public pressure and public support influences the decision of governments to pursue activities related to eGovernment.

Table 4 below depicts the classification of factors as approached by this research. A distinction is made between technological, organizational, and external factors.

**Table 4:** Overview and classification of factors affecting eParticipation adoption

Technological factors	Organizational factors	External factors
Technological infrastructure	Personnel capacity	Public pressure
IT staff and expertise	Personnel support	Public support
IT Champion	Financial resources	
	Political support	
	Leadership	
	Legal, privacy and security issues	
	Openness to relinquish autonomy	

**2.4.2 Success factors for designing eParticipation**

In 2014, Panopoulou, Tambouris and Tarabanis published a very comprehensive study identifying success factors for designing eParticipation projects. In their study, the authors not only made an in-depth-literature study but also conducted qualitative interviews with practitioners to validate their findings. Based on both inputs, they propose a framework containing 23 success factors, including specific activities associated with each factor. To my knowledge, this is the best available overview to date, and there is no further framework of success factors for eParticipation initiatives available in literature which is approximately as



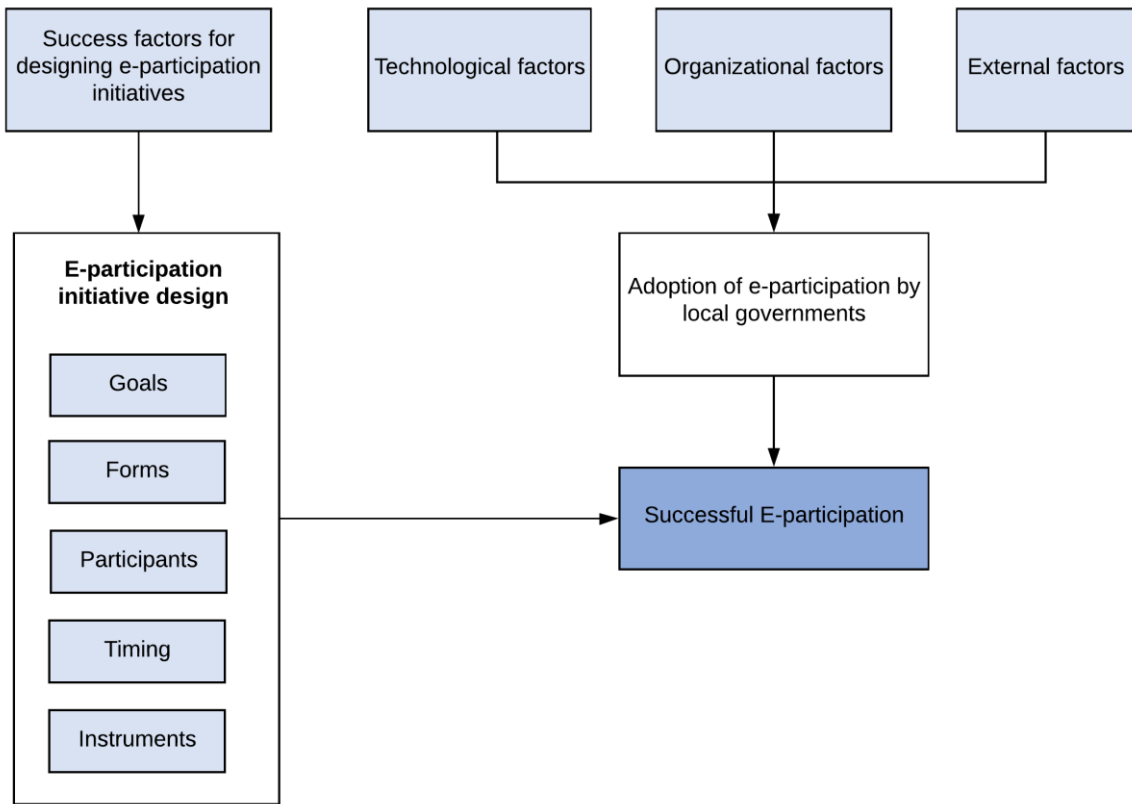
comprehensive as this one. For this reason, and given the fact that the model is based on a relatively recent in-depth literature study in combination with practitioners input, this model is adopted. An overview of the success factors as proposed by Panopoulou, Tambouris and Tarabanis (2014) are provided in Table 5.

**Table 5:** Success factors for eParticipation initiative design (adopted from Panopoulou et al. 2014)

1	Vision/Strategy	13	User needs and expectations
2	Scope and goals	14	Value for citizens
3	Policy and legal environment	15	Value for government/organization
4	Support from government/management	16	Digital divide, disabled and desired target groups/user training
5	Management and planning	17	Employee training
6	Funding	18	Participation process, policymaking stage and roles
7	Organizational structures, processes, and data	19	Change management
8	Integration and compliance	20	Leader/champion
9	Security and privacy	21	Promotion plan
10	Technology advances/constraints	22	Monitoring and evaluation plan
11	Good practice	23	Sustainability
12	Organizational culture and collaboration		

## 2.5 Conceptual Model

In the previous sub-sections, the different characteristics of eParticipation design have been described. In addition, factors that were found to influence the adoption of eParticipation by local governments, as well as success factors for designing eParticipation initiatives were put forward. The relationships between the different concepts are presented schematically in Figure 4 below.



**Figure 4:** Conceptual model

## 2.6 Analytical Framework

The analytical framework depicted in Table 6 summarizes the analytical dimensions that were derived from the literature review, as presented in this section. The framework included the operationalization of the variables in order for them to be distinguishable, measurable and understandable by empirical observation. The framework also guides the development of relevant interview questions, as well as enhancing the uniformity, objectivity and reproducibility of the study. These analytical dimensions will be tested against the empirical reality in the empirical part of this research. It should be noted that findings in the empirical reality may not be limited to the dimensions as put forward in the analytical framework, highlighting that data collection and analysis should be open for anything not included in the analytical framework but relevant to the research questions.

**Table 6:** Analytical Framework

eParticipation characteristic	Description
Why: eParticipation targets	<ul style="list-style-type: none"> <li>• Targets of eParticipation initiative:               <ul style="list-style-type: none"> <li>○ increase overall participation</li> <li>○ enhance information provision</li> <li>○ improve the quality of public policies</li> <li>○ strengthen public trust</li> <li>○ improve and share responsibility for policymaking</li> <li>○ raise public awareness and understanding of policy issues</li> </ul> </li> </ul>
What: eParticipation levels	<ul style="list-style-type: none"> <li>• Levels of eParticipation:</li> </ul>

	<ul style="list-style-type: none"> <li>○ E-informing: One-way channel that provides citizens with important information concerning policies and citizenship online</li> <li>○ E-consulting: Limited two-way channel that has the objective of collecting public feedback and alternatives</li> <li>○ E-involving: Working online with the public throughout the process to ensure that public concerns are understood and taken into consideration. Constitutes a two-way channel between citizens and government</li> <li>○ E-collaborating: A more enhanced two-way since partnering with citizens in each aspect of the decision is essential while citizens are actively participating in the development of alternatives and the identification of preferred solutions</li> <li>○ E-empowering: The placement of the final decision in the hands of the public, thus implementing what citizens decide</li> </ul>
Who: eParticipation target groups	<ul style="list-style-type: none"> <li>• Breadth of participation: <ul style="list-style-type: none"> <li>○ People with relevant knowledge and expertise</li> <li>○ Directly-affected public</li> <li>○ Any interested parties</li> </ul> </li>   <li>• Type of participants: <ul style="list-style-type: none"> <li>○ Citizens</li> <li>○ Private organizations</li> <li>○ Public organizations</li> <li>○ Non-citizens</li> </ul> </li> </ul>
When: eParticipation timing	<ul style="list-style-type: none"> <li>• Openness of participation process: <ul style="list-style-type: none"> <li>○ Pre-planning phase</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Planning phase</li> <li>○ Action-development phase</li> <li>○ Implementation phase</li> <li>○ Evaluation and/or maintenance phase</li> </ul> <ul style="list-style-type: none"> <li>• Duration of eParticipation initiative</li> </ul>
How: eParticipation instruments	<ul style="list-style-type: none"> <li>• Tools and technologies that are used to engage participants and support participation (see Table 3 for an overview)</li> </ul>

Factors affecting the adoption of eParticipation by local governments		
Factor	Indicators	Source(s)
<b>Technological factors</b>		
Technological infrastructure	<ul style="list-style-type: none"> <li>• Availability of hardware and software and interoperability</li> </ul>	Norris (2006); Eynon and Margetts (2007); Sæbø, Rose and Skiftenes Flak (2008); Meijer (2015); Wirtz, Daiser and Binkowska (2018)
IT staff and expertise	<ul style="list-style-type: none"> <li>• Availability of IT staff</li> <li>• Presence of required skill set for developing online participation initiatives</li> <li>• Ability to include external expertise/knowledge</li> </ul>	Norris (2006)
IT Champion	<ul style="list-style-type: none"> <li>• The presence of an IT champion within the organization</li> </ul>	(Melitski <i>et al.</i> (2011)

<b>Administrative/Organizational factors</b>		
Personnel capacity	<ul style="list-style-type: none"> <li>• Availability of sufficient amount of personnel/working hours</li> </ul>	Schwester (2009)
Personnel support	<ul style="list-style-type: none"> <li>• Level of belief of internal personnel on the realizability and effectiveness of eParticipation</li> </ul>	Schwester (2009)
Financial resources	<ul style="list-style-type: none"> <li>• Availability of financial resources and funding options</li> </ul>	Norris (2006); Meijer (2015)
Political support	<ul style="list-style-type: none"> <li>• Level of support in the city council for eParticipation</li> <li>• Level of support among managers for eParticipation</li> </ul>	Karkin (2014); Meijer (2015)
Leadership	<ul style="list-style-type: none"> <li>• The presence of champion(s) that have the ability to manage eParticipation (ICT) projects and motivate and support sustained commitment to eParticipation within public administrations and the use by citizens</li> </ul>	Eynon and Margetts (2007)
Legal, security and privacy issues	<ul style="list-style-type: none"> <li>• The ability of local government to comply with legal standards</li> <li>• The ability of local government to keep personal information confidential and secure</li> </ul>	Moon (2002); Norris (2006); Sæbø, Rose and Skiftenes Flak (2008); Meijer (2015); Mergel (2018)
Openness to relinquish autonomy	<ul style="list-style-type: none"> <li>• The willingness of a governmental entity to share decision-making responsibility with the public</li> </ul>	Eynon and Dutton (2007); Eynon and Margetts (2007)
<b>Contextual factors</b>		
Public pressure	<ul style="list-style-type: none"> <li>• Degree of pressure that the public exerts on the government to engage in eParticipation</li> <li>• Amount of pressure exerted by interest groups</li> </ul>	Schwester (2009)
Public support	<ul style="list-style-type: none"> <li>• Degree of public support for eParticipation</li> </ul>	Schwester (2009)

### Success factors for eParticipation initiative design

Success Factors	Activities associated with success factors (indicators)
Vision/strategy	<ul style="list-style-type: none"> <li>• Alignment to long-term goals and strategies</li> <li>• Coordination with national, regional and local programs</li> </ul>
Scope and goals	<ul style="list-style-type: none"> <li>• Determining clear and realistic goals</li> </ul>
Policy and legal environment	<ul style="list-style-type: none"> <li>• Alignment to ICT policies and standards</li> <li>• Usage of an appropriate legal framework</li> <li>• Acquiring a deep understanding of the relevant processes, policies, laws and regulations</li> </ul>
Support from government/management	<ul style="list-style-type: none"> <li>• Ensuring political will and drive</li> <li>• Ensuring strong, consistent and active commitment by top political persons and government executives</li> </ul>
Management and planning	<ul style="list-style-type: none"> <li>• Appointing an experienced Project Management and Business Management expert</li> <li>• Employing standard methods for system analysis and design</li> <li>• Following a performance measurement methodology and perform risk management</li> <li>• Ensuring availability and adequacy of needed resources (time, financial, technical and human resources)</li> </ul>
Funding	<ul style="list-style-type: none"> <li>• Considering various funding options</li> </ul>
Organizational structure, processes and data	<ul style="list-style-type: none"> <li>• Ensuring that internal organization structure and processes are appropriate for handling the new initiative—redesign may be needed</li> <li>• Ensuring that online services are appropriately connected with offline actions</li> <li>• Ensuring a clear delineation of responsibility and accountability also for the online services</li> <li>• Ensuring that processes for the online services' operation and update exists</li> </ul>
Integration and compliance	<ul style="list-style-type: none"> <li>• Addressing problems of integration/compatibility with other systems and standards</li> </ul>

Security and privacy	<ul style="list-style-type: none"> <li>• Building an absolutely secure system</li> <li>• Protecting participants' personal data (privacy)</li> <li>• Ensuring confidentiality from third parties (e.g. hackers) but also from government</li> <li>• Convincing citizens that the system is fully secure and private</li> </ul>
Technology advances/constraints	<ul style="list-style-type: none"> <li>• Keeping up with technological advances, modernization and globalization especially when such advances are used by citizens in other interactions (e.g. in e-commerce)</li> <li>• Considering infrastructure and information constraints</li> <li>• Ensuring technical quality</li> </ul>
Good practice	<ul style="list-style-type: none"> <li>• If available, exploiting available good practice ICT solutions</li> </ul>
Organizational culture and collaboration	<ul style="list-style-type: none"> <li>• Ensuring cross-departmental collaboration and knowledge-sharing</li> <li>• Avoiding cultural conflicts and problems inside the organization</li> </ul>
User needs and expectations	<ul style="list-style-type: none"> <li>• Identifying all relevant stakeholders and involve them in the design process</li> <li>• Addressing user needs and expectations</li> <li>• Consulting users continuously and get feedback through demonstrations and prototypes</li> <li>• Designing a system that is appealing, yet simple and easy to use</li> <li>• Considering error handling, the easy reversal of actions, and a helpdesk</li> <li>• Ensuring system's appropriateness for the targeted participants</li> </ul>
Value for citizens	<ul style="list-style-type: none"> <li>• Ensuring transparency</li> <li>• Offering improved quality and efficiency to users</li> <li>• Offering flexibility, e.g. combine online and offline channels for</li> <li>• Ensuring that government responsiveness and accountability is not lessened for online services</li> <li>• Considering citizens' convenience, e.g. one-stop solutions also for</li> <li>• Ensuring that the online content is clear and understandable by citizens, of appropriate quantity and quality</li> <li>• Ensuring that feedback is provided to participants</li> </ul>



	<ul style="list-style-type: none"> <li>• Showing how the initiative strengthens the decision-making process</li> <li>• Pursuing quality and pluralism of contributions</li> <li>• Targeting improved citizen satisfaction and wellbeing</li> </ul>
Value for government/organization	<ul style="list-style-type: none"> <li>• Planning for effectiveness, reduced time and cost for the organization</li> <li>• Using the initiative actually to strengthen the decision-making process</li> <li>• Targeting improved satisfaction of decision-makers and public servants</li> <li>• Pursuing added-value for the government, e.g. by increasing a country's competitive advantage and improving the image of an administration</li> </ul>
Digital divide, disabled and desired target groups/user training	<ul style="list-style-type: none"> <li>• Ensuring access for all citizens, e.g. through public access points</li> <li>• Ensuring that the initiative's target group is actually involved (e.g. young/old people, minorities, etc.)</li> <li>• Ensuring that the disabled are offered equal chances to participate</li> <li>• Addressing the issue of the digital divide</li> <li>• Educating and training users</li> <li>• Aiming at representation and political equality</li> </ul>
Employee training	<ul style="list-style-type: none"> <li>• Educating and training staff</li> <li>• Acquiring skilled personnel</li> </ul>
Participation process, policymaking stage and roles	<ul style="list-style-type: none"> <li>• Defining the involved actors and their roles and responsibilities</li> <li>• Defining the scope of the process and link it to decision-making stages and to the wider political landscape</li> <li>• Putting in place processes for conflict resolution and consensus building</li> <li>• Considering ways to capture audience attention and involve them in in-depth engagement</li> <li>• Planning for contributions' analysis (e.g. data mining or other algorithms may be needed)</li> <li>• Ensuring that feedback mechanisms are incorporated in the participation process</li> <li>• Ensuring high-quality moderation</li> </ul>
Change management	<ul style="list-style-type: none"> <li>• Mandating change</li> </ul>

	<ul style="list-style-type: none"> <li>• Eliminating fear and deal with resistance to change</li> <li>• Considering internal leadership styles, culture and bureaucracy</li> <li>• Considering a reward system for employees</li> </ul>
Leader/champion	<ul style="list-style-type: none"> <li>• Appointing a visionary champion to drive the initiative both internally and externally</li> </ul>
Promotion plan	<ul style="list-style-type: none"> <li>• Setting up a comprehensive promotion plan, utilizing the most appropriate promotional activities for each stakeholder group</li> <li>• Creating awareness from the beginning; advertising initiative's value to citizens and other stakeholders</li> </ul>
Monitoring and evaluation plan	<ul style="list-style-type: none"> <li>• Setting up monitoring and evaluation mechanisms</li> </ul>
Sustainability	<ul style="list-style-type: none"> <li>• Making provisions for the initiative's future maintenance and improvement or expansion</li> </ul>

## **3. Methodology**

### **3.1 Introduction**

This chapter puts forward the research approach for the empirical part of the research. As a first step, the research strategy is discussed, including the case selection procedure.

Subsequently, the research materials and methods of data collection needed to answer the research questions are put forward. Lastly, the process of data analysis is reflected.

### **3.2 Case study design**

In order to explore eParticipation and the required underlying conditions for its successful manifestation, a qualitative multiple case study methodology is employed. According to Verschuren and Doorwewaard (2010), a case study is a research strategy in which “the researcher tries to gain a profound and full insight into one or several objects or processes that are confined in time and space” (p.178). Bryman (2008, p. 54) prescribes a case study for settings where a “researcher is concerned to elucidate the unique features of the case”. This strategy fits well the purpose of this research to gain a deep insight in eParticipation processes and the factors that account for the successfulness of such processes. The units of analysis are Dutch municipalities. A multiple-case study is executed, allowing for the in-depth examination of success factors related to different eParticipation practices. The studying of multiple cases allows for the comparing of eParticipation practices and conditions to gain more profound insights into what factors account for the successful manifestation of eParticipation practices in the field of climate change adaptation.

It was expected that the use of ICTs for public participation is still in its infancy. However, for a compelling analysis of eParticipation processes, it is vital that these processes have been considered, are taking place or have already taken place within municipalities. Therefore, as a starting point for the selection of cases, it was assumed that frontrunners in the field of climate adaptation are more likely to have initiated, or tried to initiate such processes. Therefore, the ten Dutch municipalities connected to the City Deal Climate Adaptation, a cooperation agreement between seventeen public partners, seventeen (semi)private partners, and the Dutch government, who aim to achieve a breakthrough in tackling climate adaptation in Dutch cities, have been subject to an initial orientation regarding eParticipation processes in the field of climate adaptation. A conversation with the project coordinator Bart Stoffels, in

combination with a document/policy analysis, was done to gain insight in the degree to which these cities have employed public eParticipation processes related to climate adaptation. Based on this, the cities Groningen and Zwolle have been selected for further in-depth investigation. The municipalities were studied independently, following the same structure.

### **3.2 Data collection and analysis**

In this sub-section, the research materials and data collection methods for answering the last three sub-questions are described, as well as the methods for data analysis

#### ***How does eParticipation in the field of climate adaptation manifest itself in Dutch municipalities?:***

For this sub-question, a triangulation of data sources was pursued. Policy documents, web site resources, and municipal practitioners have been used as sources of data. Firstly, all relevant policy documents, in combination with web site resources, have been analyzed to gain insight into to what extent ICTs are used for eParticipation purposes in the cases. Secondly, municipal practitioners have been used as a source in order to validate these findings and to potentially identify processes that were overlooked or not findable in the former sources of data. The latter was in line with expectations, given the novelty of eParticipation and a changing landscape offering increased opportunity for such processes as a result of the COVID-19 crisis.

#### ***What contributing factors and barriers to eParticipation adoption by municipalities can be found in practice?***

For this sub-question, mainly municipal practitioners, but also policy documents, have been used as sources of data. Content analysis, in combination with interviews with practitioners in Zwolle and Groningen, has been employed to collect the data. Interviewees have been asked to provide insight into the development of eParticipation in the field of climate adaptation and what they perceive to be the main drivers and barriers to this development.

#### ***What are the contributing factors to the successful design of eParticipation processes in climate adaptation governance in Dutch municipalities?***

For the last sub-question, municipal practitioners were used as sources of data. Data was collected by means of an online survey. Respondents have been asked to rate the importance of the success factors for eParticipation initiative design as distilled from the literature.

### 3.2.1 Interviews

As described above, interviews were conducted with municipal practitioners. The respondents were selected by means of purposive sampling. The goal of purposive sampling is to sample participant in a strategic way so that those samples are relevant to the research questions that are being posed (Bryman, 2012). For this reason, contact was sought with the managers of the climate adaptation strategies of the municipalities. In one case, the interview request was forwarded to another, more relevant, respondent. In another case, a respondent was found by snow-ball sampling. For the case of Groningen, two interviews were held with an integral policy officer and process manager in the field of climate adaptation, and with an employee in the positions as 'product owner digital democracy'. For the case of Zwolle, one interview was held with a senior communications advisor who is solely concerned with climate change adaptation. Given her function at the interface between communication, participation and climate adaptation, and therefore ability to have a helicopter view when it comes to eParticipation development in this field specifically, it was expected that a single interview sufficiently captures the factors that account for the degree of eParticipation development in this case.

Because of the COVID-19 outbreak, the Dutch government advised to work from home as much as possible and to practice social distancing. For this reason, all interviews were held by phone or using video conferencing software Microsoft Teams. Which method was used was determined in accordance with the interviewees. Before the start of the interviews, interviewees were introduced to the aim of the research and interviews. Permission to record the interview and to use their names was also requested. On request, the recordings of the interviews have been deleted after transcribing. Appendix 1 gives an overview of the interviews that were conducted, including the names of the respondents and their position within the municipality.

The interviews were designed to acquire in-depth knowledge and were semi-structured, allowing respondents to elaborate on certain topics and the interviewer to ask follow-up questions (Verschuren and Doorwewaard, 2010). Interview questions were based on the concepts and factors presented in the analytical framework in chapter 2. However, as a starting point, general open questions were asked to have respondents reflect on the role of stimulating factors and barriers, allowing for input that transcends the factors identified in the literature. If these questions did not trigger sufficient topics for debate, more specific questions

related to the factors were put forward. The interviews followed the same structure for both municipalities, but some questions, as well as follow-up questions, did include municipality-specific information. The general interview guide is provided in Appendix 2.

The interviews were recorded, transcribed with the help of the software AmberScript and then coded using the qualitative data analysis software NVivo 12. The coding process primarily followed a deductive approach, but there was also room for inductive insights. Nodes were developed for the five characteristics of eParticipation design, and the 12 factors affecting the adoption of eParticipation by local governments. To allow for insights that could not be captured by the factors described in the analytical framework, a node for additional factors was created. In order to not lose meaning, all interviews were coded in their original language (Dutch) without translation.

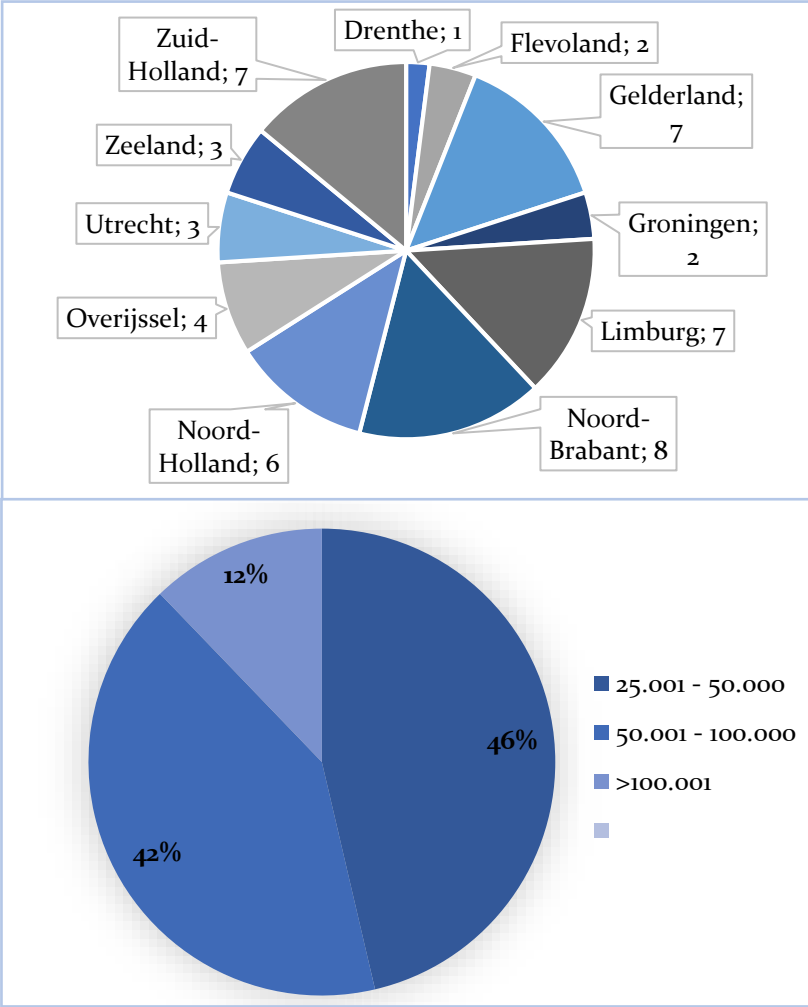
### 3.2.2 Survey

For the last sub-question of the thesis, an online survey has been drawn up and distributed to municipal practitioners. An online survey was created using the software Qualtrics. The survey comprised a total of 33 questions. The survey started with general closed questions about the municipality's current experiences with eParticipation and the respondent's expectations with regard to its role in climate adaptation. The survey then turned to the 23 success factors for eParticipation initiative design, which each was presented as a separate question, including the indicators as described in the analytical framework. It has been decided not to present each indicator as a separate question, as this would have led to a rather lengthy questionnaire, which plausibly would have decreased the response rate. The respondents were asked to assess the importance of the 23 factors according to a 5-point Likert scale. The values on this scale were: not important, slightly important, moderately important, important, and very important.

The survey was distributed via the general email addresses, or in the absence of this via the contact forms on municipal websites, of all 355 municipalities in the Netherlands. The runtime of the survey was three weeks in May. Ultimately, 51 practitioners of 50 municipalities took part in the survey, which equals 14 per cent of all municipalities. The occupations of the respondents range from policy officers sustainability and communication advisors to citizen participation employees and program managers administrative renewal. It is important to note that multiple municipalities have rejected the application under the notion that under the

current COVID-19 circumstances, they have decided to postpone collaboration to research activities due to time constraints.

Figure 5 depicts the distribution of the municipalities that have taken part in the survey based on their location (province) and the number of inhabitants. It can be seen that all provinces, except Friesland, are represented. It can also be seen that both small and larger municipalities have participated. An overview of all participating municipalities is provided in Appendix 1.



**Figure 5:** Distribution of municipalities that took part in the survey based on their location (province) and the number of inhabitants

The data of the survey was exported from Qualtrics to Excel. The built-in data analysis and reporting tools in Qualtrics were used to calculate the mean of the Likert-scale type responses. Here, for the sake of analysis, 1 represents the value ‘not important’, whereas 5 represent the value ‘very important’. These averages were manually inserted into Excel, after which this software was used to visualize the data.

## **4. Climate change adaptation in the Netherlands: A brief introduction**

This chapter provides a brief introduction about climate change adaptation in the Netherlands; explaining the expected effects of climate change, the national policy context on adaptation planning and the manifestation of climate adaptation at the local scale. Throughout this introduction, special attention will be given to the notion of participation within climate change adaptation. By doing so, this chapter puts the results as presented in the next chapters into context.

### **4.1 Expected climate change impacts in the Netherlands**

In 2014, the national weather service the Royal Netherlands Meteorological Institute (KNMI) calculated four scenarios for future climate change in the Netherlands for around 2050 and 2085 (Royal Netherlands Meteorological Institute, 2015). Each scenario provides a consistent picture of the changes in 12 climate variables, including temperature, precipitation, sea level, and wind. The four scenarios differ in terms of two possible values for the global temperature increase, 'Moderate' and 'Warm', and two possible changes in the air circulation pattern, 'Low value' and 'High value'. Together they span the likely changes in the climate of the Netherlands.

Regarding temperature, over the years, the Netherlands has already become warmer. Average temperatures in De Bilt increased by 18 °C between 1901 and 2013. Most of this increase, 14 °C, occurred between 1951 and 2013. In all four scenarios, the temperature will increase even further. The annual average temperature in the Netherlands will expectedly rise by 1 to 2.3 °C in 2050 and 1.3 °C to 3.7 °C in 2085. The mean temperature increase is most significant for winter and smallest for spring. For summer, the scenarios indicate an increase in the number of tropical nights with minimum temperature at or above 20 °C and summer days with maximum temperature at or above 25 °C. This goes hand in hand with the increasing risk of heatwaves. There are regional and even local differences. For instance, the temperature differences between coastal areas and inland will get more prominent in the summer and smaller in the winter. Also, the number of summer days and tropical nights are expected to increase more in urban than in rural areas.



Regarding precipitation, The Netherlands has seen an increase of 26 per cent in annual precipitation between 1910 and 2013 (Royal Netherlands Meteorological Institute, 2015). The national mean of precipitation is expected to further increase between 2.5 and 5.5 per cent by 2050 and up to 5 to 7 per cent in 2085. This trend is paired with an all-year-round increase in precipitation extremes such as cloudbursts and extreme rain showers with thunder and hail. Two of the four scenarios calculate a decrease in average rainfall in summer, from 8 to 13 per cent less in 2050 compared to 2014.

The sea level is expected to rise continuously in the future. According to the Royal Netherlands Meteorological Institute (2015), by 2050, there will be an increase of 15 up to 40 centimetres at the Dutch coast in comparison to 1981-2010. By 2085 this increase can be as high as 30 to 80 centimetres. It is estimated that the sea level will continue to rise even after 2100. The rate at which the sea level rises strongly depends on the global temperature rise.

The adverse effects of the climate changes described above are manifold. These effects include, among many others, damage to property, nuisance or inconvenience, disease, increased mortality and a decline in environmental and ecological quality. In order to minimise the negative impacts of climate change, the Dutch government has formulated a policy on climate adaptation.

## **4.2 Policy context**

### **4.2.1 National policy context**

To deal with the expected effects of climate change, the Dutch government formulated a strategy to limit the consequences of climate change as much as possible. Two policy documents form the basis for this: The National Climate Adaptation Strategy (NAS) and the Delta Plan on Spatial Adaptation (DPSA). The DPRS focuses on the implications for the physical living environment, whereas the NAS takes into account the broader perspective.

The NAS is the Dutch answer on the European Commission's request for member states to produce a climate adaptation strategy. The NAS was sent to the cabinet at the end of 2016 and was adopted by the new House of Representatives at the end of 2017. The NAS provides an overview of the most important climate risks and sets out the approach of dealing with these. It sets out six goals for the national government (Ministry of Infrastructure and the Environment, 2016):

1. increase awareness of the necessity of climate adaptation
2. encourage the implementation of climate adaptation measures
3. develop and exploit the knowledge base
4. address urgent climate risks
5. embed climate adaptation within policy and legislation
6. monitor the progress and effectiveness of climate change adaptation policy.

In the NAS the Dutch government stresses that ‘climate-proofing the Netherlands is a joint undertaking for which every member of Dutch society is partially responsible’ (Ministry of Infrastructure and the Environment, 2016, p. 31). In this respect, the government calls upon local and provincial authorities, private sector companies, water authorities, and societal organizations to contribute. In March 2018, the Implementation Program 2018 – 2019 National Climate Adaptation Strategy (IP NAS) was published. The goal of this program was for climate change adaptation to become a central part of policy, policy implementation and relevant activities of governments, social organizations, residents and companies (Meijs et al., 2018).

At the end of 2017, the Delta Commission presented the Delta Plan on Spatial Adaptation (DPSA) as part of the Delta Programme 2018. The Delta Plan is a joint effort of national, regional and local governments and water boards to formulate concrete actions and goals for different levels of government. In the DPSA, it was concluded that until then, climate adaptation was too non-committal and that there were substantial differences in commitment and policy advancement between municipalities (Delta Commission, 2017). The new Delta Plan was therefore aimed at accelerating the transition and to combat the non-committal nature of the efforts. The DPSA includes the following main objectives and obligations (Delta Commission, 2017):

- Before 2020, municipalities, district water boards, provinces, and the central government will have executed and published the results of local stress tests;
- By 2020, spatial climate adaptation will be an integral part of policy and implementation of all levels of government;
- By no later than 2020 governments will have drawn up implementation and investment agendas for their regions based on the adaptation strategy;
- From 2018 municipalities, district water boards and NGOs will step up their efforts to link spatial adaptation with periodic management and maintenance measures, investment programs, incentive schemes or ecosystem services.
- By 2050, the Netherlands will be climate-proof and water-robust.

#### 4.2.2 Local climate change adaptation

Under these above described national developments, municipalities have been given an increasing responsibility with regard to climate adaptation. Where climate adaptation was first mainly anchored in green and water policy, municipalities are increasingly focusing on developing a stand-alone adaptation strategy that integrates various policy fields in relation to this topic. For the design and implementation of such a strategy, a diversity of instruments are being deployed such as stress tests, cost-benefit analyses, climate ateliers, appointing climate adaptation ambassadors and supporting citizen adaptation initiatives (Graaff et al., 2017). Moreover, many municipalities joined the initiative ‘operatie steenbreek’, which can be translated as ‘operation de-pave’, and aims to encourage and engage citizens to replace paved ground in their private gardens with green space. Another, more general trend in the field of spatial planning, in which adaptation is playing an increasingly prominent role, is working with an ‘area-oriented’ perspective (‘gebiedsgericht werken’). In this approach, an area is seen as a cohesive system in which social, economic, and physical tasks must be solved in conjunction and in which much room is given for citizen participation.

Such integrative approaches towards spatial planning get of less voluntary nature with the introduction of new spatial planning law, the Environment and Planning Act (‘Omgevingswet’) (EPA), in which integration and citizen participation are key objectives. The Environment and Planning Act is expected to enter into force in 2021 and bundles dozens of laws and regulations regarding the physical living environment. The EPA has five main instruments: (1) the environmental vision, (2) the environmental plan, (3) the environmental programme, (4) project decisions, and (5) environmental permits.

The EPA demands municipalities, provinces, and the national government to formulate an environmental vision. This vision comprises a long-term strategic vision for the physical living environment (Vereniging van Nederlandse Gemeenten, 2016a). The environmental vision must, in any case, provide a description of the main features the quality of the physical living environment, the main features of its intended development, use, management, protection and preservation, and the main aspects of the integrated policy to be pursued. However, the format of the environmental vision is not fixed, implying that governmental bodies have the freedom to determine the level of detail regarding the ambitions, time-horizon, and level of abstraction. The environmental plan is the legal elaboration of the environmental vision (Vereniging van Nederlandse Gemeenten, 2016b). It provides the framework for all the municipalities’ rules

regarding the physical living environment, which includes the allocation of functions to locations, as well as rules about activities with consequences for the physical living environment. The environmental programme includes the set of measures that the municipality deems necessary to achieve the desired quality of the physical living environment (Aan de slag met de Omgevingswet). In line with this, project decisions contain the measures necessary for the implementation of specific projects. Lastly, citizens, companies and governments can request permission to carry out activities in the physical living environment themselves by applying for an environmental permit (ibid).

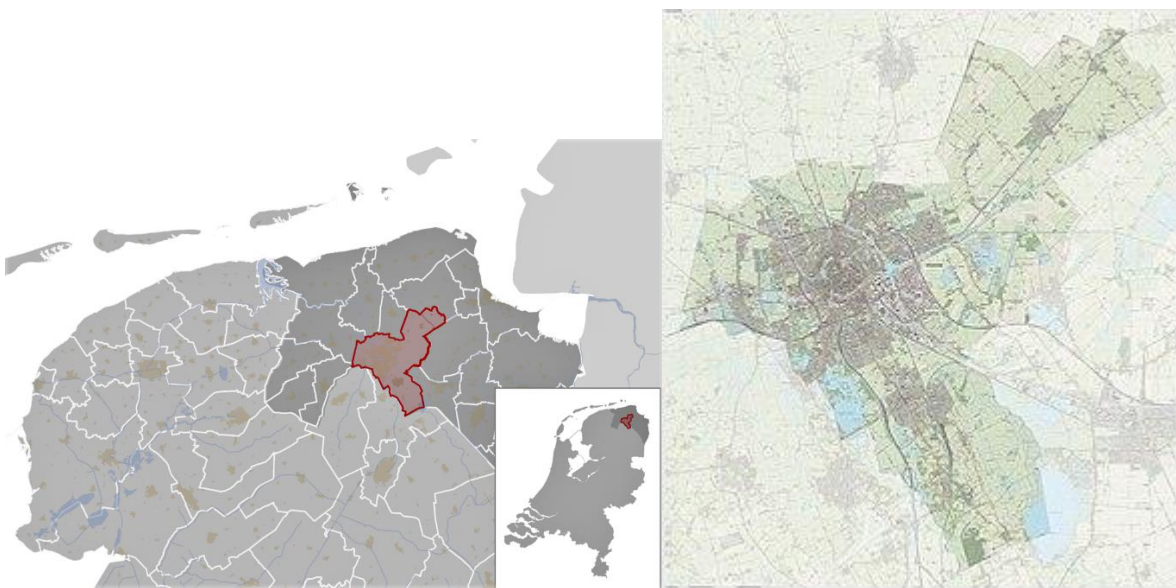
With the advent of the Environment and Planning Act, public participation will be a legal requirement in Dutch spatial planning. The EPA wants to stimulate participation from non-governmental stakeholders in an early stage, to get familiar with their interests, opinions and creative ideas (Ministry of the Interior and Kingdom Relations, 2017). It is argued that the involvement of relevant stakeholder in an early stage leads to more public support and better decision-making, while also accelerating the planning process (Aan de slag met de Omgevingswet). Although the EPA establishes an obligation to involve the public, it does not provide guidelines on how a participation process should be organised. The motivation is for this is that public participation processes should be tailor-made since every project has a different local context, decision-making procedure, and stakeholders (Ministry of the Interior and Kingdom Relations, 2017). The EPA stimulates the use of a digital platform for participation and the authorisation of permits. In the current state, there is a platform called 'Omgevingsloket online'; within this platform, people can apply for an environmental permit or can check if their permit is legitimate. However, within the new law, the goal is to expand this online platform to a state where people can do more than just apply for an environmental permit. For example, the platform can be used to facilitate discussion between stakeholders, educate local officials, give an option for people to report issues in the physical environment or the platform can be simply used to update citizens about the progress of a project.

## 5. Case study 1: Groningen

This chapter presents the case study of the municipality of Groningen, situated in the Netherlands. First, a general introduction to the city of Groningen is provided. Then the climate change impacts on the city are elaborated on, as well as the city's climate change adaptation policy. The analysis then sets out to explore the role that eParticipation plays in climate change adaptation, as well as the factors that account for this. The chapter ends with a sub-conclusion.

### 5.1 Introduction

Groningen is located in the northeast of the Netherlands and is the capital city of the same-named province (see Figure 6). The city Groningen is the central core of the municipality of Groningen, which besides this city also includes 20 other villages such as Haren, Ten Boer and Glimmen.



**Figure 6:** Spatial orientation of the case study Groningen

In more than two hundred years, Groningen has grown from a municipality with approximately 23,000 inhabitants in 1795 to a municipality with more than 232,922 inhabitants in 2020. Part of the increase can be explained by migration from the countryside to the city and the moving of students from other provinces and countries to Groningen. Another part is due to annexations that took place over time. The last municipal reclassification took place in 2019, with the municipal merger of Groningen, Haren and Ten Boer. With a total of 232,922

inhabitants (the city Groningen has 202,285 inhabitants), the municipality of Groningen is the sixth-largest municipality in the Netherlands. In total, the municipality of Groningen covers 197.96 square kilometres, of which 185.12 are land, and 12.36 are water. The population density is 1177 inhabitants per square kilometre. The municipality of Groningen can be divided into 19 districts, which in turn consist of 139 neighbourhoods.

## **5.2 Climate change impacts**

The municipality of Groningen has performed stress tests to gain insight into the expected effects of a changing climate in Groningen. A climate stress test is an investigation into the expected effects of the changing climate in a particular area. It maps how a specific area would likely perform, including how it might suffer, if struck by particular climate-related events (Stern et al., 2013). The municipality of Groningen has performed stress tests for five types of expected climate-related developments: rising temperature, increasing drought, increasing precipitation, water safety (flooding) and extreme weather conditions (Municipality of Groningen, 2020c). For each development, the municipality considers the effects and risks on five sectors that they consider relevant for their municipality: water and space; nature and agriculture; infrastructure, energy and ICT; safety and recreation; and health.

When it comes to rising temperature, the municipality of Groningen stresses the increase in the number of warm days and the increasing chance of heatwaves. They emphasise the effect that these changes have on the heat island effect in the urban area. The urban heat island effect is the phenomenon that the temperature in an urban area is on average higher than in the surrounding rural area. The municipality set up maps that showcase the expected increase in the Physiological Equivalent Temperature (PET) between 2019 and 2050. They made a classification of the degree of heat stress in relation to the PET temperature, which ranges from no heat stress (<23 °C) to extreme heat stress (>41 °C). Overall, it is expected that heat stress will increase throughout the city. In particular, the number of areas where intense heat stress (35-41 °C) is expected increases tremendously. Moreover, in 2050 extreme heat stress is expected in certain parts of the city centre. Critical hotspots are, among others, the University Medical Centre Groningen (UMCG), public squares (Vismarkt, Grote Markt), and various large parking lots. The effects of rising temperature and heat stress vary from health issues, loss in labour productivity, to the expansion of infrastructure, rendering it unusable.

Regarding increasing drought, the municipality of Groningen has mapped possible vulnerable zones (Municipality of Groningen, 2020c). They stress that increasing drought causes drops in groundwater levels and subsidence, which in turn entail various effects and risks. Examples of these effects and risks are scarcity of drinking water, economic damage from loss of harvests, and wildfires.

With respect to increasing precipitation de Municipality of Groningen (2020) expects an increasing occurrence of short and heavy rain showers. They state that their current sewer system does not have sufficient capacity to deal with such intense rain events. This will more often lead to rainwater no longer being able to be drained sufficiently, as a result of which streets will be flooded. To interpret the effects of such events in spatial terms, the municipality has drawn up a map that shows in which areas in the city it is possible for water to end up in the street during a rain shower of 73 mm in an hour. Effects and risks associated with such events include damage to buildings and cars, failure of vital systems in hospitals and nursing homes, and the interruption of emergency service routes.

Regarding water safety, the Municipality of Groningen points out that sea-level rise puts extra pressure on the Dutch sea dykes. In the Netherlands, the national government and the water boards are responsible for strengthening these dykes. Local authorities, however, play a vital role in the evacuation of citizens in case a flood does occur. The municipality has therefore mapped most vulnerable areas in the event of flooding from the sea. The effects and risks associated with such an event are, among other, utility infrastructure failure, damage to the built environment, and the chance that none self-reliant people and animals cannot bring themselves to safety.

Lastly, for extreme weather conditions, the municipality of Groningen emphasises that this is difficult to predict. This applies to both the intensity and the places where the most inconvenience occurs. Possible effects and risks of such extreme weather conditions comprise damage to buildings and infrastructure, damage to large trees with ecological value, and risk of injury from lightning strikes, falling trees and flying objects (Municipality of Groningen, 2020c).

### 5.3 Climate change adaptation policy

Climate change adaptation has played an increasingly important role in Groningen over the years. In the Netherlands, the management of water and sewerage has traditionally been a legal task for municipalities. From that capacity, the municipality of Groningen has been taking steps in the field of water management and safety for years. As a result of the major floods in the Netherlands in the 1990s and the rising general awareness about climate change in society, climate adaptation has become increasingly prominent on the agenda of the municipality of Groningen (personal communication, 8 May 2020). A shift has taken place from water and sewerage to a more integrated strategy in which climate adaptation is increasingly embedded in themes such as health and the living environment. In 2018, the green party GroenLinks became the largest party in the municipal elections in Groningen. This has resulted in increased political support for climate change adaptation and environmental issues in general (personal communication, 8 May 2020). In the coalition agreement the new coalition emphasises the importance of greenery in the city and aspire to draw up an action plan for climate adaptation (Municipality of Groningen, 2019). This ultimately led to the development of an implementation agenda for climate-resistant Groningen in 2020, which describes the municipal ambition, strategy and actions that will be taken in the field of climate change adaptation up to 2024.

In this document, the municipality of Groningen has formulated the ambition of making the municipality climate-proof by 2050. Alongside this ambition, the municipality formulated four objectives that should help them to work towards ambition. These objectives are: (1) prevent flooding, (2) prevent and reduce heat stress, (3) improve spatial quality, and (4) the extra protection of vulnerable groups. To guide in the way to achieving these goals, the municipality formulated a strategy consisting of four different pillars. The first pillar is cooperation. The municipality is aware that they cannot achieve the objectives by themselves since large parts of the municipal territory are owned by third parties. The share of privately owned land further increased with the last municipal reclassification, as a result of which the municipality has gained a lot of rural areas that are owned by farmers (personal communication, 8 May 2020). Therefore, landowners, individual homeowners and entrepreneurs also have an essential role to play in climate-proofing the municipality. To encourage these groups to take action, the municipality is committed to increasing their awareness and their capacity to take action. In this, the municipality takes on the role of stimulator and facilitator (Municipality of Groningen, 2020c). The second pillar is to take on an integral working approach. This means



that the municipality of Groningen tries to link climate adaptation to other processes and tasks. On the one hand, this means that climate adaptation issues also take account of other themes such as safety, health and sustainability. On the other hand, this means that climate adaptation is always considered when interventions are needed in public space, such as district renewals or large-scale maintenance. The third pillar is to work future-oriented. The municipality strives to work on the basis of the latest insights and predictions when it comes to climate change. In doing so, they take into account an increasingly changing climate. The fourth and last pillar is to set a good example. The municipality strives to set a good example and to work together with the region to become a leader in the field of climate adaptation. In 2018, the Global Center on Adaptation (GCA) settled in Groningen. The GCA is a global top knowledge centre that supports countries, organizations and companies with knowledge and advice in the field of climate adaptation. The arrival of this institute will enable the municipality to expand its role as a frontrunner further. Moreover, the municipality of Groningen is a member of the City Deal Climate Adaptation and the KANS network. Through these networks, the municipality of Groningen is committed to sharing and disseminating acquired knowledge and learning from other municipalities (Municipality of Groningen, 2020c).

The stress tests done by the municipality of Groningen have revealed many possible effects of climate change. In order to increase the feasibility of the climate adaptation program, the municipality has prioritized these effects according to their degree of urgency (Municipality of Groningen, 2020; personal communication, 8 May 2020). This has resulted in a list of situations that are categorized as urgent, undesirable or acceptable. Urgent situations have the highest priority, and the municipality strives to take immediate action in these cases. For undesirable situations, it is examined with measures are needed on the medium to long term. Hereby, they look at possible linkage opportunities with other, already planned activities. For acceptable situations, the municipality mainly works on raising awareness.

In tackling the various effects of climate change, the municipality distinguishes between five roles, two roles in which the municipality is the steering party, and three roles in which the society takes on this responsibility. The five roles that the municipality can fulfil are summarised in Table 7.

**Table 7:** Roles of the municipality in climate adaptation (adapted from Municipality of Groningen, 2020)

Steering party	Role of the municipality	Description role municipality
Municipality	Direct	The municipality itself takes measures in the public space or conducts further research.
	Regulate	The municipality sets frameworks in the environmental vision or enforces measures through, for example, a regulation.
Society	Facilitate	The municipality supports societal initiatives with, for example, subsidies.
	Stimulate	The municipality is working on awareness through informing
	Cooperate	The municipality actively engages in a dialogue with other parties.

All in all, climate adaptation is starting to play an increasingly prominent and integral role in the daily activities of the municipality of Groningen. The municipality has clear ambitions and goals and has set up a strategy on how to achieve them. On top of that, the municipality has developed an implementation program that provides direction for the measures to be taken until at least 2024. Within this program, reflection is given on the degree of urgency and the financial coverage of the measures.

**5.4 eParticipation in climate change adaptation**

As already highlighted in the previous sub-section, the municipality of Groningen attaches great importance to public participation in the field of climate change adaptation. Given that climate adaptation also requires adjustments to privately owned property, the municipality is aware that they cannot bring about a climate-proof municipality all by themselves (personal communication, 8 May 2020). For that reason, the municipality of Groningen works together with residents, businesses, and housing corporations to stimulate and facilitate change. Regarding the adaptation of public space, with the advent of the Environment and Planning Act, public participation is becoming an even more important part of spatial developments. The municipality has the ambition to make climate change adaptation an integral part of all

spatial developments, hereby making public participation an integral part of all climate change adaptation developments.

At the end of 2019, the municipality of Groningen in cooperation with WIJ Groningen and Stadsadviseert developed the 'Groninger Participatiewerkboek', a document to guide residents, developers and public servants to develop plans and carry out projects based on continuous dialogue and careful participation processes. This document briefly points out to the possibilities of digital participation, referring to the use of social media and the online digital platform De Stem van Groningen (more on this later) (Municipality of Groningen, WIJ Groningen and Stadsadviseert, 2019). In response to the COVID-19 crisis, in May 2020 the municipality of Groningen published the online workbook 'Eerste hulp bij online participatie' (first aid for online participation). This document provides information on seven types of online participation, the most suitable tools for this, as well as tips and tricks for preparing such activities (Municipality of Groningen, 2020b).

The above indicates that the municipality of Groningen is increasingly engaged in online participation, but that it is still in its infancy. This is confirmed by both interviewees (personal communication, 8 May 2020; personal communication, 29 May 2020). In Groningen, eParticipation efforts in the field of climate change adaptation are currently somewhat limited to e-informing and e-consulting levels of eParticipation. In this respect, the municipality of Groningen created two specific websites: [www.groningenklimaatbestendig.nl](http://www.groningenklimaatbestendig.nl), which was launched in 2018, and [www.klimaatadaptatiegroningen.nl](http://www.klimaatadaptatiegroningen.nl), which was launched more recently in May 2020. The former website was created to inform residents about the impacts of climate change and to offer them a perspective for action to get started with climate adaptation (Municipality of Groningen, 2020c). It contains information about what residents can do themselves, as well as an overview of the activities and projects that the municipality is involved in. The latter website was made from the municipality's capacity as the host city for the Climate Adaptation Week, scheduled to take place from 19 till 25 January 2021. The website contains information about the several digital events, projects and activities that are scheduled to take place in the run-up to this event. In addition, the website is also used to spread information to citizens about what they can do to contribute to a climate-proof Groningen. The website is accompanied by a LinkedIn, Facebook and Instagram page, as well as a YouTube channel. Moreover, the municipality of Groningen has also launched a phone application, called 'VergroenGroningen', that engages people in the greening of their garden in an accessible way making use of augmented reality technology. Both the first-mentioned

website and the phone application are scheduled to be evaluated in 2020 (personal communication, 8 May 2020).

In the run-up to the publication of the implementation agenda for climate-resistant Groningen, in 2019 an online survey was carried out to gain insight in the residents' opinions on climate change and experiences with climate change adaptation (Municipality of Groningen, 2020a). The target group were members of the residents' panel, and 3547 of the 12323 members have responded. The results of the survey are used, among other things, in the formulation of the climate policy of the municipality of Groningen. Moreover, the municipality of Groningen is currently drafting a plan (Groenplan Groningen, Vitamine G) to give motion to their ambition to greening the municipality. All residents have had the opportunity to respond digitally to this plan or to submit an idea for the implementation plan (Municipality of Groningen). All these responses will be bundled in a consultation note, in which for every response it will be indicated what has been done with it.

Moreover, the municipality of Groningen was the first municipality to join 'Operatie Steenbreek', a national foundation that aims to inspire the public to transform their gardens into green gardens (Municipality of Groningen, 2020c). Through this campaign, the municipality of Groningen organises numerous activities such as a green information evening and depaving actions. Although these activities usually take place offline, websites, social media pages, and a YouTube channel are being used as a way to inform the public and inspire them to take action and get involved in the offline actions. There are also various citizens' initiatives that are concerned with greening the city. Within these initiatives, in some instances, ICTs are being used to facilitate citizen to citizen interaction. For example, the 'Werkgroep Oosterpoort Duurzaam', which aims to make the neighbourhood Oosterpoort more sustainable, makes use of a website, Facebook, an online newsletter, and as a result of the COVID-19 crisis, an online consultation hour. Another example is the 'Groenste Buurt', a corporation of citizens that aims to make the neighbourhood Noorderplantsoen more sustainable. They have developed a website to spread information. Lastly, the 'Groen groep' consists of a number of residents who work on the maintenance of the 'Tiny Forest', a small forest in the neighbourhood Gravenburg in Groningen. Those involved keep in touch through a group chat on WhatsApp.

Over recent years, the municipality of Groningen has also taken steps with regard to higher levels of eParticipation. The municipality is experimenting with various new forms of public

participation in pilot projects. Part of this is its participation in the 'Proeftuin Digitale Democratie', a partnership between municipalities and the central government, with the aim of experimenting with new forms of digital democracy. From this capacity, the municipality has developed an open-source online platform for public participation: De Stem van Groningen (The voice of Groningen). For the creation of this platform, the municipality of Groningen used Consul, a digital participation platform from Madrid. The aim is to create one recognizable participation platform where residents can turn to for ideas, questions and discussions about the city (personal communication, 29 May 2020). However, the platform is still in its initial phase, and it has not yet been used for climate adaptation purposes specifically (personal communication, 29 May 2020). Although the interviewee does not exclude this from happening in the future, she finds it more plausible that climate adaptation will be linked to other developments in the city, over which then will be decided using the platform. Indeed, some outcomes of the first pilot that was concluded in October 2019 did contribute to making the municipality climate-proof, although this was not framed as such. The pilot comprised a citizens' budget of 25.000 euros to be divided over various ideas submitted by residents living in the neighbourhood Oosterparkwijk. As a first step, the submitted ideas were assessed by the municipality in terms of feasibility. The remaining 23 ideas were then voted on, after which 11 ideas have been allocated money. The chosen ideas included the planting of a flower field and walnut trees, hereby adding to the greening and climate-adaptive ambitions of the municipality.

Table 8 on the next page provides an overview of the eParticipation activities in the municipality of Groningen based on the five characteristics of eParticipation design as proposed in the theoretical section.

**Table 8:** eParticipation activities in the municipality of Groningen

eParticipation activities	Targets	Form(s)	Target groups	Timing	Instrument(s)
www.groningenklimaatbestendig.nl	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Raising awareness</li> <li>- Enhancing information provision to increase people's capacity to take action</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> <li>- Housing corporations</li> </ul>	A continuous participation effort that aims to assist participants in the pre-planning, planning, action-development, and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- Specific website</li> </ul>
www.klimaatadaptatiegroningen.nl	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Raising awareness</li> <li>- Enhancing information provision to increase people's capacity to take action</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> <li>- Housing corporations</li> <li>- Non-citizens</li> </ul>	A continuous participation effort that aims to assist participants in the pre-planning, planning, action-development, and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- Specific website</li> <li>- Social media</li> </ul>
VergroenGroningen-application	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Raising awareness</li> <li>- Enhancing information provision to increase people's capacity to take action</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> </ul>	A continuous participation effort that aims to assist participants in the action-development and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- Phone application</li> </ul>
Implementation Agenda Climate Resistant Groningen	Improving the quality of public policy	E-consulting	Members of the residents' panel	The members were given a few weeks to complete the survey. Part of the pre-planning and planning phases.	<ul style="list-style-type: none"> <li>- Online survey</li> </ul>

Greenplan Vitamin G	Improving the quality of public policy	E-consulting	All citizens	All residents were given a month to respond to the plan. Part of the planning and action-development phases.	- Online feedback form
Operation Steenbreek	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Creating awareness</li> <li>- Inspiring people to transform their gardens into green gardens</li> <li>- Providing a platform for citizens to bundle their powers</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> </ul>	A continuous participation effort that aims to assist participants in the pre-planning, planning, action-development, and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- Specific website</li> <li>- Social media</li> </ul>
Various citizen's initiatives	<ul style="list-style-type: none"> <li>- Providing residents with information to increase their willingness and capacity to take action</li> <li>- Inspire other residents and citizens' initiatives</li> </ul>	E-informing	Citizen to citizen interaction	Continuous participation efforts that can support citizen to citizen interaction during all phases of climate adaptation development	<ul style="list-style-type: none"> <li>- Specific website</li> <li>- Social media</li> <li>- WhatsApp</li> </ul>
Citizens' budget Oosterparkwijk	<ul style="list-style-type: none"> <li>- Giving citizens the power to decide what the neighbourhood budget will be spent on.</li> <li>- Sharing the responsibility for decision-making</li> <li>- Improving the quality of decision-making</li> </ul>	E-empowering	Residents of the neighbourhood Oosterparkwijk	The process involved two steps. In the first round, everyone could come up with ideas. In a second round, the ideas were voted on. Part of the action-development phase.	- De Stem van Groningen

## 5.5 Factors affecting eParticipation adoption

Various factors impact the current degree of adoption of digital participation in the municipality of Groningen. To start with, the city council has made public participation a cornerstone of all activities within the municipality (personal communication, 29 May 2020). The municipality is aware that people increasingly demand democratic autonomy, and recognises that involving the public has the potential to make the municipality more beautiful and of higher quality, and the people more understanding (Municipality of Groningen, WIJ Groningen and Stadsadviseur, 2019). From this willingness to relinquish autonomy, Groningen has participated in the 'Proeftuin Digitale Democratie', with this kickstarting experiments with new forms of digital participation. As a result of the involvement in this partnership and being part of the municipal innovation programme, sufficient financial resources are currently available for eParticipation activities and innovations (personal communication, 29 May 2020). One interviewee indicated that this is also the case for the continuation, evaluation, and possible improvement and expansion of eParticipation activities regarding the dissemination of information and raising of awareness about climate adaptation (personal communication, 8 May 2020). This is mainly because the municipality of Groningen strives to integrate expenditure in the field of climate adaptation as much as possible within existing financial programs and budgets (Municipality of Groningen, 2020c). However, both respondents stress that the current situation does not represent any guarantee for the future.

Furthermore, although the municipality is already quite active when it comes to increasing digital democracy, the COVID-19 crisis is expected to catalyse further the process (personal communication, 8 May 2020; personal communication, 29 May 2020). The city council finds it imperative to continue public participation processes, opening the door for the use of digital methods (Municipality of Groningen, 2020b). The crisis seems to also increase personnel and public support for eParticipation activities (personal communication, 29 May 2020). Another impacting factor is the availability of software. The ability to leverage and build on Madrid's existing open-source participation platform Consul has made it easier for the municipality of Groningen to get started. However, in the beginning, there were some problems with the lack of necessary specialist knowledge. This has been largely solved with the outsourcing of the hosting and management to external parties. This was part of the general assignment of the city council to outsource ICT. Nevertheless, the lack of digital knowledge and skills among civil servants remains an obstacle (personal communication, 8 May 2020; personal communication, 29 May 2020). In line with this, the interviewee stated that the municipality of Groningen still



lacks champions who have an overarching understanding of ICT, communication and participation (personal communication, 29 May 2020).

Another barrier to the adoption of eParticipation in the field of climate change adaptation is its perceived usefulness in this subject. The solutions to climate change adaptation are quite practical and often requires adjustments at the individual house or street level. In these cases, it is often found to be more useful to be physically present in the neighbourhood and provide practical help than to use an online tool (personal communication, 8 May 2020; personal communication, 29 May 2020). In addition, another reason why using online tools for participation can be considered useless has to do with the digital divide, the phenomena that not everyone in society is able to benefit equally from ICT innovations. For example, in the pilot project climate-adaptive Paddepoel, which is part of the implementation agenda climate-proof Groningen, the municipality has deliberately opted for offline citizen participation since the target group consisted of mainly older people (personal communication, 8 May 2020).

Lastly, when it comes to privacy and security issues, the municipality of Groningen has to date not experienced difficulties (personal communication, 29 May 2020). The testing of participation processes against predefined protocols, and close cooperation with the privacy and security officer help with this. What also helps is that the platform De Stem van Groningen only requires participants' email addresses. However, according to one interviewee (personal communication, 29 May 2020), it is sometimes difficult to account for purpose limitation, which is required by the General Data Protection Regulation (GDPR) and is a key personal data protection principle which requires that the collection and processing of personal data has a clearly defined and justified purpose. This is sometimes difficult to establish when it comes to eParticipation and public participation in general, given that these practices are not always legally required.

## **5.6 Sub-conclusion**

With the results presented in this chapter, sub-questions 4 and 5 can be answered for the municipality of Groningen. Recalling these sub-questions (made specific for this case study):

- *How does eParticipation in the field of climate adaptation manifest itself in Groningen?*
- *What are the contributing factors and barriers to eParticipation adoption by the municipality of Groningen?*

The current manifestations of eParticipation in the area of adaptation in Groningen have been described based on the five design characteristics of eParticipation (summarized in Table 8). It is observed that the majority of the eParticipation activities constitute a one-way channel from the government to citizens intending to increase overall participation, raise awareness, and providing citizens with the necessary information to increase their willingness and capacity to take action. These are generally continuous participation efforts that aim to assist all citizens, businesses and housing corporations during the pre-planning, planning, action-development, and implementation phases of climate adaptation. Tools used for these eParticipation efforts are specific websites, social media, and a phone application. Besides, there are also two instances in which the municipality consulted the public, utilizing an online survey and an online feedback form, before and during the drafting of policy. The objective of these activities was to improve the quality of these policies.

Furthermore, it also came to light that citizens initiatives are an important way in which citizens participate in the governance of urban climate adaptation. The use of ICTs in this type of interaction could not be adequately addressed by the analytical framework, as all eParticipation levels described herein involve some form of government-citizen interaction. However, within these initiatives, citizen to citizen interaction, although limited to e-informing, is sometimes mediated by websites and social media. Lastly, the municipality is currently experimenting with higher levels of eParticipation. Although not yet employed for climate adaptation, specifically, a pilot project shows that empowering citizens through online tools has the potential to generate climate-adaptative measures.

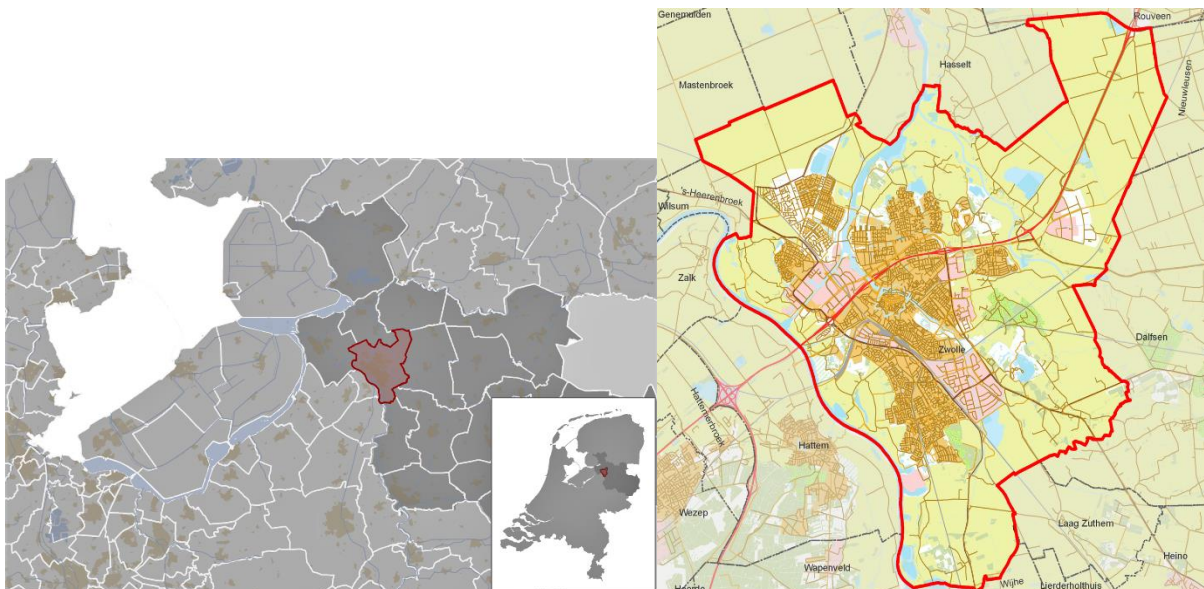
Regarding the factors affecting eParticipation adoption in Groningen, it was found that from a deep-seated willingness to relinquish autonomy, the municipality is increasingly starting to experiment with higher levels of eParticipation. From this capacity and the increasing social attention for climate adaptation, sufficient financial resources are available for eParticipation, which sets off and sustains the development. Furthermore, the COVID-19 crisis is expected to serve as catalysator, triggering digital innovations for participation out of necessity and as a result of increased political, personnel and public support. There are also barriers to eParticipation development in Groningen, which include the lack of digital knowledge and skills among civil servants, the absence of leadership, and the perceived uselessness of eParticipation in climate adaptation, partly due to the digital divide.

## 6. Case study 2: Zwolle

This chapter presents the case study of the municipality of Zwolle, situated in the Netherlands. This chapter follows the same structure as the previous chapter. First, a general introduction to the municipality of Zwolle is provided. Then the climate change impacts on the city are elaborated on, as well as the city's climate change adaptation policy. The analysis then sets out to explore the role that eParticipation plays in climate change adaptation, as well as the factors that account for this. The section ends with a sub-conclusion.

### 6.1 Introduction

Zwolle is a municipality situated in the eastern part of the Netherlands in de province of Overijssel (see Figure 7), of which the city of Zwolle is the capital. In addition to the city of Zwolle, the municipality of Zwolle also includes the two villages Wijthmen and Windesheim and seventeen other hamlets. Zwolle is situated in the IJssel-Vecht delta, alongside the rivers the Zwarte Water (“Black Water”) and the Overijsselse Vecht. The city is also connected to the river the IJssel via the Zwolle-IJsselkanaal. This spatial orientation makes the municipality of Zwolle extra vulnerable for flooding.



**Figure 7:** Spatial orientation of the case study Zwolle

As of January 2020, the municipality of Zwolle counted 128,833 inhabitants, making it the nineteenth largest municipality in the Netherlands (Municipality of Zwolle, 2020a). Zwolle has been experiencing strong population growth for years, and the population is expected to

increase further by 12.9 per cent in the period 2018-2050 (PBL Netherlands Environmental Assessment Agency, 2019). The municipality of Zwolle has a relatively young population, mainly because the municipality attracts many people in their twenties who start a family (Statistics Netherlands, 2017). In total, the municipality of Zwolle covers 119.36 square kilometres of which 111.10 are land, and 8.26 are water. The population density is 1079 inhabitant per square kilometre. The municipality of Zwolle is divided into five districts, seventeen districts and seventy-eight neighborhoods.

## 6.2 Climate change impacts

The municipality of Zwolle has conducted a series of climate stress tests to provide insight into the impacts of climate change in the built environment. Maps show which areas are vulnerable to the following four climate effects: flood risk, water nuisance, heat and drought. (Municipality of Zwolle).

For flood risk, the municipality of Zwolle derives the potential impacts from a study done by Deltares (2017) into the direct and indirect effects of flooding in the IJssel-Vecht Delta. In this study, the effects of two flooding scenarios were investigated:

- Flooding of the Vecht: dyke breach primary barrier at Berkum (probability 1/1250 years)
- Flooding of the Sallandse Wetering: the breaching of dykes at a regional barrier near Windesheim (probability 1/200 years).

The first scenario projects vast water depths over a large area. The expected effects are the failure of the road network, the failure of electricity, the disruption of rail traffic, the failure of the mobile network, and damage to gas pipelines. These effects also bring about further cascades such as problems with communication and the supply of the Isala hospital. The second scenario project far fewer effects given its smaller flood area and housing of vital infrastructure. The expected effects are the impassability of roads, damage to buildings, and the outage of power in specific neighbourhoods. Indirect effects mainly have to do with the failure of electricity. The municipality of Zwolle has the ambition to guarantee safety against a regional flood from the Sallandse Wetering with a probability of once every 200 years.

For water nuisance, the municipality stresses that extreme precipitation and emerging groundwater flows can locally lead to problems as a result of flooding. The municipality of Zwolle considers flooding problematic when water depths on the surface reach 20 centimetres

or higher and lead to damage to buildings, the inaccessibility of access roads, or the disruption of vital functions. Multiple maps have been created that depicts the expected surface water depth as a result of various rain shower intensities, one that occurs once every ten years (29 mm in 1 hour), once every 100 years (67 mm in 1 hour), and once every 250 (79 mm in 1 hour) years (Municipality of Zwolle). Herein, the monetary damage that such events cause to buildings is expressed in the level of urgency, ranging from extremely urgent ( $>€300/m^2$ ), to very urgent ( $€150 - 300/m^2$ ), to urgent ( $<€150/m^2$ ). In addition, maps have been made that visualize the accessibility of roads during two types of rain showers (67 and 79 mm per hour). Here, a distinction is made between passable, passable for emergency traffic, and impassable. All in all, the municipality of Zwolle has the ambition to be able to process a shower of 67 mm in 1 hour without it causing damage to buildings, reduced accessibility and social disruption.

When it comes to heat, the municipality of Zwolle is preparing for extreme heat as a result of climate change. They stress that extreme heat poses health risks, especially for vital and vulnerable functions, such as hospitals and care homes, and vulnerable groups, such as the elderly and young children. On top of that, it is argued that heat stress can have a negative effect on the quality of sleep, labour productivity, water quality (Municipality of Zwolle). The municipality has mapped its susceptibility to the heat effect on a tropical day ( $>30\text{ }^\circ\text{C}$ ), as well as the spatial distribution of the number of tropical nights ( $>20\text{ }^\circ\text{C}$ ) in 2050. The ambition of the municipality of Zwolle is to limit the number of nights above  $20\text{ }^\circ\text{C}$  to a maximum of seven per year and to limit the urban heat effect to a maximum of  $3\text{ }^\circ\text{C}$ .

With respect to drought, impacts for the municipality of Zwolle range from problems with the freshwater supply, soil subsidence due to settling of peat-containing soil, rotting of wooden foundations, damage to monumental greenery, damage to houseboats as a result of lower water levels, and the deterioration of bathing water (Municipality of Zwolle). Maps have been drawn that indicate the expected effects of drought in terms of the additional subsidence and change in average lowest groundwater level for the period 2016-2050. To limit the consequences of drought, the municipality of Zwolle has the ambition to limit the relative additional reduction of the average lowest groundwater level to a maximum of 15 centimetres (Municipality of Zwolle).

### 6.3 Climate change adaptation policy

The municipality of Zwolle has long been active in the field of climate adaptation. Although for a long time this did not happen under the heading of climate adaptation, the municipality of Zwolle has been working for more than twenty years to make the city more resilient to flooding (Heideveld and Janssen, 2019). Climate adaptation further raised in prominence when in 2006 the national government planned to raise the water level of the IJsselmeer by 15 meters to increase the fresh water supply. This would have had major consequences for water management in Zwolle, among which the potential flooding of the old city centre. From then on, the municipality of Zwolle really realized its interconnectedness with the water system, resulting in political support and the substantial release of financial resources for climate change adaptation purposes (Heideveld and Janssen, 2019).

In 2017, in the first part of the environmental vision, the municipality of Zwolle established the following ambitions and goals for climate change adaptation (Municipality of Zwolle, 2017):

- Zwolle will be climate-proof in 2050, making it safe for flooding and adapted to extreme weather.
- As of 2020, Zwolle acts climate adaptively in a structural way
- We are taking advantage of opportunities that currently arise to make Zwolle more climate-proof.
- Climate adaptation contributes as much as possible to other challenges in Zwolle.
- Zwolle capitalizes on the economic opportunities that climate adaptation offers.

In this document, the municipality of Zwolle also expressed the aim to develop an adaptation strategy, which was given substance to with the production of the Zwolse Adaptation Strategy (ZAS) in 2019. The strategy employed by the municipality of Zwolle is threefold (Municipality of Zwolle, 2019b). The first part is related to how to deal with flooding. The municipality is committed to working closely with the water board, the province and the central government to see what is possible when it comes to raising dykes, for example under the national Flood Protection Program. In addition, the municipality is committed to adapting the spatial layout to reduce the consequences of flooding and to stimulate citizens to take precautionary measures. The second part is to develop a resilient green-blue network. The municipality aims to better organize and add elements to the already existing green-blue structure. The municipality emphasizes that this not only provides an excellent climate buffer but also contributes to the well-being of residents, an improved business climate, and the preservation

and strengthening of biodiversity. The third part is the city-wide greening. Seventy per cent of the territory of the municipality of Zwolle is owned by private parties, making them essential actors to achieve the set ambitions and goals (Heideveld and Janssen, 2019). The municipality therefore actively encourages individual residents and businesses to take measures, such as green roofs, rain gardens and barrels, and rainproof streets.

Throughout the adaptation strategy, the municipality of Zwolle emphasizes the importance of collaboration. In this collaboration, the municipality takes on different roles, from leading and guiding, to networking and participating. Within its own organization, the municipality strives to make climate adaptation an integral part of the way of working. The many municipal organizational units involved in climate adaptation are provided with the knowledge and tools to make climate adaptation a standard part of every project, renovation, new construction or change in the existing built environment. The municipality has collected the results of the stress test in the Zwolse Climate Atlas, an online dynamic map catalogue. This makes knowledge about the impact of climate change available to everyone. It also provides information and inspiration about the measures that residents themselves can take to reduce this impact. With this tool, the municipality strives to start the conversation and to encourage people to take action themselves. Where this proves to be insufficient, the municipality is prepared to use laws and regulations such as design requirements and restrictions.

In order to give direction to the implementation of this strategy, the municipality of Zwolle is involved in various partnerships and projects in the field of climate adaptation. Through these activities, the municipality increases the available knowledge while generating innovation and employment opportunities (Municipality of Zwolle, 2019b). These partnerships are RIVUS, IJssel-Vechtdelta, Climate Campus, and the City Deal Climate Adaptation.

In conclusion, climate change adaptation is playing an increasingly important part of the internal organization of the municipality. However, until now, they mainly worked on the basis of ad hoc projects. To give more direction to the measures to be taking the municipality is currently setting up a multi-year implementation program that links up with already existing initiatives (Heideveld and Janssen, 2019). Knowledge from the stress tests on the most sensitive areas must give direction to the prioritization of the measures within this program (Municipality of Zwolle, 2019b).

## 6.4 eParticipation in climate change adaptation

In the publication 'Beginspraak: Samen kleur geven aan de stad' (2008) the municipality of Zwolle describes its vision on public participation. The municipality of Zwolle expresses its intention to give the community 'the space and confidence to influence, together with the municipality, the developments in the city' (Municipality of Zwolle, 2009). The term 'beginspraak' (initial speech) is coined, which captures the municipality's ambition to involve the public early in the development and elaboration of all spatial and social plans and issues. By setting some basic game rules, the document sets the framework within which municipal participation projects must manoeuvre. For example, all target groups involved must be taken seriously as partners in the process. In addition, there must be clear agreements about what is discussed, who is involved, and who has which role and decision-making authority. All parties involved must also have access to sufficient information, and it must be clear how the results of the process will be dealt with. Herewith, the document offers the municipal council the opportunity to assess and evaluate communication and participation during planning processes.

In the vision, the municipality of Zwolle describes 22 participation methods that can serve the purpose of 'beginspraak'. These methods range from sounding boards and inspiration meetings to house-to-house visits, consultations, and interactive websites. Apart from interactive websites, there is no mention of how ICT can contribute to the implementation of these methods. This is reflected in practice, in which, when it comes to the three highest levels of public participation - involve, collaborate, empower - until now, primarily traditional methods are being employed. This applies to all themes within the municipality of Zwolle, including climate change adaptation (personal communication, 27 May 2020). However, the measures regarding social distancing in response to the outbreak of COVID-19 have moved the municipality of Zwolle to reflect on how participation and cooperation with citizens can be continued under these new circumstances. This reflection has been recorded in a memorandum called 'Participation in changing times and at a distance (at least 1.5 meters)' (Municipality of Zwolle, 2020b). In this memorandum, the municipality of Zwolle emphasizes the importance of continuing participation processes and state that they will start experimenting with new forms of participation in the forthcoming time. The municipality aims to internally share experiences, evaluate processes, and to adjust them where necessary. Currently, a toolbox is being drawn up containing all online methods that can be used (personal communication, 27 May 2020). Nevertheless, even under these new circumstances, it



remains important, according to the municipality of Zwolle, to opt for a mix of analogue and digital means. Although the potential of digital means to allow more and other people to participate is recognized, the municipality also emphasizes that it remains relevant to pay attention to people who are less digitally skilled (Municipality of Zwolle, 2020b; personal communication, 27 May 2020).

One of the first experiences with a higher level of eParticipation has been gained through an interactive co-creation session regarding the redesign of the Azaleapark (personal communication, 27 May 2020). The redesign of the Azaleapark is an initiative by residents who call for more natural materials in the park, an improved football field, and some additional playground equipment. The municipality saw the opportunity to link the restructuring of the park to other goals, such as the drainage of excess rainwater. By doing so, climate-proofing the park and the surrounding area has now become an integral part of the plan. At the end of February this year, a walk-in evening took place for local residents to discuss the plans. As a follow-up to this, an offline co-creation evening was initially planned with a select group of residents to work on the actual design of the park. However, due to the COVID-19 crisis, this co-creation session has now taken place using videoconferencing software Zoom. According to the interviewee (personal communication, 27 May 2020), the first experiences are positive, and there are indications that this form of participation appeals to a different group of people. However, the official evaluation has yet to take place.

Before the COVID-19 crisis, eParticipation in the field of climate adaptation was mainly limited to the first two types of eParticipation, e-informing and e-consulting. The most obvious example of this is the website of the municipality of Zwolle. The website contains general information about the negative impacts of climate change in Zwolle and on how these can be dealt with. It contains information about what the municipality does, what residents of the municipality do, and what individuals can do to contribute to making the municipality climate-proof. The website aims to create awareness and provide people with information in order to increase their willingness and capacity to take action (personal communication, 27 May 2020). As a supporting tool for this, the municipality of Zwolle also created the Climate Atlas (Klimaatatlas). This digital platform contains the results of the stress tests and provides information on how to deal with the negative consequences of climate change at the individual level (Municipality of Zwolle). On this platform, individual residents and companies can gain insight into the possible adverse effects of extreme precipitation, heat, floods, and drought for their premises. The degree of impacts is visualized using maps generated by geographical

information system software ArcGIS. The platform also contains a project map with an overview of what is already happening in the municipality, as well as a summary of the future strategy. However, according to the interviewee (personal communication, 27 May 2020), climate atlas is hardly being used by residents and companies. As an explanation for this, she refers to mainly technical nature of the information on the platform that might only appeal to professionals and people with a special interest. For this reason, the municipality of Zwolle has the ambition to make the platform more interactive (personal communication, 27 May 2020). The first steps for this have been taken with the development of two interactive digital maps using ArcGIS, that are linked to the climate atlas, on which residents can report where and when they have experienced flooding and heat stress. The so-called 'Nattevoetenkaart' (Wet feet map) and 'Zweetdruppelkaart' (Sweatdrop map) are based on the principle of citizen science and have been developed with the aim of providing the municipality and residents with more insight into the spatial orientation of vulnerable areas to flooding and heat stress. The input is also used to test the flooding and heat calculations done by the municipality (Municipality of Zwolle, 2019a), while also spreading awareness among the public (personal communication, 27 May 2020). Till date, over 200 reports have been made regarding flooding and 43 reports of high day or night temperatures. Although there is some degree of participation, the municipality is not satisfied. In order to increase awareness about the existence of the maps and to encourage people to actually use them, the municipality of Zwolle increasingly makes use of social media such as Facebook and Twitter. During a heatwave or extreme weather occurrence, the municipality uses these platforms to call upon people to use the maps. The last time this happened was during storm Ciara on February 9, 2020.

As discussed before, adapting to climate change requires to a great extent interventions in the private living environment. For that reason, the municipality of Zwolle stimulates citizens' initiatives in which they play a facilitating or information-proving role (personal communication, 27 May 2020). As a result, various citizens' initiatives have emerged where people aim to make their own street or neighbourhood more climate-proof. The role that the municipality plays within these initiatives differ. On the one hand, there are initiatives such as '50 tinten groen Assendorp', 'Klimaat actieve Seringenstraat', and 'De groene loper Zwolle', in which local residents work together to green their street or individual properties by constructing, for example, façade gardens or green roofs (Municipality of Zwolle). Within these initiatives, the municipality mainly plays an information-providing role by providing residents with knowledge regarding the possibilities and methods. Another role the municipality plays in these sort of citizens' initiatives is the provision of practical help.

Interaction between residents and the municipality in this type of initiative mainly takes place through the district manager or the members of a specialist team that have to boost such initiatives (Aanjaagteam KlimaatActief!). Given the practical nature of the initiatives, this interaction takes place mainly through conventional methods. Online resources such as videos on YouTube, the website and the climate atlas are utilized when it comes to the provision of one-way information which enables citizens to take action (personal communication, 27 May 2020). In another type of citizens' initiative, such as 'Het Tussendoortje' and 'Bernisse en kleine Alm', which often involves slightly larger spatial interventions for which the design is a collaborative effort between citizens and the government. Within these projects, citizens are the initiating party while the government plays a facilitating and often executive role. The 'Bernisse en kleine Alm' is part of a larger project to climate-proof eight streets in the AA-Landen district. To date, in this project, participation efforts have all taken place offline. However, as a result of the COVID-19 crisis different opportunities are currently being explored, ranging from offline location independent methods such as an idea box or a written survey to online methods such as an online survey or a presentation of the plans using Skype or YouTube.

Citizens' initiatives logically also include much citizen-to-citizen interaction. Studying the websites of the aforementioned initiatives in Zwolle indicates that this interaction mainly takes place offline. This is not surprising given that the residents who collaborate in such initiatives usually live in close proximity to each other. However, their websites, and in some case, social media accounts ('50 tinten groen Assendorp', 'Groene Loper Zwolle') are being used as a platform to inform participants, while inspiring other residents in greening their surroundings too. In one case, that of the 'Klimaat Actieve Seringenstraat' the initiators conducted an online survey to evaluate the initiative.

Table 9 on the next page provides an overview of the eParticipation activities in the municipality of Zwolle based on the five characteristics of eParticipation design as proposed in the theoretical section.

**Table 9:** eParticipation activities in the municipality of Zwolle

eParticipation activities	Targets	Form(s)	Target groups	Timing	Instrument(s)
www.zwolle.nl	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Raising awareness</li> <li>- Enhancing information provision to increase people's capacity to take action</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> </ul>	The government website is a continuous participation effort that aims to assist participants in the pre-planning, planning, action-development, and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- General website</li> <li>- Videos</li> </ul>
Klimaatatlas	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Creating awareness</li> <li>- Enhancing information provision to increase people's capacity to take action</li> </ul>	E-informing	<ul style="list-style-type: none"> <li>- All citizens</li> <li>- Businesses</li> <li>- Experts</li> </ul>	The 'Klimaatatlas' is a continuous participation effort that aims to assist participants in the pre-planning, planning, action-development, and implementation phase of adaptation actions.	<ul style="list-style-type: none"> <li>- Online information platform</li> <li>- Videos</li> <li>- GIS-Tool</li> </ul>
Nattevoetenkaart	<ul style="list-style-type: none"> <li>- Raising awareness</li> <li>- Improving the quality of public policy</li> <li>- Testing the robustness of flooding and heat calculations done by the local government</li> </ul>	E-informing E-consulting	All citizens	The 'Nattevoetenkaart' is a continuous participation effort that aims to assist the local government in the planning and action-development phase of adaptation planning.	<ul style="list-style-type: none"> <li>- GIS-Tool</li> <li>- Social media</li> </ul>
Zweetdruppelkaart	<ul style="list-style-type: none"> <li>- Raising awareness</li> <li>- Improving the quality of public policy</li> <li>- Testing the robustness of flooding and heat calculations done by the local government</li> </ul>	E-informing E-consulting	All citizens	The 'Nattevoetenkaart' is a continuous participation effort that aims to assist the local government in the planning and action-development phase of adaptation planning.	<ul style="list-style-type: none"> <li>- GIS-Tool</li> <li>- Social media</li> </ul>

Co-creation Azaleapark	<ul style="list-style-type: none"> <li>- Increasing overall participation</li> <li>- Sharing responsibility for the development of the project</li> </ul>	E-collaborating	- A specific group of local residents that are directly affected by the project, and who were identified during a previous offline meeting.	The co-creation session lasted several hours and is part of the planning and action-development phases of the project.	Video conferencing software (Zoom)
Various citizens' initiatives	<ul style="list-style-type: none"> <li>- Providing residents with information to increase their willingness and capacity to take action</li> <li>- Inspire other residents and citizens' initiatives</li> </ul>	E-informing	Citizen to citizen interaction	Although some citizens' initiatives have finished, their websites and social media pages may continue to inspire people and provide information to them that may be useful in the pre-planning, planning, action-development, and implementation phases.	<ul style="list-style-type: none"> <li>- Specific website</li> <li>- Social media</li> </ul>
Klimaat Actieve Seringenstraat	<ul style="list-style-type: none"> <li>- Evaluating the process of the citizens' initiative</li> </ul>	E-consulting	Citizen-to-citizen interaction aimed at the residents involved in the initiative.	Involved residents had several weeks to complete the survey. Belongs to the evaluation phase of the initiative.	E-survey

## 6.5 Factors affecting eParticipation adoption

As discussed in the previous sub-section, eParticipation in the field of climate adaptation in the municipality of Zwolle is predominantly limited to e-informing and e-consulting levels of eParticipation. There are several factors that influence this current state of affairs. According to the interviewee (personal communication, 27 May 2020), the main reason that higher levels of eParticipation have so far been absent is a matter of habit, the lingering in conventional participation methods. Currently, the COVID-19 crisis is experienced as an opportunity for breaking this habit. Soon after the onset of the crisis, the continuation of participation processes through online methods received great support from political management and project leaders (personal communication, 27 May 2020). The municipality is aware of the importance of continuing participation processes for the realization of (municipal) objectives in the areas of quality of life, housing, energy and climate adaptation. They emphasize its importance for the future-oriented developments that are important for the quality and livability of Zwolle in the short and long term (Municipality of Zwolle, 2020b).

With the COVID-19 crisis offering a window of opportunity and increased support from top management and local politics, the municipality of Zwolle is currently experimenting with new forms of eParticipation. An important enabling factor for this is the presence of IT champions within the organization. In the municipality of Zwolle the so-called 'webteam', consisting of three IT employees, takes on a leadership role that stimulates eParticipation development throughout the municipality (personal communication, 27 May 2020). However, the municipality also experiences obstacles in the adoption of eParticipation. This mainly has to do with the availability of knowledge and skills among civil servants (ibid). The average age of the employees of the municipality of Zwolle is relatively high, making the adaptation to new forms of participation using online systems a relatively time and energy-intensive process. Another hindering factor is the availability of the right software for eParticipation purposes. Project leaders are currently tapping into a fragmented body of eParticipation software, usually the unlicensed version offering few options (personal communication, 27 May 2020). For this reason, the municipality of Zwolle is currently setting up an overview of useful eParticipation software that should be used throughout the entire municipality. This is also where the financial aspect comes into play as licensing software costs money. Although the municipal council considers the continuation of participation necessary, according to the interviewee (personal communication, 27 May 2020), a different situation may arise if money comes into play. For this reason, the municipality is trying to accommodate any additional costs within

the project budget (Municipality of Zwolle, 2020b). However, it should be noted that the interviewee stated that it is too early to say anything concrete about the availability of financial resources for eParticipation purposes on the longer term.

Moreover, another factor that hinders the municipality of Zwolle from fully committing to eParticipation is the digital divide. The municipality is aware that not everyone has the tools and skills to participate in an online environment. For this reason, the municipality of Zwolle is not eager to digitalize participation processes if the target audience is not suitable for this (personal communication, 27 May 2020). In this sense, it is argued that participation remains a tailor-made endeavour and requires a combination of online and offline methods to increase overall participation and effectiveness (Municipality of Zwolle, 2020b). Lastly, according to the interviewee (personal communication, 27 May 2020), privacy and security concerns require some exploration in this new way of participation. This is about when to ask for permission, and how to handle and, if allowed, store data. However, with the implementation of the General Data Protection Regulation (GDPR) in 2018, protecting personal data is already increasingly interwoven in the daily practices of the municipality. Because of this, in combination with the appointment of a privacy officer, the interviewee is convinced that the municipality is sufficiently capable of adequately dealing with these concerns (personal communication, 27 May 2020).

## 6.6 Sub-conclusion

With the results presented in this chapter, sub-questions 4 and 5 can be answered for the municipality of Zwolle. These sub-questions, made specific for this case study, are:

- *How does eParticipation in the field of climate adaptation manifest itself in Zwolle?*
- *What are the contributing factors and barriers to eParticipation adoption by the municipality of Zwolle?*

The current manifestations of eParticipation in the area of adaptation in Zwolle have been described based on the five design characteristics of eParticipation (summarized in Table 9). Just as in Groningen, the majority of eParticipation activities revolve around either the directional spreading of information from government to citizens or a limited-two way channel to collect public feedback. These forms of eParticipation are observed in both government-citizen and citizen-citizen interactions. There has been one instance in which ICT enabled

citizens to engage in a deliberation process and exercise direct authority over the redesign of a park to make it climate-proof.

Regarding the factors affecting eParticipation adoption in Zwolle, it was found that sticking to traditional methods of participation as a habit ensured that higher levels of eParticipation have to date mostly been absent. Only since the outbreak of COVID-19 the municipality of Zwolle started to recognize the possibilities of ICT-facilitated public participation in the field of climate adaptation. Factors that currently stimulates the development of eParticipation in the municipality of Zwolle are increased support from management and local politics, and the presence of IT champions who take the lead. The municipality also experiences barriers to eParticipation adoption, which include the unavailability of knowledge and skills among civil servants, the absence of proper software, and the digital divide.

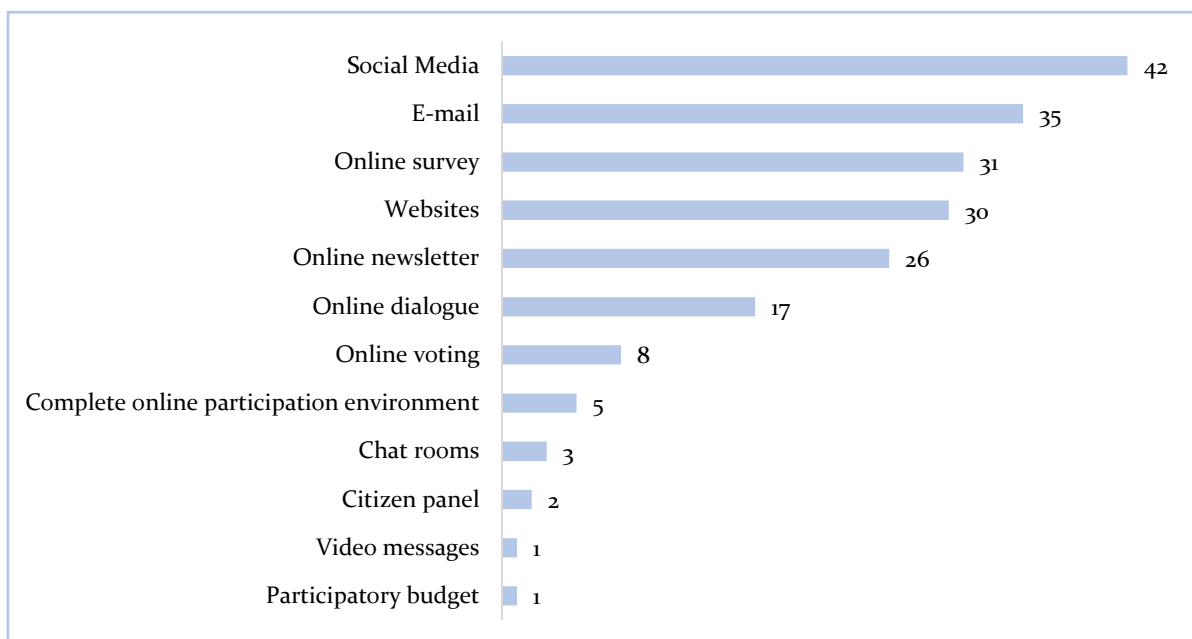


## 7. Survey results

The results of the case studies have shown that eParticipation in the field of climate change adaptation is emerging, but that it is still somewhat limited to the e-informing and e-consulting levels of eParticipation. In line with this, it is expected that insufficient participation initiatives have yet been developed to draw lessons from them when it comes to conditions for success. For that reason, the 23 factors identified in the literature that influence success when designing eParticipation initiatives, have been submitted to municipal practitioners in order to gain insight in what they perceive to be important factors when designing such endeavours. Besides, questions have been asked to gain insight into the role that practitioners envision for eParticipation in the field of climate adaptation.

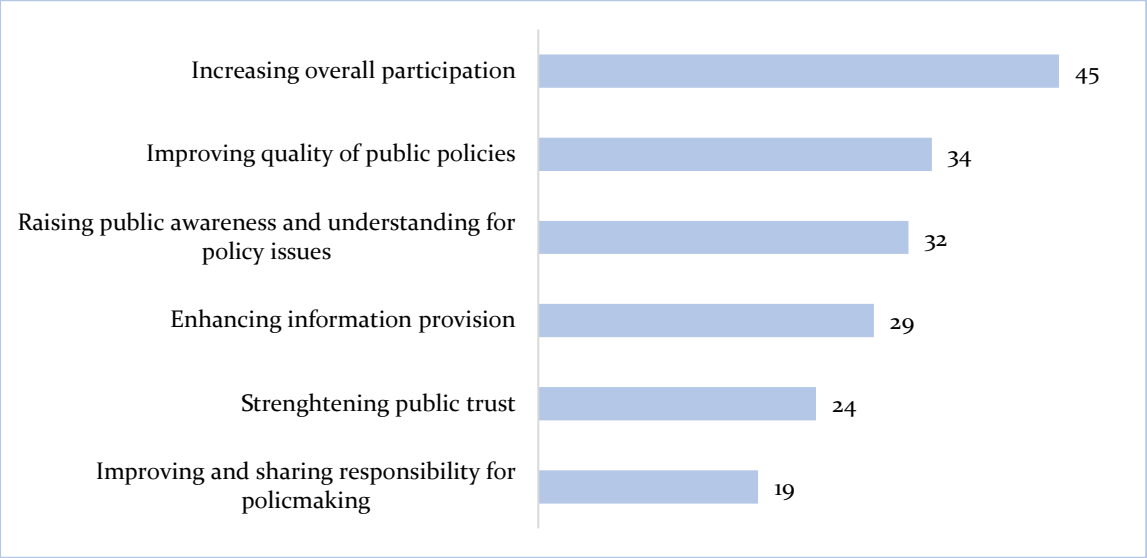
### 7.1 Findings

First, the practitioners were asked to note in what ways eParticipation is currently being employed within their municipality in relation to climate change adaptation. As can be seen in Figure 8, mainly online tools are used that support the low levels of eParticipation. Over 80 per cent of the municipalities use social media, whereas 60 per cent of the municipalities use websites, either the municipal website or specific ones, to communicate information. More than 60 per cent of the municipalities indicate that they have used an online survey, while only a third of the municipality indicates that they use some form of online dialogue.



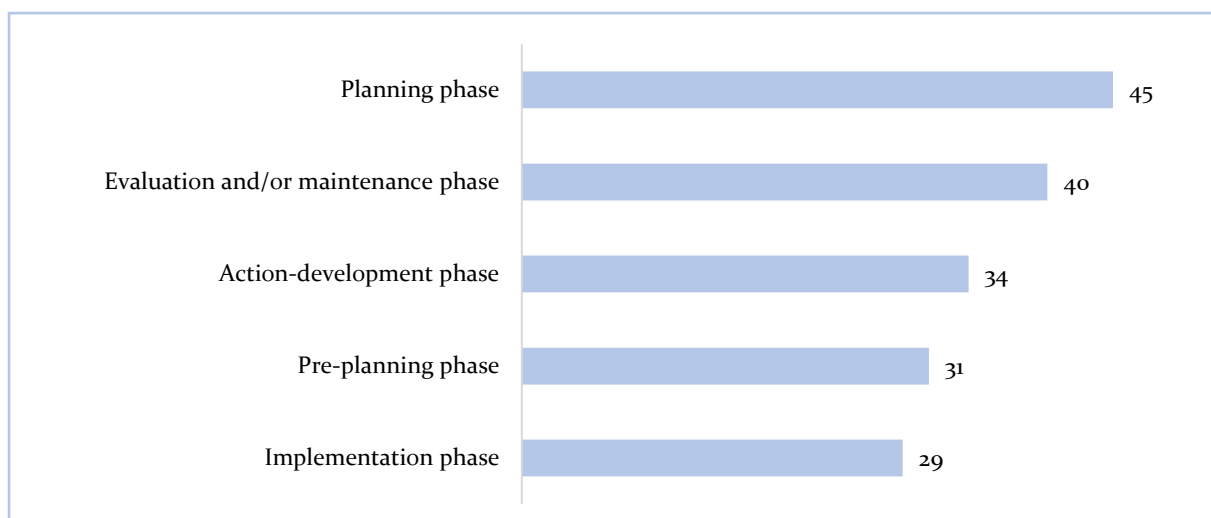
**Figure 5:** Practitioners' answers to the question "What type of eParticipation tools are used in your municipality? (#, multiple answers possible)"

When posed with the question to reflect on the goal of eParticipation almost 90 per cent of the respondents indicate that it serves to increase the overall participation of citizens (Figure 8), while improving the quality of public policies, raising awareness and enhancing the information provision are also considered important objectives. It is interesting to see that only 37 per cent of the practitioners consider improving and sharing the responsibility of policymaking as an objective of eParticipation.

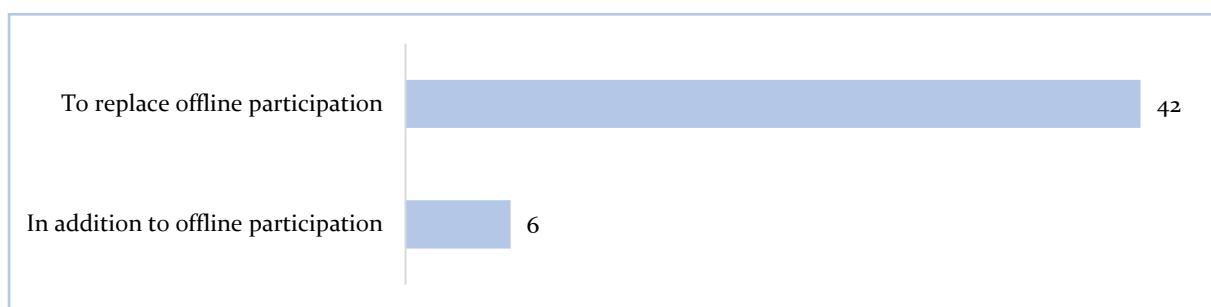


**Figure 6:** Practitioners' answers to the question “What do you think is the goal of eParticipation?” (#, multiple answers possible)

Practitioners were also asked in which phase of climate adaptation planning they anticipate a role for eParticipation. Figure 9 shows that eParticipation is expected to serve some purpose at every stage of the planning processes. The primary role is foreseen for the planning and evaluation phases, while a smaller role is assigned to the pre-planning and implementation phases. Furthermore, the respondents were asked to reflect on the role of eParticipation in relation to traditional offline methods of participation. It is interesting to see that the vast majority of the practitioners view eParticipation as an addition to traditional participation (Figure 10). Only 12 per cent of the respondents think that online methods of participation can eventually completely replace offline methods. Some respondents highlighted that it is situation-dependent and that eParticipation in some cases substitutes offline methods, while in other cases it complements it. There were two respondents that noted that during the COVID-19 crisis eParticipation is used to replace offline participation, but that it is expected that in the long term it will serve more as a supplement to offline methods.

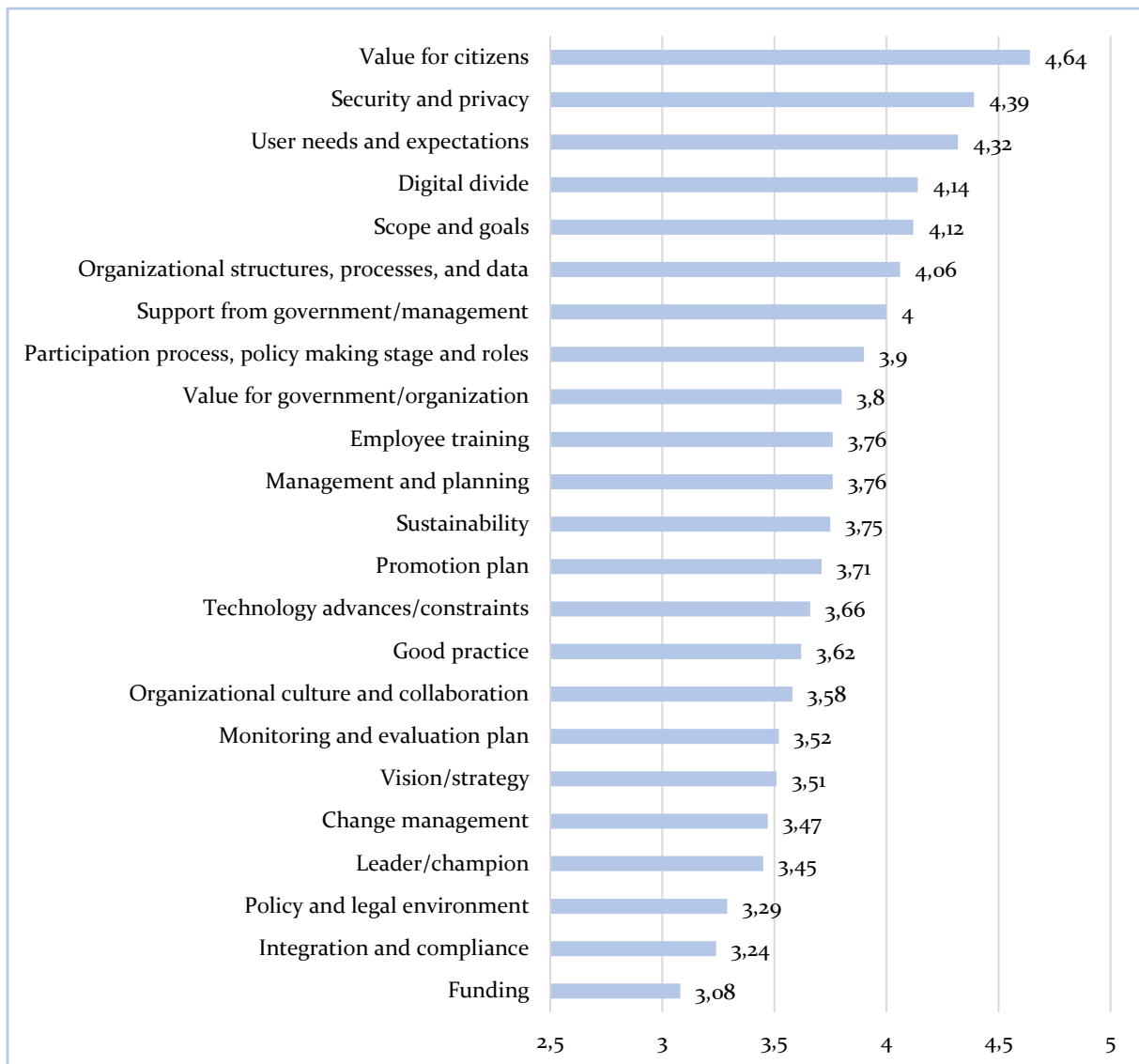


**Figure 7:** Practitioners' answers to the question "In which phase of climate adaptation planning do you foresee a role for eParticipation? (#, multiple answers possible)"



**Figure 8:** Practitioners' answers to the question "How do you view the role of E-participation in relation to traditional offline participation methods?" (#, single answer)"

Lastly, the respondents evaluated the importance of the success factors underlying eParticipation design, using a 5-mark Likert scale, where: 1 – not at all important, and 5 – very important. Figure 11 represents the average marks which the practitioners gave to all the factors. It is found that the most significant importance belongs to the following factors: value for citizens (65% of the respondents noted this factor to be very important, another 31% found it important), security and privacy, and user needs and expectations. Another group of important factors are considered with the full and equal representation of citizen (digital divide), having clear and realistic goals, having an appropriate organizational structure, and ensuring political will and commitment. Factors that are considered a be a lot less important are the alignment of an eParticipation initiative to the current policy and legal environment, the addressing of problems of integration and compatibility with other systems and standards, and the addressing of various funding options.



**Figure 9:** Success factors for eParticipation initiative design, practitioners' evaluation

## 7.2 Sub-conclusion

With the above-presented results of the survey, sub-question six can be answered, which goes as follows:

- *What are the contributing factors to the successful design of eParticipation initiatives in climate adaptation governance in Dutch municipalities?*

Results from the survey indicate that the success factors for eParticipation initiative design identified in the literature are all at least considered moderately important by practitioners. The four factors that are considered to be most important are: value for citizens, security and privacy, user needs and expectations, and the digital divide. Interestingly, all these factors relate to the user side of eParticipation initiatives. This highlights the importance of designing

online participation in climate adaptation in such a way that it generates value for citizens, meets user needs and expectations, is fully inclusive and guarantees user privacy. Other, but somewhat less, important factors include drafting clear and realistic goals, appropriately coordinating new initiatives with the organization structure, and ensuring political will and commitment. Factors that are considered a lot less important are the alignment of eParticipation initiatives with the current policy and legal environment, the addressing of problems of integration and compatibility with other systems and standards, and addressing various funding options.

Besides, practitioners were asked about the current use of online tools within their municipality, and the role they envision for eParticipation in the field of climate adaptation. It is found that currently, mainly online tools are used that support the low levels of eParticipation, which is in line with the findings of the case studies. Furthermore, practitioners cite increasing overall participation as the primary goal of eParticipation, while improving and sharing responsibility for decision-making is mentioned the least often. Moreover, practitioners foresee a substantial role for eParticipation in the planning, and evaluation and maintenance phases of climate adaptation. In contrast, its role in the implementation phase is considered to be the least. Lastly, the lion's share of the respondents expects that online participation only serves as an addition to traditional methods, rather than completely replacing it.

## 8. Conclusions and discussion

### 8.1 Answering the research question

The main research question of this project is as follows:

*What is the role of eParticipation in climate change adaptation governance in cities and under what conditions can successful eParticipation be achieved?*

This question can be split up into two parts, starting with answering the first part:

*What is the role of eParticipation in climate change adaptation governance in cities [..]?*

A literature review revealed that eParticipation design could be described based on five characteristics: *targets, levels, target groups, timing, and instruments*. Based on this, the current manifestations of eParticipation activities within the Dutch municipalities of Groningen and Zwolle have been described. It is observed that within both municipalities, eParticipation predominantly manifests itself as a directional flow of information from the local government to citizens, businesses and housing corporations. The municipalities make use of specific websites, social media, videos, GIS-tools, and in one instance, a phone application to spread information about the effects of climate change, and what measures can be taken to adapt to these changes. These initiatives generally aim to increase overall participation, raise awareness, and to provide citizens with the necessary information to increase their willingness and capacity to take action. The latter has proven to be especially crucial in the field of climate adaptation given that making cities climate-proof depends broadly on measures that citizens themselves take on their privately owned land. Hence, this type of ICT-facilitated participation aims to assist the target groups during the pre-planning, planning, action-development, and implementation phases of climate adaptation by providing them with the necessary information to take action.

Besides this directional flow of information from government to citizens, limited two-way channels that have the objective to collect public feedback and alternatives have also been observed. In the case of Groningen, in the run-up to the publication of the *Implementation Agenda for Climate-resistant Groningen*, an online survey was carried out to gain insight in the residents' opinions on climate change and experiences with climate change adaptation. Also, during the drafting of the *Greenplan Vitamin G*, all citizens were invited to digitally react to the

plan and provide ideas for the implementation plan. The objective of these eParticipation initiatives was to increase the quality of the policies at hand. In the case of Zwolle, this limited two-way interaction is expressed in the form of interactive digital maps, where citizens can report where and when they have experienced flooding and heat stress. This input is used to test the robustness of the heat and flooding calculations performed in the stress tests. At the same time, it also spreads awareness among the public and serves as input to improving the quality of public policies aimed at these problems.

Another type of ICT-facilitated interaction within climate change adaptation governance is witnessed within citizens' initiatives. Within these initiatives, ICT-tools such as specific websites, social media, and chatting software are being used by citizen groups to spread information in order to increase other citizens' willingness and capacity to take action and to inspire other citizens to start such initiatives themselves. Although it is not a type of government-citizen interaction, it is argued that this can be described as a form of e-informing. In contrast, in these cases, information flows directionally from citizen to citizen.

Although still in the initial phase, the first cases of ICT-facilitated deliberation activities in the field of climate adaptation have been observed in both municipalities. In the municipality of Groningen, this has been expressed in the form of an online budgeting process. Although climate adaptation was not a specific goal of this process, it has led to measures that serve climate adaptation such as the construction of flower fields and walnut trees. In the municipality of Zwolle, an online co-creation session was initiated using videoconferencing software Zoom. A particular group of residents, previously identified in an offline session, were invited to shape the Azalea Park in a climate-proof manner in cooperation with the municipality. These examples show that, although it is still in the experimental phase, eParticipation in the field of climate adaptation has the potential to achieve high levels of public participation.

The above-described outcomes were, to some extent, validated by the results of the survey. These results indicate that within municipalities, currently mainly online tools are used that support the low levels of eParticipation, which is in line with the findings of the case studies. Besides, practitioners of Dutch municipalities rate the improving and sharing of responsibility for decision-making, which is associated with higher levels of eParticipation, the least important goal of eParticipation in climate change adaptation. Lastly, the lion's share of the

respondents expects that online participation only serves as an addition to traditional methods, rather than completely replacing it. This insight was also found in the case studies.

Moving on to answering the second part of the research question:

*[...] and under what conditions can successful eParticipation be achieved?*

There are two parts to answering this question. Firstly, it has been investigated what factors influence the degree of eParticipation adoption by the municipalities of Groningen and Zwolle. For the municipality of Groningen, it is found that from a deep-seated willingness to relinquish autonomy, the municipality is increasingly starting to experiment with higher levels of eParticipation. Factors that are stimulating this development are the sufficiency of funding, and the municipality's capability to build on already existing software. Furthermore, the COVID-19 crisis is expected to serve as catalysator, triggering digital innovations for participation out of necessity and as a result of increased political, personnel and public support. There are also barriers to eParticipation development in Groningen, which include the lack of digital knowledge and skills among civil servants, the absence of cross-cutting leadership, and the perceived uselessness of eParticipation in climate adaptation, partly due to the digital divide. For the municipality of Zwolle, results indicate that habitually sticking to traditional participation methods ensured that higher levels of eParticipation have mostly been absent to date. However, the COVID-19 crisis is currently boosting eParticipation, triggering the municipality to experiment with alternative forms of public participation. Factors that currently stimulates the development of eParticipation in the municipality of Zwolle are increased support from management and local politics, and the presence of IT champions who take the lead. The municipality also experiences barriers to eParticipation adoption, which include the unavailability of knowledge and skills among civil servants, the absence of proper software, and the digital divide.

In summary, although the adoption of eParticipation is highly context-specific, the results do provide general insights into the required conditions and activities that can contribute to the successfulness of this. Firstly, the results highlight the critical role that political will and support plays for the adoption of eParticipation. Secondly, the presence of champions that have overarching knowledge about technology, participation and communication, as well as sufficient funding options have also proven to be prerequisites. Furthermore, the municipal adoption of eParticipation can be accelerated when municipalities are able to capitalize on



already existing software and externally-induced windows of opportunities, such as the current COVID-19 crisis. Lastly, eParticipation adoption benefits from careful consideration regarding the digital divide and the training of staff to provide them with the necessary technical knowledge and skills.

Secondly, utilizing a survey, it has been investigated how municipal practitioners rate the importance of 23 success factors for eParticipation initiative design found in the literature. Results from the survey indicate that for eParticipation initiatives to be successful, it is essential that its design is revolved around its target groups. The importance is highlighted of designing online participation in climate adaptation in such a way that it generates value for citizens, meets user needs and expectations, is fully inclusive and guarantees user privacy. Other, but somewhat less, important factors include drafting clear and realistic goals, appropriately coordinating new initiatives with the organization structure, and ensuring political will and commitment. Factors that practitioners consider to be a lot less important are the alignment of eParticipation initiatives with the current policy and legal environment, the addressing of problems of integration and compatibility with other systems and standards, and addressing various funding options.

## **8.2 Discussion**

### **8.2.1 Theoretical reflection**

This study has shown that currently, in the Netherlands, eParticipation in the field of climate change adaptation is predominantly limited to the informing and consulting levels of participation. Even though some initial experiments have taken place with higher levels of eParticipation, ICT tools prove to have relatively limited power to provide deliberative modes of governance. This is in line with what Mukhtarov, Dieperink and Driessen (2018) found in the field of urban water governance, and Le Blanc (2020) in general. A partial explanation for this could be the fact that climate-proofing cities depend broadly on measures that citizens themselves take on their privately owned land. The fact that residents themselves are responsible for taking action precludes higher levels of participation per definition. However, local authorities can play a crucial facilitating and stimulating role, raising awareness and teaching citizens the required knowledge and skills, for which ICTs are a useful tool. It could even be argued that by doing so, municipalities are empowering citizens with the authority to take action and contribute to the public interest. However, this form of eParticipation might

be most effective in combination with offering practical help on the neighbourhood level and the provision of incentives such as structural subsidies or tax reductions (Mees et al., 2019).

Furthermore, the results of both case studies and the survey highlight that political will and support are essential factors for both the municipal adoption of eParticipation and the successful design of particular initiatives. These findings are in line with what has been consistently pointed out about the inability of technology to, on itself, enhance deliberative governance (Sæbø, Rose and Skiftenes Flak, 2008; Macintosh, 2008). Instead, political willingness to involve citizens is required to achieve more authoritative and deliberative modes of participation (Mukhtarov, Dieperink and Driessen, 2018). Also, while generally reported as a barrier to eParticipation adoption at the user-side (Naranjo Zolotov, Oliveira and Casteleyn, 2018; Tang et al., 2019), the digital divide proves to be an important factor at the supply-side of eParticipation development too. When online participation is considered to be useless as a result of the digital divide, municipalities may opt to stick to traditional methods of participation. For that reason, it is imperative to strive towards an optimal mix of both online and offline methods of participation, while even greater importance must be attached to increasing the digital capacity of society. Moreover, this study contributes to the knowledge of factors influencing the adoption of eGovernance, by emphasizing the importance of windows opportunities offered by external pressures (in this case, the COVID-19 crisis).

Furthermore, results indicate that practitioners consider all success factors for eParticipation initiative design at least moderately important. This strengthens previous findings on success factors that factors focused on the outcomes, implementation process, and the operating environment are all crucial determinants of success (Panopoulou, Tambouris and Tarabanis, 2014; Borman and Janssen, 2013). It is interesting to note that practitioners in this study attached great importance to factors (scope and goals, organisational structures, processes and data) that Panopoulou, Tambouris and Tarabanis (2014) found to be absent in practice.

### **8.2.2 Methodological reflection**

Due to the limited time available for this research, only two case studies could be carried out. A well-known weakness of the case study method is the limited empirical generalizability of the findings. Therefore, it should be noted that the knowledge generated by the empirical analysis holds the most relevance for the cases included in the analysis: Groningen and Zwolle. For that reason, findings regarding the current manifestation of eParticipation were validated

through a survey. Because of this, and because of its congruence with other studies (Mukhtarov, Dieperink and Driessen, 2018; Le Blanc, 2020), it can be expected that the findings are to some extent also relevant for other municipalities. Yet, what factors influence the adoption of eParticipation are expected to remain predominantly context-specific.

The validity of the results is affected by the research techniques employed. The fact that semi-structured interviews were conducted hampers the reliability and reproducibility of the research. Moreover, as is common in social science research, the information generated through the interviews is clouded by the individual's perceptions, memories and the particular image interviewees would like to propagate. The impact of these factors was limited as far as possible through triangulation of sources, coding based on operationalised variables and the use of the same interview guide for all interviewees.

The design of the survey also poses some limitations. Instead of presenting all indicators associated with the success factors separately, it was decided to present the success factors themselves together with a description of the indicators. The reason for this was to keep the survey at a reasonable length, taking into account the external validity. However, given that respondents may have weighted some indicators within the same success factor more important than others could have skewed the results. The underlying choice for this decision was a constant trade-off between internal and external validity.

### **8.2.3 Future research**

Based on the limitations of this study discussed above as well as the issues raised by this research, some recommendations for further research can be made. Firstly, this study is based on the notion that climate change adaptation at the local level would benefit from eParticipation. However, current research has indicated that this is not always the case, so future research that evaluates the impact of eParticipation would be fruitful.

Another fruitful line of inquiry would be to investigate the relationship between the success factors and eParticipation initiative design. It would be interesting to see how the different success factors relate to different types of eParticipation. Furthermore, in this study, the importance of success factors was approached generally and from an ex-ante perspective. It would be interesting to apply the framework of success factors to a specific eParticipation initiative in an evaluative manner.

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# Appendices

## Appendix 1

### List of interviewees

Name	Municipality	Function	Date
Martijn Schuit	Groningen	Integral policy officer and programme manager climate change adaptation	8 May 2020
Nephtis Brandma	Groningen	Product owner digital democracy	27 May 2020
Saskia Buis	Zwolle	Senior communications advisor	29 May 2020

### List of survey respondents

Municipality	Province	Number of inhabitants
Schiedam	Zuid-Holland	78.842
Westerkwartier	Groningen	63.376
Stadskanaal	Groningen	31.636
Urk	Flevoland	21.073
Roerdalen	Limburg	20.516
Vlissingen	Zeeland	44.339
Helmond	Noord-Brabant	92.312
Boekel	Noord-Brabant	10.774
Altena	Noord-Brabant	55.966
Bunschoten	Utrecht	21.891
Haarlemmermeer	Noord-Holland	156.355
Velsen	Noord-Holland	68.732
Heumen	Gelderland	16.483
Schagen	Noord-Holland	46.471
Noordoostpolder	Flevoland	47.443
Peel en Maas	Limburg	43.627
Hoeksche Waard	Zuid-Holland	87.531
Barneveld	Gelderland	59.308
Heerhugowaard	Noord-Holland	57.752
Den Helder	Noord-Holland	56.359
Hardinxveld-Giessendam	Zuid-Holland	18.334
Heusden	Noord-Brabant	44.709
Nijkerk	Gelderland	43.202

Beekdaelen	Limburg	35.952
Tynaarlo	Drenthe	33.818
Elburg	Gelderland	23.229
Zevenaar	Gelderland	43.804
Wassenaar	Zuid-Holland	26.236
Goeree-Overflakkee	Zuid-Holland	50.147
Hengelo	Overijssel	81.198
Leusden	Utrecht	30.423
Sittard-Geleen	Limburg	92.330
Breda	Noord-Brabant	184.187
Meierijstad	Noord-Brabant	81.301
OVER-gemeenten	Noord-Holland	25.984
Venlo	Limburg	101.830
Deventer	Overijssel	100.893
Zwolle	Overijssel	129.062
Vijfheerenlanden	Utrecht	56.912
Kaag en Braassem	Zuid-Holland	27.377
Teylingen	Zuid-Holland	37.524
Wageningen	Gelderland	39.881
Horst aan de Maas	Limburg	42.461
Kapelle	Zeeland	12.697
West Betuwe	Gelderland	51.233
Deurne	Noord-Brabant	32.438
Sluis	Zeeland	23.198
Oosterhout	Noord-Brabant	56.052
Dalfsen	Overijssel	28.685
Beesel	Limburg	13.477
Heerhugowaard	Noord-Holland	57.752

## **Appendix 2 – Interview guide**

*Each interview was tailor-made to capture specific processes occurring in the municipality. The list below provides an overview of some general questions. These questions were translated from Dutch to English. Each interview started with a short introduction to the research topic.*

*Permission was also requested to record the interview and to use personal data.*

### **Introducing questions:**

- Can you introduce yourself briefly and say something about your role within the municipality?
- Can you tell me how the municipality is engaged in public participation?
  - What are the goals?
  - What is the role of public participation in relation to climate change adaptation?

### **eParticipation in climate change adaptation:**

- Can you tell me how the municipality is engaged in eParticipation in relation to climate change adaptation?
  - What are the goals?
  - What is the added value of online tools in relation to traditional methods?
  - How do eParticipation initiatives come about? Who is responsible?
  - What role for eParticipation do you foresee for the future?

### **Questions about specific eParticipation initiatives:**

- What are the goals of this initiative?
- What degree of participation do the participants have?
- Who participated in the initiative/who is the initiative aimed at?
- To which phase of climate adaptation planning does this initiative apply? What is the duration of the initiative?
- What tools and technologies are used for the initiative?

### **Factors affecting eParticipation adoption:**

- What has led you as a municipality to get started with online participation?
- What is your experience when it comes to barriers to the development of eParticipation?

- What is your experience with the capacity and resources to get started with eParticipation?
- What are your thoughts on security and privacy considerations that come with eParticipation?
- What are your thoughts on the attitude within your municipality towards eParticipation? Political/civil
- How do citizens view the development of eParticipation?
- In your experience, what are the factors that contribute to the effectiveness of online participation initiatives?
- In your experience, what are the factors that contribute to the effectiveness of online participation initiatives?

**Concluding questions:**

- Are there any important topics we have not covered?
- Do you have any suggestions for the next interviews? (if applicable)