Following the Money

Crowdfunding the Civic Engaged Urban Nature-based Solutions

Master Thesis (30 ECTS)

Photo took by author in July 11, 2018, at Ghent, Belgium.

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Summary

In recent years, because of its multi-purpose benefits and climate adaption functions, nature-based solutions (NBS) have gradually been integrated with urban planning in order to tackle current environmental challenges. Inadequate financial resources are one of the significant barriers for implementing NBS, but these barriers are overcome by offering specific financing channels and increasing the private sector's participation. One of the financing mechanisms is using crowdfunding (CF) to collect public donations. However, besides the financial benefit, it is still unclear what other functions CF can provide to allow sub-national governments (SNGs) to collaborate with the civil society within urban NBS governance process. SNGs should collaborate with citizens so the outcome of sustainable urban transitions could become more innovative, increase quantity and quality of urban green space and enhance social cohesion and environmental awareness.

This thesis endeavours to contribute to the understanding of how SNGs can use CF to finance and facilitate civic engagement in urban NBS. The research adopts a policy arrangement approach as the conceptual foundation to build upon the CF propositions. Through the academic understanding of CF's contribution toward the emergence of smart cities and the successful factors for civic engagement in urban NBS governance, the research summaries 13 factors with four policy arrangement dimensions that SNGs should develop for civic engagement in urban NBS governance. The research has proposed five CF propositions and adopted multiple case studies to test the propositions' validity. The study cases include: (1) The City of Ghent with Crowdfunding.gent, (2) The Province of Noord-Brabant with Crowdfunding VoorNatuur, and (3) The City of Manchester with Spacehive.

In conclusion, the research proposes that SNGs can adopt CF with five principles to complement their policy arrangement for facilitating civic engagement in urban NBS governance: (1) consider CF as an instrument to facilitate collective volunteering actions between SNGs and the civil society, and the policy discourse should connect CF campaign's outcome to the NBS development, (2) define the CF campaign's functions in order to ensures the effectiveness and performance of civic engagement in NBS projects, (3) adopt CF as an institutional innovation to conduct flexible governance for civic engagement in urban NBS, (4) use CF to diversify the NBS projects' participants and strengthen the coalition between the authority and civil society and (5) adopt CF to provide finance, environmental expertise and informational and social capital toward civic engagement in urban NBS projects.

Keywords: Sub-national governments, Nature-based solutions, Crowdfunding, Civic engagement, Policy arrangement approach

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'We have to make sure, above all, that our mind is not halved by a horizon – Amartya Sen'

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Chapter 1: Introduction

1.1 Background and problem definition

According to the United Nation's (UN) forecast, 68% of the global population will become an urban resident by 2050 (UN, 2018). Growing at a rapid pace, urban areas have become a frontline to facing the climate challenge (Broto, 2017; Frantzeskaki et al., 2019). This occurred not only because most of the economic activities and environmental pollutants are concentrated in urban areas but also because the practical solutions that can tackle current environmental challenges—namely extreme climate events—are also more feasibly implemented and managed in urban areas (Hoornweg et al., 2016; McCormick et al., 2013; Frantzeskaki et al., 2019). In recent years, because of its multi-purpose benefits and climate adaption functions, nature-based solutions (NBS) have gradually been integrated with urban planning (Frantzeskaki et al., 2019). NBS are solutions that 'aim to help societies address a variety of environmental, social and economic challenges in sustainable ways. They are actions which are inspired by, supported by or copied from nature' (European Commission, 2015, p. 5). For instance, these include green roofs, urban green spaces, community gardens and green-blue infrastructure. (Toxopeus & Polzin, 2017). Compared with other similar concepts—like ecosystem-based adaptations, green infrastructure, and eco-engineering—NBS is an umbrella concept that includes all nature-based sustainable interventions (Dorst et al., 2019).

Inadequate financial resources are one of the significant barriers for implementing NBS, but these barriers are overcome by offering specific financing channels and increasing the private sector's participation (Ershad Sarabi et al., 2019). According to the European Union (EU) Horizon 2020 project called 'GrowGreen', there are twelve types of existing mechanisms for sub-national governments (SNGs) to finance urban NBS (GrowGreen, 2019). One of the financing mechanisms uses crowdfunding (CF) to collect public donations (GrowGreen, 2019). Different from conventional financing mechanisms, CF is a type of alternative financing that aims to support economic growth and social impacts outside of the traditional banking and financial system (Motylska-Kuźma, 2018). CF is said to be 'the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries' (Mollick, 2014, p. 2). Compared with other NBS financing mechanisms, CF provides a chance for SNGs to co-create the small-scale NBS projects with a large number of individuals, such as citizens (GrowGreen, 2019). This form of CF is civic CF, which is a subtype of CF that 'involve[s] either directly or indirectly, the use of government funds, assets or sponsorship, which may include the development of public assets… produce some non-rival benefits that serve either the non-excludable public or broad sections of it' (Davies, 2014, p. 17 & 29). Different from equity-based and business-oriented alternative finance tools, CF (especially donation-based and reward-based) is more likely to attract backers who value projects' positive societal impacts instead of financial return (Baeck et al., 2014; Carè et al., 2018). Moreover, CF also becomes the only financing solution for the community-based projects that would be difficult to fund from other financing channels (Baeck et al.,

2014).

Civic engagement is crucial for designing, implementing and operating the NBS projects (Frantzeskaki et al., 2019; Droste et al., 2019). CF can also facilitate cooperation or partnerships between SNGs and civil society to acquire financial and non-financial resources beyond its organizational boundaries (Doan & Toledano, 2018; Hong & Ryu, 2019). Specifically, although SNGs use CF to collect financial resources for NBS projects, the mechanism might encourage citizens to join the governance processes for achieving public goods (Hong & Ryu, 2019). In the urban context, when citizens' agency increases in the public domain through information and communication technology, the dialogue and collaboration between civil society and governments also increase, which leads to the development of smart cities (Vlachokyriakos et al., 2016; Carè et al., 2018; Vesco & Ferrero, 2015). The smart cities 'use technology to enhance the quality, performance, and interactivity of urban services, reduce costs and resource consumption, and improve collaboration between citizens and government' (Gooch et al., 2018, p. 2:2). Namely, the use of CF to support public projects could also promote the emergence of smart cities (Gooch et al., 2018). In Europe, there are several NBS-related public CF campaigns sponsored by SNGs (Gullino et al., 2019; GrowGreen, 2019; Carè et al., 2018). For example, in the UK, the London City Hall cooperates with the CF platform Spacehive to support local communities' initiative in transforming an abandoned railway into an urban park (Gullino et al., 2019). However, the academic analysis about how CF can scale-up citizen-led and public-private cooperative NBS projects were lacking (Toxopeus & Polzin, 2017). Besides the financial benefit, it is still unclear what other functions CF can provide to allow SNGs to collaborate with the civil society within the urban NBS governance process. In other words, this research aims to address how SNGs can adopt CF to let urban NBS become more civically engaged. As an emerging funding model in recent years, it is important to consider the role that CF can play in achieving publicly funded projects that favour sustainable urban development.

1.2 Scientific background and research gaps

Regarding the emergence of smart cities' governance, it is necessary to have 'smart' citizens' participation (Bernadino & Santos, 2016). Through information and communication technology, local communities can engage and work with SNGs to explore new types of governance partnerships while generating mutual benefits (Bernadino & Santos, 2016; Miglietta & Parisi, 2017). CF can empower citizens' roles within urban civic projects without burdening the public budget or facing challenges from bureaucracy (Miglietta & Parisi, 2017). After reviewing the literature related to CF and its contribution toward smart cities governance, this research identifies five CF functions.

Firstly, Miglietta and Parisi (2017) discover that CF can connect any individual to urban civic projects. Without focusing on particular groups' political or economic interests, CF allows the general crowd to show their ideas and provide their support which stimulating a new participation culture between public, private and civil society (Miglietta & Parisi, 2017; Carè et al., 2018). In their empirical study on New

Zealand's Awaroa beach campaign, Doan and Toledano (2018) discovered that CF can perform as crowd-enabled collective actions. Through the CF process, the campaign can lower individuals' participation threshold, which enables all individual to post and communicate project-related information and blurs the institutional boundary that hinders the coordination of individuals' contributions (Doan & Toledano, 2018). Similarly, in Logue and Grimes's (2019) research, the fundamental working element of the public-oriented CF campaigns is their inclusion of cross-sectoral participants, allowing different interests behind the promotion of a given social innovation to be heard. As an online information platform, CF allows individuals who cannot be reached by face-to-face communication to participate in the project's initiative process (Bernadino & Santos, 2106).

Secondly, CF can create high public consensus for civic projects (Miglietta & Parisi, 2017). As the participants' motivations are already based on common social and economic interests, the project does not need to follow a new democratic process to decide whether it should be implemented (Miglietta & Parisi, 2017). Using CF to support citizens' participation in public governance could be a form of digital civics, which strengthens the collaboration between citizens and governments through technology (Gooch et al., 2020). Based on Vlachokyriakos et al.'s (2016) explanation of the participatory platform's function in digital civics, the interaction between related actors in a CF campaign is said to form from participants' dialogue, which can foster advocacy for the actions (Vlachokyriakos et al., 2016). In Light and Briggs's (2017) study of the UK's social and environmental-oriented CF campaigns, the scholars discovered that CF can stimulate social trends and might facilitate a popular groundswell by forming a constellation of people around specific socio-economic events (Light & Briggs, 2017).

Thirdly, CF is suitable to support different scales of civic projects, without sole regard to the project's financial performance (Miglietta & Parisi, 2017). In other words, the projects' feasibility is not entirely about its participants' assets, credibility and investment potential but also about the capacity to mobilise and stimulate participation from different individuals or organizations (Miglietta & Parisi, 2017; Bernadino & Santos, 2016). Without only evaluating the financial performance, CF allows citizens to easily show their various needs to the public and to attract funders to precisely support these needs (Miglietta & Parisi, 2017). As Chu et al. (2019) discuss, CF is an open innovation space that coordinate diverse actors and knowledge to enable innovative initiates through networking different type of capital.

Fourthly, CF can enhance the community's belonging and respect for the common resources through non-investors' knowledge sharing and their commitment to the community project (Miglietta & Parisi, 2017). Through tracking the development of the UK's CF platform Spacehive, Logue and Grimes (2019) have shown that there is an opportunity to create shared value among the CF campaign's participants. When the CF campaigns are employed to fund the public goods, a collective sense within the interest groups emerges (Light & Briggs, 2017). Moreover, for knowledge sharing, the CF platform can provide distributed apprenticeship within the campaign communities (Hui et al., 2019). As an information and

communication technology, CF can assist resource-lacking initiators in acquiring instruction through a distributed online network by showing instructional attributes, supporting feedback between multiple stakeholders and documenting the process (Hui et al., 2019).

Lastly, CF can increase governance transparency and greater compliance with society demand (Miglietta & Parisi, 2017; Bernadino & Santos, 2016). Different from the mainstream governance practice, through CF, citizens are not only the consumer of public services but also play a central role in public service governance (Vlachokyriakos et al., 2016). Because the core interest in and idea about developing the community are located within the civil society, CF let authority have a closer connection and compliance with the local community's interest—gauging their needs for collaborative action (Miglietta & Parisi, 2017; Hong & Ryu, 2109). Unlike traditional tax regimes, in which citizens cannot make specific decisions about how the local government should spend their tax payments, the CF supports public service without misrepresenting the citizens' choices and by allocating funds efficiently (Hong & Ryu, 2019; Bernadino & Santos, 2016). Furthermore, the government's participation in the CF campaigns can mitigate the information asymmetry between the public and private sectors, which will improve citizens' trust and strengthen public-private partnerships (Hong & Ryu, 2019).

Strengthening public-civic collaboration is a crucial facilitating element for both urban NBS and smart cities' governance. According to Miglietta and Parisi's (2017) research and other CF literature, CF can provide five types of functions to support the emergence of smart cities. Although CF is a recognised alternative financing tool to support the urban NBS projects, there is a research gap in systematically understanding CF's contributions toward civic engagement in urban NBS governance besides its financing function. Hence, to address the gap, this research aims to explore CF's role in facilitating civic engagement in urban NBS governance according to the academic understanding of CF's contribution toward the emergence of smart cities' governance.

1.3 Research aim and research questions

This thesis endeavours to contribute to the understanding of SNGs using CF to finance and facilitate civic engagement in urban NBS by developing and testing a set of CF propositions in cases from Belgium, the Netherlands and the UK. According to the propositions, the thesis expects to provide recommendations to SNGs about adopting CF for its contribution toward smart cities, including civic engagement in urban NBS governance. Thus, the main research question of this master thesis is as follows:

How can crowdfunding complement a sub-national government's policy arrangement for facilitating civic engagement in urban nature-based solutions through its contribution toward the emergence of smart cities?

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The following sub-questions will further address the main research question:

SQ1. What are the policy arrangement demands for civic engagement in urban NBS according to the literature review?

SQ2. How can the academic understanding of CF's contribution toward the emergence of smart cities complement a SNG's policy arrangement for civic engagement in urban NBS governance?

SQ3. How can studying the CF campaigns in Belgium, the Netherlands and the UK help revise SNGs' propositions by using CF to facilitate civic engagement in urban NBS?

1.4 Research framework

The research has designed a research framework to demonstrate the research process (see Figure 1-1). Sub-question 1 aims to build the conceptual foundation of this research. Based on the literature review, the research seeks to establish a policy arrangement model for civic engagement in urban NBS governance. Sub-question 2 aims to provide a set of propositions to explain how SNGs can adopt CF to implement the policy arrangement for civic engagement in urban NBS governance. Furthermore, the answer to Sub-question 2 will also contribute to identifying the potential factors and the successes of the operationalized methods for the urban NBS CF governance through an analytical framework and by testing the research cases. Lastly, Sub-question 3 aims to revise the propositions for strengthening the research's explanatory credibility and answering the main question.
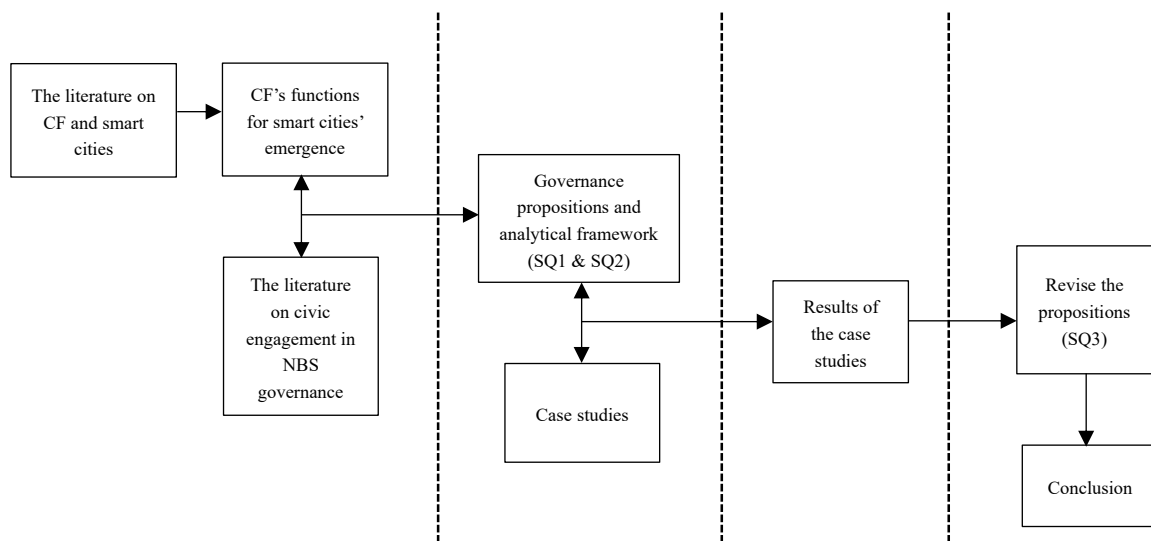
Figure 1-1. Research framework

1.5 The scientific and societal relevance

In general, the research's scientific and societal aims will contribute to realising the UN's Sustainable Development Goal 11: making cities and human settlements inclusive, safe, resilient and sustainable (UN, n.d.). From the scientific perspective, the research will provide a systematic understanding of CF's role in civic engagement in urban NBS governance regarding its contribution to the emergence of smart cities. The research interlinks three literature fields: collaborative urban NBS governance, crowdfunding and

smart cities. The research endeavours to contribute to the theoretical development of how a society can adopt information and communication technology to support the smart and sustainable urban transition regarding the cooperation between SNGs and civic sectors. From a societal perspective, the propositions can assist SNGs in understanding the implications and functions of CF for its urban NBS governance. Specifically, the propositions look to provide comprehensive policy guidelines for policymakers on how to fund the sustainable urban transition and strengthen the social capital by adopting CF.

Chapter 2: Theory development

In this chapter, the research has built a set of propositions that can guide SNGs utilising CF to complement their urban NBS policy arrangement for citizens' participation. First, this study will discuss the reasons why citizens should participate in the urban NBS governance process. After that, this paper will introduce the research's conceptual foundation. Thirdly, the demands for civic engagement in urban NBS governance will be integrated into the research's conceptual foundation. Lastly, the research will consider CF's contribution toward the emergence of smart cities and outline a set of CF propositions for SNGs.

2.1 Civic engagement in urban NBS governance

In tackling environmental challenges and consolidating society's resilience, depending merely on governments' resources and actions are increasingly proven to be less workable (Frantzeskaki, 2019). Discovering a collaborative governance approach that works with social actors can contribute to more transparency, legitimacy, openness and long-lasting urban sustainable transition (Frantzeskaki, 2019; Kabisch et al., 2016). Because the local context influences the acceptance of NBS, SNGs need to interlink citizens' know-how, which is fragmented, site-specific and informal, into the governance process to facilitate the urban NBS development (Buijs et al., 2019). In other words, SNGs should collaborate with citizens who are actively willing to contribute to urban greening and generate public welfare in urban societies (Buijs et al., 2019). Accordingly, the outcome of sustainable urban transitions could become more innovative, increase quantity and quality of urban green space and enhance social cohesion and environmental awareness (Kabisch et al., 2016; Buijs et al., 2019).

2.2 Policy arrangement approach

The research adopts the policy arrangement approach (PAA) as the conceptual foundation to build CF propositions for civic engagement in urban NBS governance. PAA is an analytical concept that guides the researcher in understanding the content and organisation of the environmental policy (Arts et al., 2006). Based on this approach, the policy analysis can also focus on the interrelation between the arrangement of policy participants and the policy's influence on changing the social and political process (Arts et al., 2006). In other words, PAA regards 'the institutionalisation of policy arrangements as a consequence of the duality of actor and structure' (Arts et al., 2006, p. 97).

PAA has been used in empirical research for NBS-related policy domains (e.g., climate change, planning and infrastructure and area-based policy) (Arts et al., 2006; Buijs et al., 2019). The empirical research through PAA has led to two scientific understandings: (1) more hybrid governance that combines top-down and bottom-up structure has emerged in the environmental policy arrangements and (2) the participants' power distribution within the new policy arrangements becomes more decentralised (Arts et al., 2006). Considering CF as a form of policy arrangement for civic engagement in urban NBS governance, the research aims to utilise PAA's explanatory strength on the interplay between policy actors and structure to discover how CF can facilitate and empower citizens' participation in the urban NBS governance process.

In PAA, the policy arrangement's content and organisation can be analysed through four dimensions: (1) discourse, (2) rules of the game, (3) actors and coalition and (4) resources (Arts et al., 2006; Buijs et al., 2019). Referring to Buijs et al.'s (2019) research, the policy instrument that facilitates civic engagement in urban NBS governance can relate to these dimensions. The definitions of these four dimensions are as follows:

(1) *Discourse*: Policy participants' viewpoints and narrative (i.e., norms and values), and the definition of problems and solutions (Arts et al., 2006). For civic engagement in the urban NBS context, the discourse can be the shared greening vision and goals for specific projects between policy participants (Buijs et al., 2019).

(2) *Rules of the game*: Actual and formal rules related to policy participants' interactions and decision-making processes (Arts et al., 2006). For the civic engagement in the urban NBS context, the rules of the game define SNGs and citizens' agency scale and interaction forms (e.g., regulations for land ownership and public land-use rights) (Buijs et al., 2019).

(3) *Actors and coalition*: Actors who related to the policy arrangement (Arts et al., 2006). In the civically engaged urban NBS context, one must also consider how the policy arrangement mobilises new actors (Buijs et al., 2019).

(4) *Resources*: Land, money and expertise that can contribute to policy outcomes (Arts et al., 2006; Buijs et al., 2019).
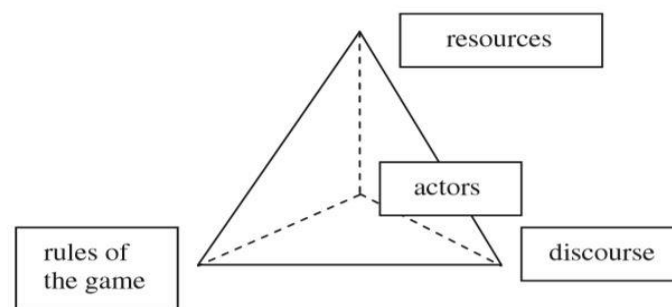
Figure 2-1. The tetrahedron symbol for the relations between four PAA dimensions (Arts et al., 2006).

2.3 Policy arrangement for civic engagement in urban NBS governance

This study has reviewed the literature related to the demands for civic engagement in urban NBS governance and summaries the findings into four PAA dimensions. The goal of this section is to list all of the theoretical and empirical factors on which SNGs should focus for civic engagement in urban NBS governance. In other words, theoretically speaking, all policy tools for the NBS policy arrangements should fulfil these factors to facilitate civic engagement.

Discourse

Firstly, the policy discourse for civic engagement should enhance citizens' awareness of the NBS projects. Considering citizens as essential participants in the governance process, SNGs should include the following actions in their NBS policy discourse: (1) promote NBS-related public acceptability, confidence, consciousness and sense of belonging, (2) make citizens aware of their options and legal responsibilities for NBS projects and (3) ensure citizens' strong attention and involvement during projects' co-creation and co-design (Ferreira et al., 2020; Wamsler et al., 2020; Brink & Wamster, 2018; Frantzekaki, 2019).

Secondly, the policy discourse for civic engagement should promote value adding and sharing of the NBS projects and among its participants. Connecting more participants' viewpoints can strengthen urban green space productivity and the quality of biodiversity (Ferreir et al., 2020). Hence, SNGs can include the following actions in their NBS policy discourse: (1) enhance the sharing of concerns and interests within collaborations between citizens and governments, (2) identify the value added by urban NBS projects in terms of natural and social capital and (3) promote common values, beliefs and worldviews between citizens, governments and other participants (van der Jagt et al., 2017; Ferreira et al., 2020; Säumel et al., 2019; Wamsler et al. 2020).

Thirdly, the policy discourse for civic engagement should promote discourse congruence between NBS projects' participants. SNGs should include the following actions in their NBS policy discourse: (1) make sure the policy arrangement's discourse has aligned with active citizens' viewpoints and narratives on urban NBS projects, (2) harmonise participants' conflicting viewpoints and interests and (3) citizens' participation should be legitimated and indicate the potential influence on private property (Buijs et al., 2019; Ferreira et al., 2020; Wamsler et al., 2020).

Lastly, the policy discourse for civic engagement should enhance the projects' functions. Through citizen's participation, an urban planner and manager can acquire more site-specific information to enhance the NBS projects' multifunctionality (Ferreira et al., 2020; Buijs et al., 2019). Hence, SNGs can include the following actions in their NBS policy discourse: (1) clarify the contextual requirements for the ecosystem services, (2) identify the benefit from NBS projects' multifunctionality, (3) ensure the project's effect on biodiversity and (4) connect people with nature (e.g., reachability, accessibility and

usability of NBS) (Ferreira et al., 2020; Buijs et al., 2019; Säumel et al. 2019).

Rules of the game

Firstly, the governance rules for the policy arrangement of civic engagement should facilitate the bottom-up collaborative network for urban NBS project governance. Collaborative NBS governance should work as a responsive management system that establishes an open and transparent environment to support a positive and productive relationship between civil society and government (Buijs et al., 2019; Brink & Wamsler, 2018; Frantzeskaki, 2019; Wamsler et al., 2020). Hence, SNGs need to include the following rule characteristics in their NBS policy arrangement: (1) promote grassroots innovations and transition initiatives to advocate and practice urban NBS and regenerate green urban commons and (2) prevent localist trap that civic initiatives were limits in the community scale (Kabisch et al. 2016; Buijs et al. 2019).

Secondly, the governance rule for policy arrangement of civic engagement should be supported by a feasible institution structure. In other words, the rules set for the policy arrangement of civic engagement needs to prevent bureaucracy's negative impact on the willingness and effectiveness of civic participation (Ferreira et al., 2020). The feasible institutional structure can stimulate civic stewardship for urban NBS (Langemeyer et al., 2018). Hence, SNGs should include the following rule characteristics in their NBS policy arrangement: (1) provide clear and lateral institutions, (2) enhance organizational flexibility to facilitate participation by diverse actors and citizens, (3) prevent bureaucracy and various formalities when dealing with community groups and (4) provide institutional support (e.g., property rights and capacity for decisions) for civic initiatives (Ferreira et al., 2020; Säumel et al. 2019; Wamsler et al., 2020; van der Jagt et al., 2017; Langemeyer et al., 2018).

Actors and coalition

Firstly, SNGs should connect feasible project participants of the civic engagement policy arrangement to establish an effective collaborative network for up-scale outcomes of urban NBS (Ferreira et al., 2020). Hence, SNGs should facilitate the following network actions in their NBS policy arrangement: (1) Ie and connect diverse actors with citizens to co-create and co-design the NBS projects, (2) introduce knowledgeable and powerful actors to citizens and (3) acquire support from politicians and key administrators (Frantzekaki, 2019; Buijs et al., 2019; Säumel et al., 2019; Neumann & Hack, 2020; van der Jagt et al., 2017; Ferreira et al., 2020).

Secondly, the policy arrangement for civic engagement should promote social cohesion and learning during the urban NBS governance process. Instead of working alone, governments should collaborate and learn with other groups of actors, including citizens, for the newest and contextual knowledge that can contribute to solving actual issues (Ugolini et al., 2018). Hence, SNGs can facilitate the following network actions in their NBS policy arrangement: (1) promote cooperative working, mutual learning,

experience sharing and different forms of NBS co-creation and (2) promote social learning and innovation (Ferreira et al., 2020; Frantzekaki, 2019).

Thirdly, the policy arrangement should also provide feasible authority capacity for civic engagement in urban NBS governance. Civic engagement needs adjustments from internal authority to change the traditional policy mechanism's power structure and mainstream consideration (Wamsler et al., 2020). Hence, SNGs can have the following networking capacities in their NBS policy arrangement: (1) collaborate with related actors and citizens instead of only providing regulative and consultative modes, (2) build trust with citizens on urban NBS projects' aim and process, (3) keep the continuity collaboration and (4) capitalise citizens' input into SNGs institutional capacities (Frantzekaki, 2019; Wamsler et al., 2020; Kabisch et al., 2016; van der Jagt et al., 2017; Brink & Wamster, 2018; Mattijssen et al., 2017).

Resources
Firstly, funding is one of the crucial resources for implementing NBS projects and is essential for civic involvement (Ershad Sarabi et al., 2019; Buijs et al. 2019; Wamsler et al. 2020). SNGs need to establish long-term funding partnerships with citizens and other urban NBS actors (Ferreira et al., 2020; Ugolini et al., 2018).

Secondly, the policy arrangement should channel environmental expertise into civic engagement in urban NBS governance. The environmental influence of civic engagement in projects can become more effective by collecting site-specific know-how from citizens (Ferreira et al., 2020; Brink & Wamsler, 2018). Hence, SNGs should include the following actions in their NBS policy arrangement to provide environmental expertise: (1) initiate environmental education about the benefit of NBS and citizens' options, (2) exploit and adopt existing skills and expertise and (3) transfer transdisciplinary knowledge between experts and other urban NBS actors (Ferreira et al., 2020; Zwierzchowska et al., 2019; Kabisch et al. 2016; Neumann & Hack 2020).

Fourthly, the policy arrangement should promote information and social capital flow in civic engagement in urban NBS governance. A mechanism like social media is necessary to exchange information and knowledge among participants and mobilise the public for the NBS projects (Ferreira et al., 2020; Yamaki, 2016). Hence, SNGs can include the following actions in their NBS policy arrangement: (1) establish an information network for learning about cases of success and failures and (2) provide citizens with useful and timely information, incentives and equitable legal processes (Frantzeskkaki, 2019; Brink & Wamster, 2018).

Lastly, the policy arrangement should provide land acquisition for civic engagement in urban NBS governance. SNGs can offer physical spaces for civic initiatives, which can even generate stewardship of urban green spaces (Langemeyer et al. 2018).

2.4 CF propositions for civic engagement in urban NBS governance

Reflecting on CF's contributions to the emergence of smart cities, the information and communication technology can empower citizens to become involved in and increase their sensitivity toward urban civic projects (Miglietta & Parisi, 2017). SNGs can use CF as an intermediary to engage and empower citizens' participation in urban NBS governance. In this section, this paper proposes a set of CF propositions based on the theoretical requirements of a policy arrangement for civic engagement in urban NBS governance and CF's contribution to the emergence of smart cities (see Figure 2-2).

Discourse

Firstly, to enhance citizens' awareness, SNGs can include CF in the policy discourse for civic engagement in urban NBS due to its function for facilitating public consensus. The CF process can be a dialogue mechanism that stimulates people to take action (Vlachokyriakos et al., 2016; Light & Briggs, 2017; Bernadino & Santos, 2016). Through dialogue, individuals' awareness of NBS projects and sense of community and belonging to public institutions will enhance (Bernadino & Santos, 2016; Gooch et al., 2020). Secondly, to promote value adding and sharing within NBS projects and among their participants, SNGs can include CF in the policy discourse for civic engagement in urban NBS due to its function for value sharing and enabling. Furthermore, CF can act as marketing materials and collect project-related feedback through online and offline community gathering (Gooch et al., 2020; Hui et al., 2019). Thirdly, to promote discourse congruence among NBS projects' participants, SNGs can include CF in the policy discourse for civic engagement in urban NBS due to its function for governance transparency, compliance and public consensus. Through a matching funds campaign on the CF platform, SNGs can decrease information asymmetry between projects' participants and discover local community needs (Miglietta & Parisi, 2017; Hong & Ryu, 2019). However, CF can support feedback relationships between projects' participants according to their function of facilitating public consensus (Hui et al., 2019). Lastly, to enhance the NBS projects' functions, the scientific understanding of CF's contribution to the emergence of smart cities did not provide the related research outcome. However, the research will explore CF's role in SNGs' policy discourse that related to NBS project's functions. Hence, according to the above discussion, the research summarises two CF propositions for civic engagement in urban NBS policy discourse:

Proposition #1: CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing and foster NBS projects' discourse congruence; and

Proposition #2: In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions.

Rules of the game

To facilitate the bottom-up collaborative network and provide a feasible institutional structure, SNGs can include CF in the policy rules for civic engagement in urban NBS due to its function of governance transparency and compliance. Adopting CF can allow SNGs to mitigate their distance with the local community, which leads to higher policy compliance and decreases the information asymmetry between both parties (Miglietta & Parisi, 2017; Hong & Ryu, 2019). Hence, according to the above discussion, the research summarises one of the CF propositions for the policy rules on civic engagement in urban NBS:

Proposition #3: CF can support SNGs by facilitating a bottom-up collaborative network and providing a feasible institutional structure within its urban NBS policy rules.

Actors and coalition

Firstly, to connect project participants and improve the outcome of urban NBS, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS due to its function for enhancing actor diversity and inclusiveness. CF can connect general crowds with regard to assembling diverse civil interests to facilitate new interactions between citizens, private sectors and SNGs (Miglietta & Parisi, 2017; Carè et al., 2018; Logue & Grimes, 2019). Secondly, to promote social cohesion and learning between urban NBS projects' participants, SNGs can adopt CF in civic engagement in urban NBS policy arrangements due to its promotion of public consensus and value sharing and enabling. CF can support communication between project participants and public society, which might stimulate new social trends (Light & Briggs, 2017). Moreover, CF's encouragement of value sharing and enabling can contribute to social cohesion and learning by assisting participants with forming feedback relationships, searching for similar cases and sharing of knowledge (Hui et al., 2019; Miglietta & Parisi, 2017). Lastly, to provide feasible authority capacity for civic engagement in urban NBS governance, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS due to its function for governance transparency and compliance. Regarding its effect on governance transparency and social compliance, CF can also equip SNGs with the capability to determine the requirements for collaborating with citizens and private sectors (Miglietta & Parisi, 2017; Hong & Ryu, 2019). Hence, according to the above discussion, the research summarises one of the CF propositions for civic engagement in the urban NBS policy's actors and coalition arrangement:

Proposition #4: For the policy's actors and coalition arrangement, CF can support SNGs by connecting project participants, promoting social cohesion and learning, and providing feasible, collaborative capacity.

Resources

Firstly, to establish long-term funding partnerships with citizens and other urban NBS actors, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS due to its promotion of resources coordination. CF can mitigate the barriers required for citizens to publicly show their various needs and precisely attract funders to support them (Miglietta & Parisi, 2017). Secondly, to channel environmental expertise, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS due to its function for value sharing and enabling. CF's effect on distributed apprenticeship and the platforms' function in related case searching can contribute to knowledge sharing within participant groups (Hui et al., 2019; Miglietta & Parisi, 2017). Thirdly, to promote the flow of information and social capital, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS because it promotes value sharing and enabling and governance transparency and compliance. CF platforms' case search function allows project initiators and participants to become aware and learn from experiences in other cases (Hui et al., 2019). Furthermore, SNGs can use the CF network to distribute timely information and administrative resources for citizens and other project-related actors (Miglietta & Parisi, 2017; Hong & Ryu, 2019). Lastly, to provide land acquisition for civic engagement in urban NBS governance, SNGs can adopt CF in policy arrangements for civic engagement in urban NBS due to its function for governance transparency and compliance. Regarding its capability to mitigate information asymmetry between public and private sectors (Miglietta & Parisi, 2017; Hong & Ryu, 2019), SNGs can use CF to support land acquisition for civic initiatives. Hence, according to the above discussion, the research summarises two CF propositions for civic engagement in urban NBS policy's actors and coalition arrangement:

Proposition #5: For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants' groups, promoting information and social capital flow and supporting land acquisition.
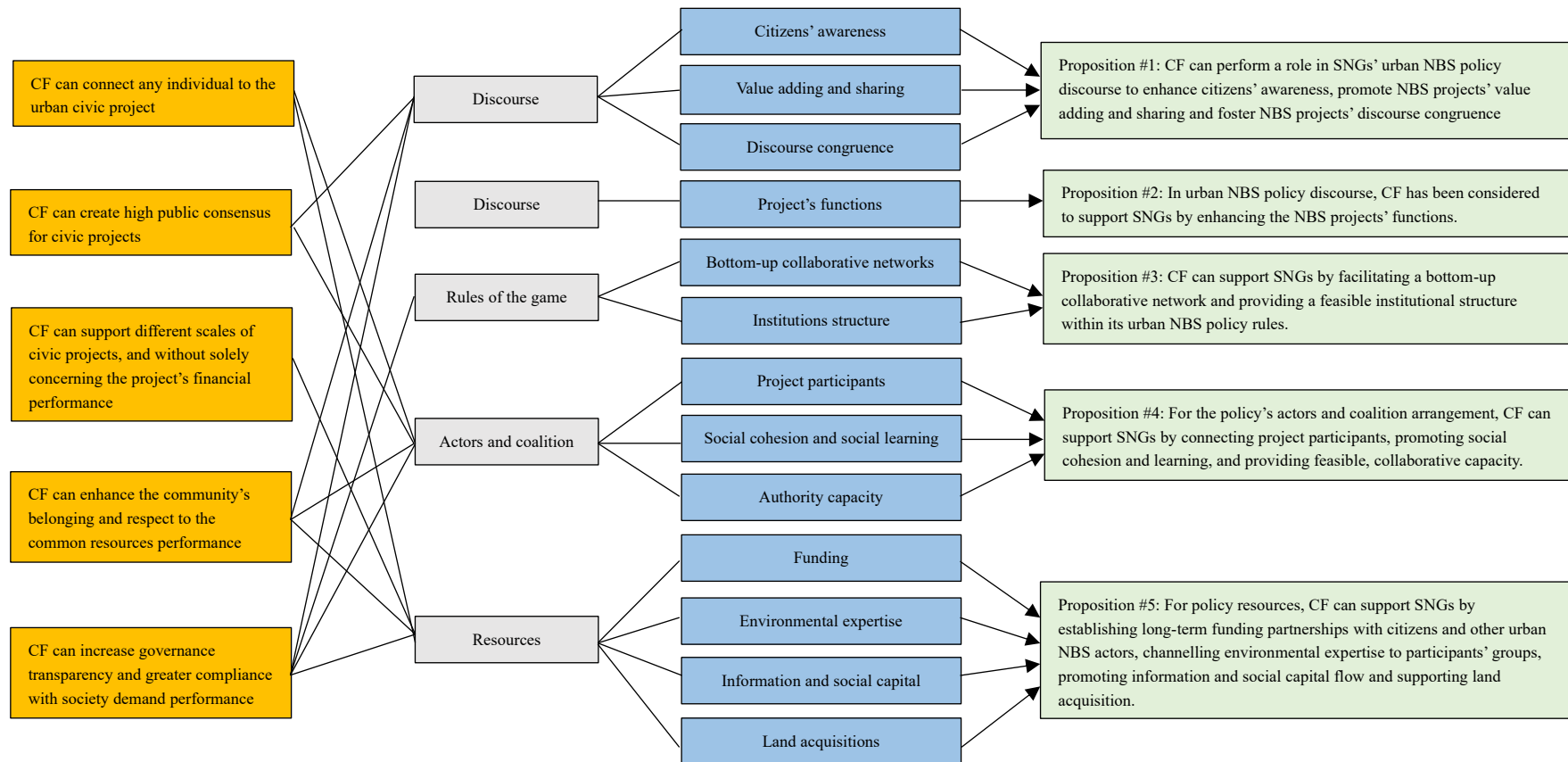
Figure 2-2. Conceptual framework for CF propositions

(Orange boxes represent CF functions; Grey boxes represent PAA dimensions; Blue boxes represent the factors for civic engagement in urban NBS governance; Green boxes represent the CF propositions)

Chapter 3: Methodology

3.1 Research strategy

This research has designed three sub-questions to answer the main research question. Based on the literature review, the first and second sub-questions were answered by a set of CF propositions for urban NBS governance and an analytical framework that includes potential success factors for manipulating the propositions. To explicate the unique roles that CF can play to complement SNGs urban NBS governance, the research adopts a case study approach to test the propositions.
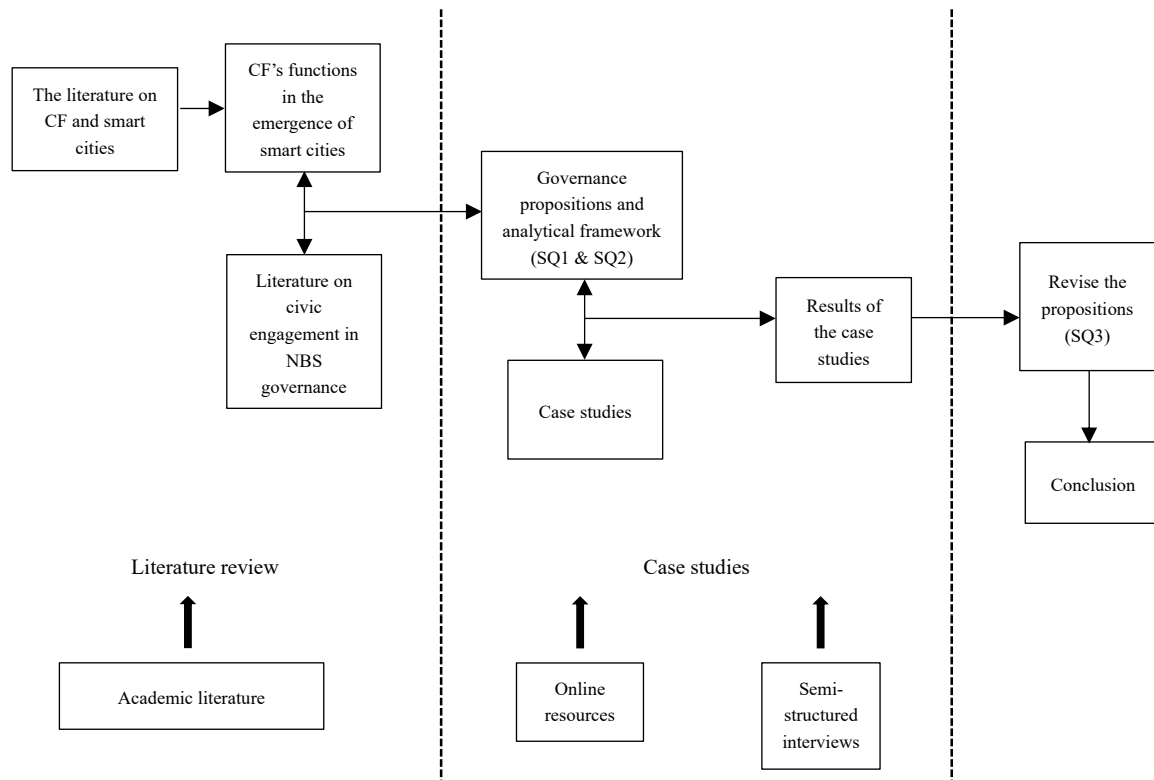
Figure 3-1. Research method

According to Baxter and Jack's (2008) summary, researchers should consider adopting a case study approach when the following occurs: (1) the research aims to provide answers to 'how' and 'why' questions; (2) the research cannot manipulate the behaviours within the research context; (3) the research aims to uncover the context's influence toward the specific phenomenon; or (4) the line between the research context and focus phenomenon is not clear. In this research, the third sub-question is a 'how' question. Moreover, the research is adopting an ex-post perspective to test the CF propositions, which means that manipulating case-related actors and contexts are impossible. Most importantly, the research focuses on exploring and understanding the influence of the CF mechanism (i.e., context) toward civic engagement (i.e., phenomenon) for urban NBS governance. Hence, a case study approach seems necessary to answer the third sub-question. Specifically, the research has chosen multiple case studies. Through this type of case study, the research can identify the similarities and differences between the contexts (Baxter & Jack, 2008).

The research has four case selection criteria. Firstly, the cases should relate to NBS-related policy actions to explore CF's role within the SNGs policy arrangement. Secondly, the SNGs should have earmarked the public budget for matching funds on the CF platform. Thirdly, the CF projects need to be jointly implemented by SNGs and community member or organisations. Lastly, the urban setting of the NBS projects is grey infrastructure with green features, e.g., planting trees on streets, urban gardens, etc. After searching the database from the EU-funded NBS research projects, i.e., NATURVATION and GrowGreen, the research has selected three European-based CF campaigns as study cases (see Table 3-1).

Table 3-1. Information about selected cases

	Case #1	Case #2	Case #3
Country	Belgium	The Netherlands	United Kingdoms
SNG	City of Ghent	Province of Noord-Brabant	City of Manchester
NBS and CF-related policies	- Ghent climate plan 2014 – 2019 - Smart city concept Gent	- Natural network Brabant - Natural and social programme	- Our Manchester - Green & Blue infrastructure strategy
CF platforms	- Crowdfunding.gent	- Crowdfunding VoorNatuur	- Spacehive
Focused CF campaigns	- Lekker Dichtbij - Edible Street	- Dommelbimd - Liduina	- Stevenson Square Green Makeover

3.2 Data collection

Firstly, the research adopts academic literature as a primary source to design the CF propositions and the analytical framework. The research uses academic search engines, such as Scopus and Google scholar, to collect literature related to CF and NBS. For CF's contribution toward the emergence of smart cities, the research adopts a set of search keywords, like 'crowdfunding + smart city' and 'crowdfunding + urban sustainability'. For the governance demands of civic engagement in NBS, the research adopts a set of search keywords, like 'Nature-based solutions + citizen', 'Nature-based solutions + civic participation', and 'Nature-based solutions + civic engagement'.

Secondly, for the case studies, the main data resources were collected from an EU-funded NBS research projects' database, grey documents (i.e., policy documents and NGO reports), academic literature, online news reports from Google and Nexis Uni and CF platforms. All three cases' CF platforms provided information, including each CF campaign page, contribution and communication between campaign initiators and backers and written or audio-visual material (Doan & Toledano, 2018).

Referring to Charbit and Desmoulins (2017), five types of participants related to the civic CF: (1) SNGs, (2) CF platforms, (3) campaign initiators, (4) backers and (5) citizens who are beneficiaries of the local public good. Hence, the third data collection method is conducting a series of semi-structured interviews

that focus on the abovementioned participants. The benefit of using semi-structured interviews is exploring CF participants' experience, which was hard to access from online survey (Hui et al., 2019). The research has adopted the snowball sampling method to identify and recruit interviewees (Hui et al., 2019).

3.3 Data processing

For the multiple case-studies, the collected data were separated into four groups. The first group of data included authority documents and webpages. This group of data provided official perspectives about the relationship between the policy setting and the CF. The second group of data consisted of CF platform's webpages, which included individual campaign pages, CF workshop information and SNGs' campaign introductions. This group of data aimed to provide insights about CF campaigns' structure and CF platforms' services. The third group of data contained third parties' research and opinions, which included academic articles, research reports, online databases, and webpages. This group of data can supplement the limitation of primary data collection and provide various angles toward understanding the SNGs' relationship with CF. The fourth group of data were interview transcripts and online news reports, which aimed to provide an individual's experience while participating in the CF campaign. For the semi-structured interviews, the researcher designed a general interview agenda based on the five functions of CFs for the emergence of smart cities (see Appendix A). For each interview, the research has adjusted the agenda according to the interviewee's role in the CF campaign. The data were assessed using the following analytical framework (see Table 3-2). To analyse the online resources, the data were evaluated through the researcher's interpretation. If the data aligned with the description of the success factors operation in Table 3-2, the researcher determined that the data information supported the factors that could complement the SNGs' civic engaged urban NBS governance. For each case study, the data analysis results were separated into four PAA dimensions. In each dimension, the research provided a table to describe and to visualise the data performance (see Table 3-3). Green means the data fulfilled the description of the success factor operation. Yellow means the data partially fulfilled the description of the success factor operation. Red means the data did not fulfil the description of the success factor operation. If the analysis outcome of the related factors is in green, it means the corresponding CF proposition is valid in the case study. If more than one related factor's analysis outcome is not in green, it means the corresponding CF proposition is partially valid. If the analysis of the related factor is in red, it means the corresponding CF proposition is invalid.

Table 3-2. Analytical framework

Dimension	CF propositions	Potential factors	Success factors operation	Data sources
Discourse	*Proposition #1: CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing, and foster NBS projects' discourse congruence.*	Citizens' awareness	- Intensify the public acceptability, confidence, consciousness and sense of belonging according to the NBS (Ferreira et al., 2020; Wamsler et al., 2020). - Raise citizens' awareness of their options and legal responsibilities (Brink & Wamster, 2018). - Include citizens' strong attention and involvement when co-creating and co-designing the projects (Frantzekaki, 2019; Ferreira et al., 2020).	- Grey documents - CF campaign pages - Online news reports
		Value adding and sharing	- Enhance the sharing of concerns and interests for collaborations between citizens and governments (van der Jagt et al., 2017). - Identify the urban NBS projects' value added in terms of natural and social capital (Ferreira et al., 2020; Säumel et al., 2019). - Promote common values, beliefs and worldviews between citizens, governments and other participants (Wamsler et al., 2020).	
		Discourse congruence	- Discourse congruence between government and active citizenship (Buijs et al., 2019). - Prevent and manage conflicting points of view and interest (Ferreira et al., 2020). - Ensure citizen involvement is legitimate/just governmental action, measure impact on private land (Wamsler et al., 2020).	
	Proposition #2: In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions.	Project's functions	- Contextualize functions with ecosystem services (Ferreira et al., 2020). - Benefit from multifunctionality (Ferreira et al., 2020). - Increase biodiversity (Ferreira et al., 2020). - Connect people with nature (i.e., reachability, accessibility and usability) (Ferreira et al., 2020; Buijs et al., 2019; Säumel et al., 2019).	
Rules of game	*Proposition #3: CF can support SNGs by facilitating a bottom-up collaborative network and providing a feasible institutional structure within its urban NBS policy rules.*	Bottom-up collaborative networks	- Create grassroots innovation and transition initiatives as collaborative networks or allow citizens to play a significant role in advocating and practising urban NBS and re-establishing green urban commons (Kabisch et al., 2016). - Prevent localist trap that civic initiatives that limit the community scale (Buijs et al., 2019).	- Naturvation database - ClimateADAPT database - CF campaign pages - Grey documents - Interviews
		Institutions structure	- Provide clear and lateral institutions (Ferreira et al. 2020; Säumel et al. 2019). - Enhance organizational flexibility to facilitate diverse actors' and citizens' participation (Wamsler et al., 2020). - Prevent bureaucracy and various formalities when dealing with community groups (van der Jagt et al., 2017). - Provide institutional support (e.g., property rights and decisions capacity) for civic initiative (Langemeyer et al., 2018).	
Actors & coalition	*Proposition #4: For the policy's actors and coalition arrangement, CF can support SNGs by connecting*	Project participants	- Include and connect diverse actors with citizens to co-create and co-design the NBS projects (Frantzekaki, 2019; Buijs et al., 2019; Säumel et al., 2019; Neumann & Hack, 2019). - Introduce knowledgeable and powerful actors to citizens (van der Jagt et al., 2017). - Acquire politicians' and key administrators' support (Ferreira et al., 2020).	- Naturvation database - ClimateADAPT database - CF campaign pages

Dimension	CF propositions	Potential factors	Success factors operation	Data sources
	project participants, promoting social cohesion and learning and providing feasible, collaborative capacity.	Social cohesion and learning	- Promote cooperative working, mutual learning, experience sharing and different forms for NBS co-creation (Ferreira et al., 2020; Frantzekaki, 2019). - Promote social learning and innovation (Ferrieria et al., 2020).	- Grey documents - Academic literature - Online news reports - Interviews
		Authority capacity	- Collaborate with related actors and citizens instead of only using regulative and consultative modes (Frantzeskaki, 2019; Wamsler et al., 2020; Kabisch et al., 2016; van der Jagt et al., 2017). - Build trust with citizens on urban NBS projects' aim and process (Frantzeskaki, 2019). - Keep the continuity collaboration (Mattijssen et al., 2017). - Capitalise citizens' input into SNGs institutional capacities (Brink & Wamster., 2018).	
Resources	*Proposition #5: For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants'groups, promoting information and social capital flow and supporting land acquisition.*	Funding	- Establish long-term funding partnerships with citizens and other urban NBS actors (Ferreira et al., 2020; Ugolini et al., 2018).	- Policy and grey documents - Naturvation database - ClimateADAPT database - CF campaign pages - Grey documents - Academic literature - Online news reports - Interviews
		Environmental expertise	- Initiate environmental education about the benefit of NBS and citizens' options (Ferreira et al., 2020; Zwierzchowska et al., 2019). - Exploit and adopt existing skill and expertise (Kabisch et al., 2016). - Transfer transdisciplinary knowledge between experts and other urban NBS actors (Neumann & Hack, 2019).	
		Information and social capital	- Establish information network for learning the success and failures of existing cases (Frantzeskkaki, 2019). - Provide citizens with useful and timely information, incentives and equitable legal process (Brink & Wamster, 2018).	
		Land acquisition	- Offer physical spaces for civic initiative (Langemeyer et al. 2018).	

Table 3-3. Table format for case study data analysis results

Factors	Success factors operation	Outcome	Propositions
Factor #1	…	- …	Proposition #
	…	- …	
Factor #2	…	- …	
	…	- …	
Factor #3		- …	

3.4 Method limitations and ethical issues

The research design has two main limitations. The first limitation is the research budget and time needed for multiple case studies (Baxter & Jack, 2008). Accordingly, this study required semi-structured interviews to collect CF participants' insights. However, due to the limitations from the research budget and time, conducting long-term interview sessions for data collection was impracticable, leading to a small research sample size.

The second research limitation is from the form of the interviews. CF for civic projects are highly localised activities, hence the researcher had planned to engage with participants in the local community. However, there was an ongoing pandemic outbreak during this research, so travelling to case locations and having face-to-face interviews became impossible. Accordingly, the researcher could only conduct online interviews, which might influence the data's quality.

To maintain the quality of online interviews and prevent ethical problems, the researcher sent an agenda document that stated the research purpose and questions to the participants before conducting the interviews. To maintain the case study interviewees' privacy, their names were anonymised. To prevent the misrepresentation of participants' viewpoint, all transcripts will be sent to the interviewees for review. Lastly, the researcher informed the interviewees about the findings in the thesis, requested their permission to share the document, and explained the research outcome with them.

Chapter 4: City of Ghent

4.1 Case introduction

In Ghent, the city has announced the *Ghent Climate Plan 2014–2019* as its long-term strategy toward climate-neutrality and energy independence in 2050 (Stad.gent, n.d.a). The city has identified six priority action domains and considered CF as an additional instrument to support the climate actions, specifically housing refurbishments, government-owned property projects and renewable energy promotion (Stad.gent, n.d.a). The successful CF campaigns have shown CF's potential to facilitate the city's work on NBS-related projects, such as urban agriculture.

Under the climate plan, the city established the Gent en Garde Programme to shorten the local food supply chain by creating a participative governance structure (United Nations Climate Change, n.d.). In the Lekker Dichtbij campaign, the community vegetable garden aligned with the Gent en Guard Programme's goal and acquired the city alderman's support to initiate urban garden projects through CF (Gent en Garde, 2015). Yet, the Edible Street campaign aimed to promote sustainable food production within the community by building façade gardens along the streets (Interviewee 2, personal communication, April 22, 2020). The Lekker Dichtbij campaign was initiated by a local non-governmental organisation (NGO) called Samenlevingsopbouw Gent, and the Edible Street campaign

was created by the citizens group Onze Eetbare Straat Gent (Crowdfunding.gent, 2015a; Crowdfunding.gent, 2015b). The research focused on these two NBS-related CF campaigns because they represent how local citizens and NGOs can contribute to a city's urban agriculture development through CF (Samenlevingsopbouw Gent, 2015a; Climate ADAPT, 2016).

Figure 4-1. Crowdfunding.gent homepage
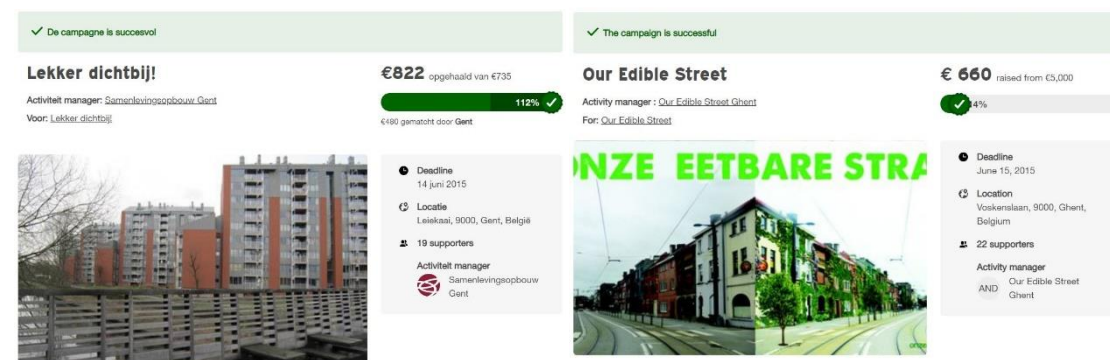
Figure 4-2. Pages for The Lekker Dichtbij campaign and Edible Street campaign

The CF platform that been used in two focus campaigns is Crowdfunding.gent, which was established in 2015 by the city's government. The city aims to adopt CF to support the Smart City Concept Gent (Climate ADAPT, 2016; Stad.gent, n.d.b). The goal of the Smart City Concept Gent is promoting collaboration and co-creation for city life among all kinds of city actors through technology (Stad.gent, n.d.b). Crowdfunding.gent is one of the instruments to help the city realise the Smart City Concept Gent and focus on stimulating active forms of participation (Verschuere & Steen, 2015). The platform wants to call the city's residents to action and targets on four themes: (1) knowledge and innovation, (2) culture; (3) child-friendly city and (4) transition to a climate-neutral city (Stad.gent, 2015). The team who managed the platform was from the City's Policy Participation Service and was responsible for overseeing all CF applications and providing customised support for each campaign (Stad.gent, 2015; Verschuere & Steen, 2015). The Policy Participation Service is a governance body that oversees all policy themes' development progress around different city districts and has an administrative network from neighbourhoods to city-scales (Verschuere & Steen, 2015).

Because the city aims to integrate citizens' contributions to the climate actions, the officially run CF

platform become a facilitator with financial and consciousness incentives to encourage people's behavioural changes (Climate ADAPT, 2016). According to the city's experience, CF can be an instrument to support small-scale climate adaptation projects (e.g., urban farming and gardening) and realise multiple stakeholders' involvement (Climate ADAPT, 2016). In other words, considering the city's policies for climate and smart governance and the focus of the two CF campaigns, the Ghent's case study can shed light on how SNGs can establish CF platforms to open an opportunity for civic engagement in the urban NBS governance.
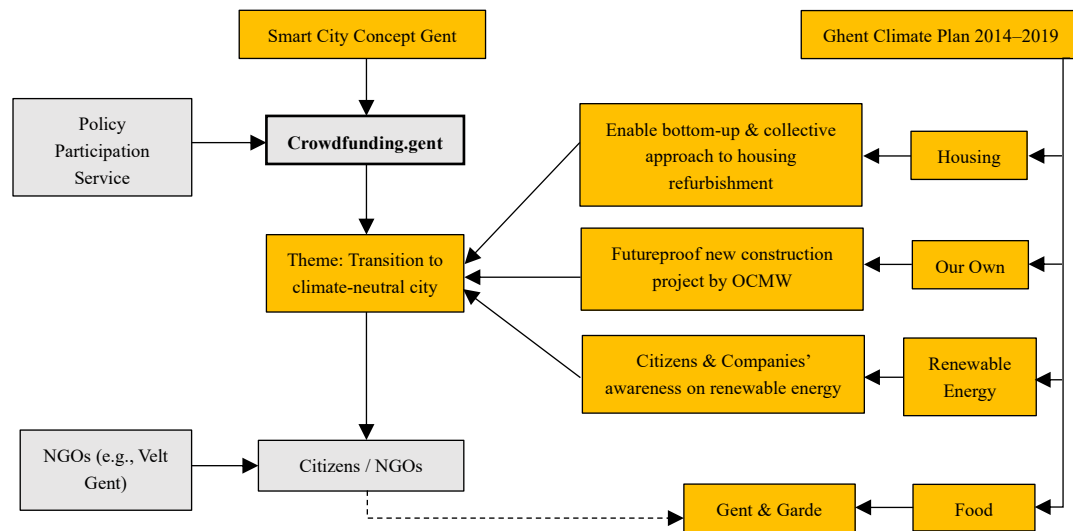
Figure 4-3. Relationship between Crowdfunding.gent and the City of Ghent
(Grey boxes represent the CF platform and participants; Orange boxes represent the SNG's policies).

4.2 Analysis results and CF propositions reflection

To test the validation of the CF propositions for SNGs' civic engagement in urban NBS governance, the research has used the analytical framework in Table 3-2 to assess the governance relationship between CF and the city for urban NBS development. In the following sub-sections, the data analysis results and key findings will be shown through four PAA dimensions. Moreover, based on the data analysis outcome, the research reflects the CF propositions' validation after describing the key findings in each PAA dimension. In each sub-section, the research has provided a summarising table that includes four parts: factors, success factors for operation, outcome and propositions. Following Section 3.3's data processing method, the summarising tables indicate the performance of each proposition's related factor and validation. Overall, most of the factors were partially fulfilled. The relationship between CF and the city only fulfils one factor for civic engagement in urban NBS governance: institutional structure. Two policy resources—environmental expertise and land acquisition—are missing in the relationship between CF and the city. Considering the results of Ghent's case study, all five CF propositions for civic engagement in urban NBS governance were partially valid.

4.2.1 Discourse

The research found that SNGs can link the CF campaign with civic engagement in urban NBS development in the policy discourse. Both the city's climate and smart governance policies indicate that using CF to discover social trends and connect citizens' initiatives to the urban development goals can also strengthen the relationship between the city and its citizens (see Table 4-1, analysis outcomes of factors related to citizens' awareness and value adding and sharing). However, without defining citizens' roles and the expected campaign functions in term of NBS development, the CF campaign's policy influence will become unclear. The collected data have shown that the CF motivation behind the initiators and the city was unmatched (see Table 4-1, analysis outcome of discourse congruence factor). The primary motivation behind the CF initiators focused more on increasing the projects' publicity instead of collaborating with the government.

Furthermore, the policymaker has reflected that it is hard to identify CF campaigns' exact effectiveness in the city's development strategies. According to the data analysis, it seems that this results from the city only identifying four CF themes that they were especially interesting and did not specifically describe the kinds of functions that CF campaigns need to offer to support these themes. In Ghent's case study, the targeted CF function is more about its governance effect on civic engagement instead of the climate and NBS-related purpose (e.g., increasing biodiversity and connecting people with nature). Although two focused CF campaigns have demonstrated CF's potential in promoting civic engagement in NBS development, the city did not link citizens' awareness to the urban NBS or identify the value added to the NBS projects (see Table 4-1, analysis outcomes of value adding and sharing factor and project's functions factor). In other words, to strengthen SNGs' civic engagement in NBS governance through CF, it is crucial to identify CF as a dialogue mechanism for collative actions and the specific policy outcome of using CF to promote urban NBS development in the policy discourse.

The Ghent case study has partially matched with the assumption of Proposition #1: *CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing, and foster NBS projects' discourse congruence*. The city's policy narrative toward CF's role has matched with the literature review indicating that SNGs can consider CF as a dialogue mechanism for advocating for people's actions, a facilitator for public consensus, and valuable marketing materials that can collect project participants' feedback (Vlachokyriakos et al., 2016; Light & Briggs, 2017; Bernadino & Santos, 2016; Gooch et al., 2020; Hui et al., 2019). However, besides focusing on the collaborative governance perspective, the city's CF-related narrative did not align with the literature review, which suggests that it is important to enhance citizens' attention and to connect and compare citizens' viewpoints on NBS projects (Ferreira et al., 2020; Wamsler et al., 2020; Brink & Wamster, 2018; Frantzekaki, 2019: van der Jagt et al., 2017: Säumel et al., 2019; Buijs et al., 2019). To implement Proposition #1, the Ghent case study implies that an SNG's policy discourse can include elements like collaborative urban governance, social connection and interaction, the value that people come first and

civic experiments. These elements have established the governance context that adopting CF to enhance citizens' awareness, promote citizens initiatives', encourage value adding and sharing through social engagements, and promote the project's discourse congruence between the authority and the citizens. The missing policy narrative in the Ghent case study is CF's connection to the NBS concept and citizens' NBS-related legal responsibility. A lack of public understanding of the NBS concept and NBS's relation toward CF can hinder the civic engagement in urban NBS governance from reaching Proposition #1.

The Ghent case study has partially matched with the assumption of Proposition #2: *In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions*. According to the literature review, the academic understanding of CF's role in enhancing NBS projects' functions is unclear. Through Ghent's case study, the research discovers that the effectiveness and performance of NBS projects' functions will be influenced by the CF campaign's embedded policy context. Because the urban planner and manager can acquire more site-specific information to enhance the NBS projects' multifunctionality through citizens' participation (Ferreira et al., 2020; Buijs et al., 2019), SNGs need to identify and describe NBS functions within their policy discourse to implement Proposition #2. Moreover, Ghent's case study shows that the city's policy narratives have reflected CF's role in collecting citizens' contributions to public goals. However, the policy narratives did not describe the environmental NBS functions that a CF campaign needs to provide, including increasing biodiversity and connecting people and nature. In other words, an unclear policy position and expectation that considers NBS's social and environmental functions for CF campaigns can hinder civic engagement in urban NBS governance from reaching Proposition #2

Table 4-1. Analysis result of the Ghent case-study's discourse dimension

Factors	Success factors operation	Outcome	Propositions
Citizens' awareness	Intensify the public acceptability, confidence, consciousness and sense of belonging	- The city wants to strengthen citizens' awareness of collaborative urban governance through its Smart City Concept and aims to use CF to discover and enable citizens' initiatives (Stad.gent, n.d.b).	
	Raise citizens awareness of their options and legal responsibilities	- From the initiators' perspective, CF can strengthen social connections within the citizens' group (Samenlevingsopbouw Gent, 2015a).	
	Include citizens' strong attention and involvement when co-creating and co-designing the projects	- The City expects that using CF to integrate citizens' contribution to the city's 2050 climate neutral goal (Stad.gent, n.d.a). - Public and politicians' acceptance of NBS and CF will both influence CF campaign's outcome (Interviewee 2, personal communication, April 22, 2020). - The link to the NBS projects and related legal responsibilities did not explicitly show in the policy discourse.	
Value adding and sharing	Enhance the sharing of concerns and interests for collaborations between citizens and governments	- The Smart City Concept wants to promote the value that 'people come first' and aims to facilitate the collaboration between citizens and the SNG (Stad.gent, n.d.b).	
	Identify the urban NBS projects' value added in terms of natural and social capital	- The city has considered using CF to collect citizens' contributions for its climate policy (Stad.gent, n.d.a).	Proposition #1
	Promote common values, beliefs and worldviews between citizens, governments and other participants	- The city is aware of the climate policy's natural and social impact (Stad.gent, n.d.a). However, due to the policy design, the related NBS projects will most likely link to urban farming instead of other types of NBS.	
Discourse congruence	Discourse congruence between government and active citizenship	- The city considered the CF platform as an experimental and co-creation space to handle conflicting points of view and interests with citizens (Serneels et al., 2016).	
	Prevent and manage conflicting points of view and interests	- The CF platform's regulation documents and criteria settings have reflected the legitimacy of citizens' public participation and aimed to prevent the potential discourse conflict (Serneels et al., 2016).	
	Ensure citizens' involvement is legitimate/just governmental action, measure	- The criteria for defining a legitimated CF campaign include: (1) no discrimination based on sex, race, age, social status, religion, political preference, etc.; (2) equally open to everyone; (3) must exceed individual interest; and (4)	

Factors	Success factors operation	Outcome	Propositions
	impact on private land	did not break the law (Crowdfunding.gent, 2016a). - The city asked initiators to submit justification documents about the campaign's financial performance and the end use of subsidies and public donations within a limited time (Stad.gent, 2015). - From the initiators' perspective, the motivation to adopt CF is more about increasing projects' publicity instead of collaborating with the city (Climate ADAPT, 2016).	
Project's functions	Contextualize functions with ecosystem services Increase biodiversity Benefit from multifunctionality Connect people with nature (i.e., reachability, accessibility and usability)	- The CF initiatives' contextual functions were mainly based on the urban agriculture perspective and did not focus on biodiversity (Samenlevingsopbouw Gent, 2015a; Climate ADAPT, 2016; Interviewee 2, personal communication, April 22, 2020). - The CF platform's criteria indicate the CF initiatives' contribution to both the city's development themes and social participatory (Stad.gent, 2015). - The CF platform did not mention how the city expects citizens' initiatives to contribute to the connection between people and nature. - In the Edible Street campaign, citizens have shown CF's potential to expand the green spaces around the city (Climate ADAPT, 2016; Baeremaeker, 2015). - The policymaker has reflected that it is hard to identify CF initiatives' exact effectiveness in the city's development strategies (European Environmental Agency, 2017).	Proposition #2

4.2.2 Rules of the game

The research found that CF can become SNGs' institutional innovation for promoting civic engagement in NBS governance. From the bottom-up collaboration perspective, the city's CF regulatory design has asked the platform management team to support the citizens in forming a working group for the campaign regarding their social network resources (see Table 4-2, analysis outcome of bottom-up collaborative network factor). In other words, the regulatory design of the CF platform can reflect the city's attitude toward different scales of citizens' activities. From the institutional structure perspective, the establishment of the government-run CF platform can be seen as the city's institutional innovation. The CF platform's regulatory characteristics provide flexibility for the city and CF initiators to manage the campaign design. By regulating the platform's working process and responsibility of the participants, the CF platform can act a joint action structure for public initiative projects (see Table 4-2, analysis outcome of institutions structure). Hence, to support civic engagement in urban NBS governance through CF, SNGs can provide a regulative guideline to inform CF-related stakeholders about their interaction method and collaboration process for the NBS project.

The Ghent case study has partially matched with the assumption of Proposition #3: *CF can support SNGs to facilitate a bottom-up collaborative network and provide a feasible institutional structure within its urban NBS policy rules*. The city's regulatory design for CF has reflected previous literature suggesting that CF can contribute to higher policy compliance and decrease the information asymmetry between participants (Miglietta & Parisi, 2017; Hong & Ryu, 2019). To have responsive management for civic engagement in NBS governance, SNGs' regulations need to prevent bureaucracy's negative impact on citizens' participation and stimulate civic stewardship for urban NBS (Ferreira et al., 2020; Langemeyer et al., 2018). To implement Proposition #3, the Ghent case study implies that SNGs' CF regulation can encourage initiators to form a working group within their social network and allow them to support different scales of the CF campaign. The CF regulation can also announce an administrative team that operates the CF platform to strengthen SNGs' governance flexibility and compliance. However, the Ghent case study overlooked the connects between CF regulation of NBS-related tasks and re-establishing green urban commons. Similar to Proposition #1 and Proposition #2, the lack of NBS-related CF regulations can hinder the civic engagement in urban NBS governance from reaching Proposition #3.

Table 4-2. Analysis results of the Ghent case study's rules of game dimension

Factors	Success factors operation	Outcome	Propositions
Bottom-up collaborative network	Create grassroots innovation and transition initiatives as collaborative networks or allow citizens to play a significant role in advocating and practising urban NBS and re-establishing green urban commons	- The CF rule asks the platform manager to guide initiators in forming a working group for the campaign and making good use of their social networks (Crowdfunding.gent, 2016b; Serneels et al., 2016). - The CF platform allows the public to support citizens' initiatives through different options (i.e., money, time and knowledge, or personal networks) (Crowdfunding.gent, 2016c). - The CF platform supports different scales of CF campaigns (i.e., street, neighbourhood, and city) (Crowdfunding.gent, 2016b). - The research and successful CF campaign experiences have shown that CF can improve the effect of small-scale climate adaptation measures (Crowdfunding.gent, 2016b; Climate ADAPT, 2016). - The city's rules for the CF platform did not link advocating for urban NBS and re-establishing green urban commons.	
	Prevent localist trap that civic initiatives that limit the community scale		
Institutions structure	Provide clear and lateral institutions	- The CF platform was set by the city, which has been considered =a new form of civic engagement in public service to manage citizens' initiatives and create a more diverse outcome (Verschuere & Steen, 2015). - The case management on the CF platform allows the city to adopt a more flexible governance process to consider dialogues and viewpoints on each CF case (Serneels et al., 2016). - The criteria on the CF platform aims to focus on defining unqualified projects to boost the output of the citizens' initiatives (Climate ADAPT, 2016). - The bureaucracy structure for the CF platform has simplified the SNG's decision process toward citizens' initiatives (Serneels et al., 2016). - The CF's regulation document *Subsidy Regulations for the Co-financing of Non-profit Crowdfunding Projects 'Wijs van Gent'* has defined the CF campaign process and responsibility between the city and the initiators (Stad.gent, 2015). - The management team of the CF platform will arrange an assessment interview and provide suggestions for increasing the initiative's success rate (Crowdfunding.gent, 2016d.; Serneels et al., 2016).	Proposition #3
	Enhance organizational flexibility to facilitate diverse actors' and citizens' participation		
	Prevent bureaucracy and various formalities when dealing with community groups		
	Provide institutional support (e.g., property rights and decisions capacity) for civic initiative		

4.2.3 Actors and coalition

The research determined that SNGs need to equip CF platform with cross-sectoral networking services for civic engagement in urban NBS governance. During the CF platform's campaign management process, the management team can introduce feasible government actors and form a co-working network to support citizens' initiatives (see Table 4-3, analysis outcomes of project participants factor and social cohesion and learning factor). The authority's management capacity for the CF platform was based on channelling related governmental departments and acquiring technical and information support from a Dutch CF company (see Table 4-3, analysis outcome of authority capacity factor). However, the research did not uncover evidence suggesting that the interaction between the city and its citizens can generate trust and lasting collaboration. Furthermore, the collected data did not indicate whether the CF platform can connect non-governmental actors and organisations to CF initiators. In other words, a cross-sectoral network for working and learning is missing within the platform's actors and coalition arrangement. In the two CF campaigns, the initiators needed to establish a connection with non-governmental actors who have a NBS-related profession or their own resources (see Table 4-3, analysis outcome of social cohesion and learning factor). The cross-sectoral networking service will also influence the arrangement of the policy resources. If the CF platform can connect initiators with NBS expertise and the project-related third parties through its networking service, the city can provide more diverse and feasible policy resources to the citizens' NBS campaigns.

The Ghent case study has partially matched with the assumption of Proposition #4: *For the policy's actors and coalition arrangement, CF can support SNGs in connecting project participants, promoting social cohesion and learning, and providing feasible collaborative capacity*. The city's policy actor and coalition arrangement for the CF campaign have reflected the literature review, which reveals that CF can equip SNGs with the capability to determine the public's needs when collaborating with citizens and private sectors (Miglietta & Parisi, 2017; Hong & Ryu, 2019). However, it is unclear whether a CF platform's management team can connect knowledgeable, powerful actors that relate to NBS outside the government. Civic engagement in NBS governance should form an effective collaborative network (Ferreira et al., 2020) and require the authority to change their governance behaviour and mindset, including through collaboration with and learning from other groups of actors (Walmsler et al., 2020; Ugolini et al., 2018). To implement Proposition #4, the Ghent case study implies that SNGs can allow the team behind the CF platform to bridge related governmental actors, give opinions and judge the initiatives, which reflect the co-working idea among SNGs and citizens' coalition. However, limitations of networking services might influence the CF platform's functions for exploring a civil interest and stimulating new social trends (Miglietta & Parisi, 2017; Carè et al., 2018; Logue & Grimes, 2019; Light & Briggs, 2017). As shown in the Ghent case study, the lack of a cross-sectoral networking service on a CF platform can hinder the civic engagement in urban NBS governance from reaching Proposition #4.

Table 4-3. Analysis results of the Ghent case study's actors and coalition dimension

Factors	Success factors operation	Outcome	Propositions
Project participants	Include and connect diverse actors with citizens to co-create and co-design the NBS projects	- The CF platform can introduce governmental actors to citizens' initiatives before their projects are verified (Verschuere & Steen, 2015). - The CF application judgment group needs to submit assessment advice to the mayor and the alderpeople and let the city council decide whether to support the initiatives (Stad.gent, 2015). - It is unclear whether the CF platform's management team can connect knowledgeable, powerful actors outside the governmental system.	Proposition #4
	Introduce knowledgeable and powerful actors to citizens		
	Acquire politicians' and key administrators' support		
Social cohesion and learning	Promote cooperative working, mutual learning, experience sharing and different forms for NBS co-creation	- The assessment stage before the CF campaign is published online has been considered as a co-working time between the city and its citizens (Stad.gent, n.d.b; Serneels et al., 2016). - According to focused campaigns, the participants have developed a social network to acquire information and resources for implementing the campaign (Samenlevingsopbouw Gent, 2015a). - It is unclear whether the CF platform has managed events or workshops that aim to promote social learning and innovation between social actors. - It is unclear to what extent the platform can provide NBS knowledge to support citizens' initiatives.	
	Promote social learning and innovation		
Authority capacity	Collaborate with related actors and citizens instead of only using regulative and consultative modes	- The city uses the CF platform to realise its collaborative governance vision and to integrate citizens' contributions into city development (Stad.gent, 2015). - The city has appointed an officer to manage and communicate with citizens and cooperated with a Dutch CF platform to maintain its service quality (Stad.gent, 2015). - The city considered CF as a useful tool to capitalise citizens' contributions because 33% of the campaigns have successfully reached their target amount on the platform (Climate ADAPT, 2016). - The CF platform's effects on enhancing citizens' trust, continuing the individual projects and controlling the CF campaigns' policy contribution were unclear.	
	Build trust with citizens on urban NBS projects' aim and process		
	Keep the continuity collaboration		
	Capitalise citizens' input into SNGs institutional capacities		

4.2.4 Resources

The research indicated that both online and offline communication with the citizens is important when SNGs adopt CF to deliver NBS-related informational and financial policy resources for civic engagement in urban NBS projects. The city has used the CF platform to provide informational and financial resources to the civic society. Yet, in the individual project, the city is more likely to build up short-term financial support (see Table 4-4, analysis outcome of funding factor). For promoting information and social capital flow, the platform can be seen as an information network for initiators and the public to understand the experiences of existing CF cases and share the related policy regulations (see Table 4-4, analysis outcome of information and social capital factor). However, the collected data did not show that the platform could provide environmental expertise to the CF initiators. In general, to support civic engagement in urban NBS governance, the Ghent case study reveals that SNGs can consider using the CF platform to deliver NBS-related informational and financial policy resources through online and offline formats.

The Ghent case study has partially matched with the assumption of Proposition #5: *For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants' groups, promoting information and social capital flow and supporting land acquisition*. The city's policy resource arrangement for the CF campaign has reflected previous literature, which suggests that CF can allow citizens to publicly show their various needs, support and knowledge sharing (Miglietta & Parisi, 2017; Hui et al., 2019). Furthermore, the case study has shown CF's ability to distribute timely information and administrative resources and to mitigate information asymmetry between the city and citizens. To implement Proposition #5, the Ghent case study implies that SNGs can offer annual budgets to the CF platform as a long-term funding partnership to the whole society but not to the individual initiators, and the webpages' content can include the following: (1) successful CF cases, (2) CF teaching materials, (3) process regulations and (4) online communication boxes for initiators and backers. However, environmental information missing can mitigate the civic engaged NBS projects' environmental influence, civic participation scale and citizens' stewardship for urban green spaces (Ferreiral et al, 2020; Brink & Wamsler, 2018; Yamaki, 2016; Langemeyer et al., 2018). Participants' co-learning and co-sharing can cultivate and expand the resources network that fuels the development of civic engagement in NBS projects. In the Ghent case study, the lack of environmental expertise, third-party information, offline communication and land acquisition on the CF platform's service can hinder the civic engagement in urban NBS governance from reaching Proposition #5.

Table 4-4. Analysis results of the Ghent case study's resources dimension

Factors	Success factors operation	Outcome	Propositions
Funding	Establish long-term funding partnerships with citizens and other urban NBS actors	- The city will annually provide EUR 55,000 budget for matching funds on the CF platform (European Environmental Agency, 2017). - It is unclear whether the CF platform can establish long-term funding partnerships between the city and individual initiatives.	
Environmental expertise	Initiate environmental education about the benefit of NBS and citizens' options Exploit and adopt existing skill and expertise Transfer transdisciplinary knowledge between experts and other urban NBS actors	- It is unclear whether the CF platform can provide environmental expertise to the citizens' initiatives. - The campaign initiators can acquire NBS knowledge through their networking without the platform's support (Baeremaeker, 2015; Vromman, 2015). - Without a specific end target, the platform could lose its supporting foundation (De Wakkere Burger, 2015).	
Information and social capital	Establish information network for learning the success and failures of existing cases Provide citizens with useful and timely information, incentives and equitable legal process	- The CF platform's online resources can be seen as an information network for initiators or public learning based on existing CF cases in Gent and the Netherlands (Crowdfunding.gent, n.d.a; Crowdfunding.gent, n.d.b). - The success of the CF campaign has shown a ripple effect for offline learning (Climate ADAPT, 2016). - The city asked initiators to provide timely information on the campaign page and assist in its promotion to enhance citizens' understanding and acceptability of the CF platform (Crowdfunding.gent, 2016e). - The city has established promotional channels (e.g., the city's social media and magazine) to enhance the public's understanding and acceptability of the CF platform (Climate ADAPT, 2016). - The CF platform's regulation can be seen as a managing resource for an equitable legal process (Stad.gent, 2015). - An information network that connected different public and social actors' resources was lacking. - Offline communication between the city and its citizens still needs to be improved and should bring more attention to the climate-related problem (Interviewee 2, personal communication, April 22, 2020).	Proposition #5
Land acquisition	Offer physical spaces for civic initiative	- The CF platform cannot provide physical spaces for citizens' initiatives.	

Chapter 5: Province of Noord-Brabant

5.1 Case introduction

In Noord-Brabant, the Province announced a ten-year strategy called Brabant: Inviting Green in 2012 to do the following: (1) create a province-wide nature network that can strengthen biodiversity and nature reservation and (2) integrate the natural landscape into society for better living and economic quality (Provincie Noord-Brabant, 2012). Under this strategy, the Province has designed two sub-policy streams that can define its relationship with the CF platform. Firstly, to facilitate nature's development, the Province announced the Nature Network Brabant to guide the Province's partners in determining upon which areas to focus to connect the existing nature spaces (Provincie Noord-Brabant, n.d.a). Under this policy stream, the Province established the Green Development Fund Brabant in 2014 to provide a subsidy, land and knowledge for entrepreneurs, NGOs, municipalities and citizens initiating nature-based projects for the Nature Network Brabant (GOB, n.d.). Secondly, to facilitate social cooperation, the Province created the Natural and Social Programme to connect nature to people's living environment and economic activities (Provincie Noord-Brabant, n.d.b). Specific to the green civic movements, under the Natural and Social Programme, the Province worked with environmental NGOs to design the action strategy called the Impulse Green Volunteers Noord-Brabant to promote citizens' roles in nature management and stimulating public interest toward nature (Brabants Landschap, 2019).

The two policy streams have integrated into the annual competition Natural in Your Hand. Hosted by the Province, Green Development Fund Brabant, Brabants Landschap and IVN Brabant, the goal of this competition is to stimulate citizens' willingness to change the living environment through greening (Provincie Noord-Brabant, 2020a). Every year, Natural in Your Hand selects three civic-initiated plans to win the Green Development Fund Brabant's prize of € 5,000 per plan (IVN, n.d.). Plans that win must include the following criteria: (1) it is original and can mobilise people, (2) has a public impact and (3) improves the biodiversity within the Province (IVN, n.d.). During the competition event, the Province also invites alternative financial partners (e.g., CF platforms) to support plans that did not win the competition (IVN, n.d.).

The CF platform that the Province collaborates with is Crowdfunding VoorNatuur, which was established by IVN, Landschappen NL, Innovation Agro & Nature, and the National Green Fund in 2014 (Crowdfunding VoorNatuur, n.d.a). The goal of the platform is to support environmental NGOs or individuals in collecting resources for implementing nature and biodiversity-related projects (Crowdfunding VoorNatuur, n.d.a). The platform offers a matching funds service for the organisation, such as the provinces and foundations that were interested in contributing to the nature-based projects based on their own requirements (Crowdfunding VoorNatuur, n.d.b). Through the Natural and Social Programme, the Province provided a budget to ask that Crowdfunding VoorNatuur host to match the funding campaign in Noord-Brabant (Interviewee 1, personal communication, April 02, 2020). With Crowdfunding VoorNatuur's consultation services, the citizens can not only collect financial resource

from the Province and public donation but also reach out to environmental NGOs for technical support in crowdfunding workshops or through the platform's introduction (Interviewee 1, personal communication, April 02, 2020).

Even though the Province has set up a matching funds campaign on the CF platform and introduced it to the Natural in Your Hand competition, the applicants for the matching funds campaign were not necessarily related to the competition. The research has focused on two CF campaigns: the Liduina campaign and the Dommelbimd campaign. For the Liduina campaign, the initiator not only aims to build a flower garden to provide better living quality for senior residents in the care house but also endeavours to enhance the area's biodiversity, including through cooperation with the beekeepers (Stolvoort, 2019). For the Dommelbimd campaign, the initiator intends to use CF to mobilise and finance the local community's land purchase action for green space preservation (Dommelbimd, n.d.). Both campaigns were initiated by individual citizens (Crowdfunding VoorNatuur, n.d.c; Crowdfunding VoorNatuur, n.d.d).

Figure 5-1. Crowdfunding VoorNatuur homepage.
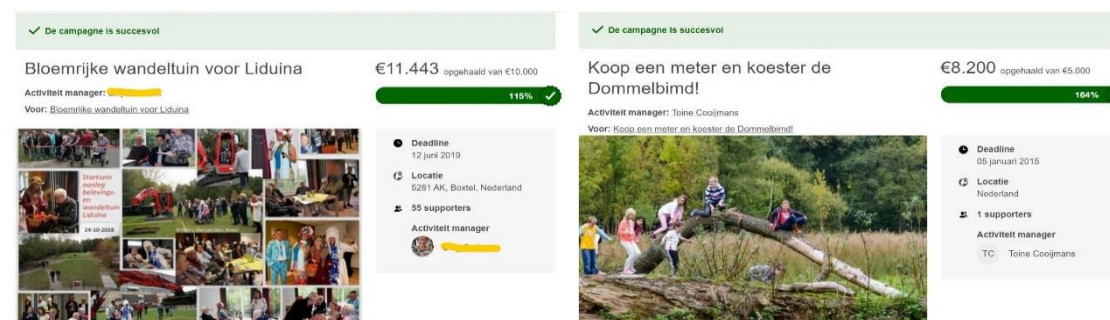
Figure 5-2. Pages for Liduina campaign and Dommelbimd campaign.

In general, the CF platform is one of the instruments that support the Province's vision in empowering and collecting citizens' contributions toward its natural network construction (Interviewee 1, personal communication, April 02, 2020). Hence, the Noord-Brabant case study can shed light on how SNGs can design a policy arrangement that cooperates with the CF platform to create an opportunity for civic engagement in urban NBS governance.
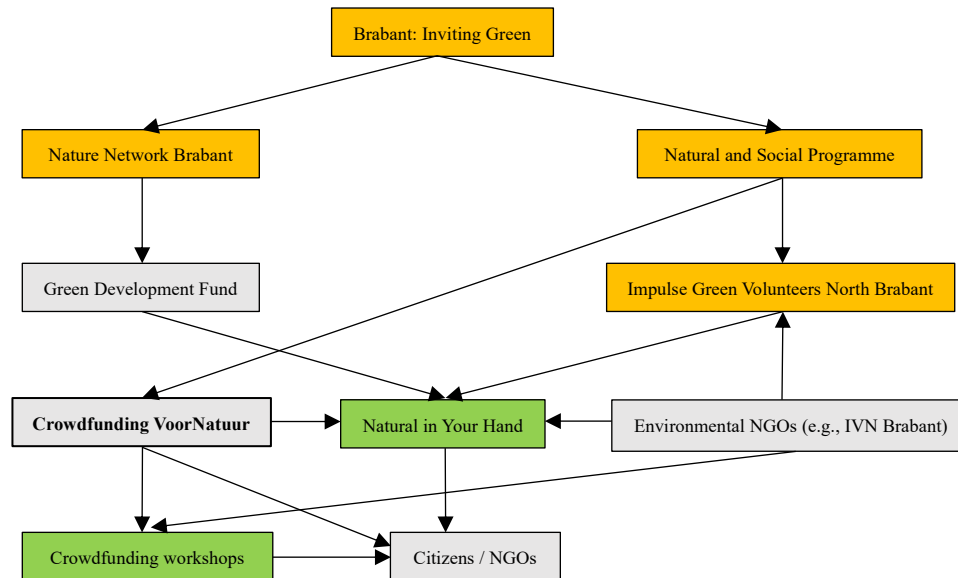
Figure 5-3. Relationship between Crowdfunding VoorNatuur and the Province of Noord-Brabant (Grey boxes represent the CF platform and participants; Orange boxes represent the SNG's policy actions; Green boxes represent the workshops and interaction activities).

5.2 Analysis results and CF propositions reflection

To validate the CF propositions so that SNGs can promote civic engagement in urban NBS governance, the research has used the analytical framework in Table 3-2 to assess the governance relationship between CF and the Province for developing urban NBS. In the following sub-sections, the data analysis results and key findings will be shown through four PAA dimensions. Furthermore, based on the data analysis outcome, the research has reflected the CF propositions' validation after describing the key finding in each PAA dimension. In each sub-section, a summarising table is provided that includes four parts: factors, success factors operation, outcome and propositions. Following Section 3.3's data processing method, the summarising tables indicate the performance of each proposition's related factor and validation. Overall, most of the factors were partially fulfilled. The relationship between CF and the Province fully fulfil three of the civic engagement in urban NBS governance factors: value adding and sharing, social cohesion and learning and information and social capital. Yet, one policy resource—land acquisition—is missing in the relationship between CF and the Province. Moreover, the result of Noord-Brabant's case study reveals that all five CF propositions for civic engagement in urban NBS governance were partially valid.

5.2.1 Discourse

Firstly, the research reveals that the SNG's NBS policy discourse describes CF as a building block for establishing a collective action network that aims to promote volunteering in civic NBS initiatives. The Province's NBS-related policy discourse has shown the visions needed to enhance citizens' awareness of NBS, facilitating civic initiatives and forming a green collective action network to promote green

volunteers (see Table 5-1, analysis outcomes of citizens' awareness factor and value adding and sharing factor). CF can be seen as a part of the Province's building block for a collective action network. The CF campaign can attract a group of supporters to advocate for the projects that match the Province's NBS-related policy discourse.

Secondly, the research shows that SNGs can provide NBS-related theme setting to define the effectiveness of the CF campaign. According to the Province's policy vision and the CF platform's service target, the matching funds campaign has attracted people who have extensive knowledge about NBS and who are interested in using NBS for social-oriented benefits (see Table 5-1, analysis outcome of project's function factor). Hence, to support civic engagement in urban NBS governance through CF, SNGs' policy discourse could describe CF as a facilitator to promote collaboration between governments and active citizens and should identify a CF campaign's NBS functions that contribute to the related policy goals.

The Noord-Brabant case study has partially matched with the assumption of Proposition #1: *CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing, and foster NBS projects' discourse congruence*. Referring to the literature review, suggesting that the CF process can be seen as a dialogue mechanism for advocating for people's action (Vlachokyriakos et al., 2016; Light & Briggs, 2017; Bernadino & Santos, 2016), the Province has considered CF as an instrument to facilitate citizens' volunteering actions toward NBS. Yet, considering that SNGs need to make citizens aware of their options and legal responsibility to enhance citizens' awareness of the NBS projects (Brink & Wamster, 2018), the Province did not provide NBS-related legal responsibilities that it asked citizens to follow. Moreover, the Province's policy discourse did not emphasise promoting discourse congruence between NBS projects' participants, preventing conflicting points of view and interests, or ensuring citizens' initiatives were legitimated. However, the CF platform's service and campaign outcomes have shown CF's effect on enhancing discourse congruence for civic engagement in NBS governance. To implement Proposition #1, the Noord-Brabant case study implies that the SNG's policy discourse can describe CF as an instrument to facilitate a collective action that aims to promote volunteering in civic NBS initiatives.

The Noord-Brabant case study has partially matched with the assumption of Proposition #2: *In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions*. In the Nature Network Brabant, the Province offered a development vision and the requirements for different types of natural projects regarding the specific natural context. However, the Province did not reflect this factor in the matching funds campaign. The design of the matching funds campaign might influence the effects of an individual CF campaign's functions to support the Nature Network Brabant's policy goal. According to the literature review, the academic understanding of CF's role in enhancing NBS projects' functions is unclear. Through the Noord-Brabant case study, with regards to implementing

Proposition #2, the research discovers that SNG's policy narrative can identify a CF campaign's specific NBS functions based on two perspectives: (1) NBS's biodiversity and contextual requirements and (2) the civic engagement format.

Table 5-1. Analysis results of the Noord-Brabant case study's discourse dimension

Factors	Success factors operation	Outcome	Propositions
Citizens' awareness	Intensify the public acceptability, confidence, consciousness and sense of belonging according to the NBS	- The CF platform is part of the SNG's collective action network that supports citizens' initiatives (Geerts, 2017). - The Province expects that a new nature landscape and innovative nature management can contribute to strengthening the regional identity among the residents (Provincie Noord-Brabant, 2012).	
	Raise citizens' awareness of their options and legal responsibilities	- The Province NBS-related policy discourse aims to raise citizens' awareness of how they can work with the Province to generate green spaces (Brabants Landschap, n.d.; Geerts, 2017).	
	Include citizens' strong attention and involvement when co-creating and co-designing the projects	- The Province finds that CF can enhance the public's concerns about nature reservations and bottom-up green space management (Douw&Koren, n.d.). - The Province has an explicit policy viewpoint about citizens' roles in managing nature spaces, collecting nature data, enhancing social and nature connections and stimulating public interests toward nature (Brabants Landschap, 2019). - The SNG did not intend to raise citizens' awareness about legal responsibilities.	
Value adding and sharing	Enhance the sharing of concerns and interests for collaborations between citizens and governments	- The Province is looking forward to collaborating with other authorities and non-governmental partners to implement sustainability actions (Provincie Noord-Brabant, 2012). - Both the Province and its collaborative partners should have an active attitude toward participants in nature and landscape actions (Provincie Noord-Brabant, 2012).	Proposition #1
	Identify the urban NBS projects' value added in terms of natural and social capital	- The Province's sustainability vision is not only focused on environmental performance but also aims to combine economic, socio-cultural and ecological quality (Provincie Noord-Brabant, 2012).	
	Promote common values, beliefs and worldviews between citizens, governments and other participants	- The Province expects citizens' green initiatives can contribute social effects while also generating and maintaining the green spaces (Slaverda & Pleijte, 2015).	
Discourse congruence	Discourse congruence between government and active citizenship	- The CF platform considers that the communication with the initiator before the campaign is published online is an assessment process to identify projects' potential conflict points (Interviewee 1, personal communication, April 02,	

Factors	Success factors operation	Outcome	Propositions
	Prevent and manage conflicting points of view and interest	2020).	
		- The platform will try to rule out the uncertainties before the initiator announces the project to the public (Interviewee 1, personal communication, April 02, 2020).	
	Ensure citizen involvement is legitimate/just governmental action, measure impact on private land	- CF has been seen as a strategy for the Province to strengthen civic society's role in the Nature Network Brabant development (Salverda et al., 2016; Provincie Noord-Brabant, n.d.c; Interviewee 1, personal communication, April 02, 2020).	
		- The discourse about measuring impact on private lands is unclear.	
Project's functions	Contextualize functions with ecosystem services	- The Province wants citizens' green initiatives located in the Nature Network Brabant area and follows the managing requirement according to each type of natural context (Brabants Landschap, 2019). Yet, this discourse did not reflect on the Province's matching funds campaign.	
	Benefit from multifunctionality	- Along with using natural-based interventions to absorb CO2, the goals of NBS include providing a healthier and happier living environment to people (e.g., less obesity and depression, children's outdoor exercise, better business environment and promoting province's recreation sector) (Provincie Noord-Brabant, n.d.d).	
	Increase biodiversity	- The Province's matching funds campaign has attracted two groups of people: (1) those who have extensive knowledge about NBS and (2) those who are interested in using NBS for social-oriented benefits (Interviewee 1, personal communication, April 02, 2020).	Proposition #2
	Connect people with nature (i.e., reachability, accessibility and usability)	- If the initiators would like to acquire the Province sponsorship, their projects must contribute to one of the following goals: (1) realising the green space, (2) making green space accessible and (3) enhancing the biodiversity (Crowdfunding VoorNatuur, n.d.e).	
		- In the Liduina garden campaign, the initiator not only looks forward to providing better living quality for senior residents but also would like to enhance the area's biodiversity (Stolvoort, 2019).	

5.2.2 Rules of the game

The research determined that the SNG has commissioned the CF platform to provide civic engagement in NBS governance to complement the authority's institutional capacity. From the bottom-up collaboration perspective, the rule design of the Province's matching funds campaign was focused on establishing a local community's collaboration network (see Table 5-2, analysis outcome of bottom-up collaborative network factor). From the institutional structure perspective, the Province adopts the CF platform as a working partner outside the governmental system to enhance the institution's flexibility and to prevent bureaucracy (see Table 5-2, analysis outcome of institutions structure factor). In general, according to the Noord-Brabant's experience, through commissioning a private CF platform to manage the authority's matching fund, the platform's rule for the campaign process can be considered as an institutional support to complement the SNG's civic engagement in urban NBS governance. This cooperation not only can provide the SNG with an innovative institutional option to fulfil the institutional demands for civic engaged urban NBS governance but also can decrease the administrative cost for governmental actors who interact with small-scale civil imitators.

The Noord-Brabant case study has partially matched with the assumption of Proposition #3: *CF can support SNGs by facilitating a bottom-up collaborative network and providing a feasible institutional structure within its urban NBS policy rules*. The CF platform's management during the campaign process has reflected the literature review, which indicates that CF can contribute to higher compliance and decrease the information asymmetry between participants (Miglietta & Parisi, 2017; Hong & Ryu, 2019); yet, the supported campaigns are more focused on a community-scale. In other words, it is unclear whether the CF platform or SNG have the capabilities to integrate local campaigns' contributions into a larger-scale, civic NBS development strategy through the CF mechanism. Also, to have responsive management for civic engagement in NBS governance, SNGs' regulation needs to prevent bureaucracy's negative impact on citizens' participation and stimulate civic stewardship for the urban NBS (Ferreira et al., 2020; Langemeyer et al., 2018). However, even though the Province has considered CF as a flexible way outside the governmental system to speed up the subsidy process of citizens' initiatives, the Province only assists the CF platform with the matching funds budget. If the citizens need additional authority support or resources, they still must search and contact the right person within the Province authority. To implement Proposition #3, SNGs' regulatory design can commission the CF platform to manage and consult the civic engagement in NBS initiatives. However, the lack of guidance to improve citizens' initiatives and the diversity of authority support can still hinder the civic engagement in urban NBS governance from reaching Proposition #3.

Table 5-2. Analysis results of the Noord-Brabant case study's rules of game dimension

Factors	Success factors operation	Outcome	Propositions
Bottom-up collaborative network	Create grassroots innovation and transition initiatives as collaborative networks or allow citizens to play a significant role in advocating and practising urban NBS and re-establishing green urban commons Prevent localist trap that civic initiatives that limit the community scale	- Local citizens' participation (i.e., using, collaborating and visiting the projects), is a requirement for the matching funds CF campaign (Crowdfunding VoorNatuur, n.d.e). - The successful experience of the Dommelbimd campaign made governments aware of CF's functions in enabling citizens' participation, and they will consider using CF to promote citizens' initiative projects (Douw&Koren, n.d.). - The matching funds campaigns are more focused on the community scale (Douw&Koren, n.d.; Crowdfunding VoorNatuur, n.d.e).	Proposition #3
Institutions structure	Provide clear and lateral institutions Enhance organizational flexibility to facilitate diverse actors' and citizens' participation Prevent bureaucracy and various formalities when dealing with community groups Provide institutional support (e.g., property rights and decisions capacity) for civic initiative	- Noord-Brabant is the only province that offers citizens' initiatives scheme (i.e., Nature and Social Programme) to facilitate citizens' participation in greening the living environment (Salverda et al., 2016). - Through setting a close working relationship with the Province, the CF platform can help campaign initiators quickly find related administrative resources based on each project's demands, including getting approval in the public space (Interviewee 1, personal communication, April 02, 2020). - Because it is hard for the Province to manage all of the small-scale civic initiatives, CF becomes a flexible way to allow the Province to collaborate with these initiatives (Interviewee 1, personal communication, April 02, 2020). - The CF platform is a support window outside the bureaucracy's system that helps the Province to manage and subsidise citizens' initiatives through a faster process (Interviewee 1, personal communication, April 02, 2020). - The Province only provides a matching funds budget without additional support (Interviewee 1, personal communication, April 02, 2020).	

5.2.3 Actors and coalition

The research found that CF platform's partner network is important for facilitating the connections and interactions between CF initiators, the local community and other related actors for NBS projects. In the Noord-Brabant case study, the CF platform introduced knowledgeable and powerful actors to citizens through its partner networks (see Table 5-3, analysis outcome of project participants factor). The CF platform can work as a mediator to consolidate cooperation between community members and local actors. Moreover, besides directly providing feedback on the campaign design at the proposal stage, the CF platform has organised workshops for initiators to improve their campaigns (see Table 5-3, analysis outcome of social cohesion and learning factor). In other words, the CF platform's networking service can generate crowd learning opportunities through the online communication functions and the arrangement of offline workshops. Online communication is more likely to strengthen the social learning and innovation within the local community, and the offline workshops give the initiators opportunities to explore new campaign designs and implementation methods outside their community. Furthermore, through providing matching funds on the CF platform, the Province can have a less regulative role to interact with the citizens' initiatives (see Table 5-3, analysis outcome of authority capacity factor). Depending on the CF platform's design, this mode of governance can let participants feel transparent when sharing project information and feel safe when collecting money between various actors.

The Noord-Brabant case study has partially matched with the assumption of Proposition #4: *For the policy's actors and coalition arrangement, CF can support SNGs by connecting project participants, promoting social cohesion and learning and providing feasible collaborative capacity*. The Province's actor and coalition arrangement for the CF campaign has comported with the literature review, which suggested that civic engagement in NBS governance should connect feasible NBS project-related participants to form an effective collaborative network (Ferreira et al., 2020), and it requires the authority to change their governance behaviour and mindset, like collaborating with and learning from other groups of actors (Walmsler et al., 2020; Ugolini et al., 2018). However, because the authority was not directly involved in the CF process, it is unclear whether there is a suitable or necessary position for political and key administrators who are participating in the CF campaign. If the CF campaign wants to acquire politicians' and key administrators' support, the campaign can show how strong the public is behind it. Furthermore, from an individual perspective, the CF experience is different for each initiator due to the different capabilities. To implement Proposition #4, the Noord-Brabant case study implies that SNGs and CF platforms can partner with local environmental NGOs to introduce knowledgeable and powerful actors to the citizens.

Table 5-3. Analysis results of the Noord-Brabant case study's actors and coalition dimension

Factors	Success factors operation	Outcome	Propositions
Project participants	Include and connect diverse actors with citizens to co-create and co-design the NBS projects	- The CF campaign can work as a mediator to consolidate cooperation between community members and local actors (Crowdfunding VoorNatuur, n.d.e). - The CF campaign must include residents to adopt the Provinces' matching funds (Crowdfunding VoorNatuur, n.d.e).	Proposition #4
	Introduce knowledgeable and powerful actors to citizens	- The CF platform can introduce the Province and local environmental NGOs (e.g., IVN Brabant) to the CF initiators to share professional knowledge about NBS (Interviewee 1, personal communication, April 02, 2020).	
	Acquire politicians' and key administrators' support	- It is unclear whether there is a suitable position for political and key administrators who are participating in the campaign.	
Social cohesion and learning	Promote cooperative working, mutual learning, experience sharing and different forms for NBS co-creation	- The CF platform provides feedback on the campaign design to the initiator (Crowdfunding VoorNatuur, n.d.e). - The CF platform provides online and offline communication spaces for citizens and environmental NGOs (Interviewee 1, personal communication, April 02, 2020).	
	Promote social learning and innovation	- CF workshops offer communication opportunities for initiators to improve their campaign through cooperative working, mutual learning and experience sharing (Interviewee 1, personal communication, April 02, 2020).	
Authority capacity	Collaborate with related actors and citizens instead of only using regulative and consultative modes	- The Province has set up the matching funds criteria and has given the platform the right to judge the applications (Interviewee 1, personal communication, April 02, 2020).	
	Build trust with citizens on urban NBS projects' aim and process	- Users of the CF platform have mentioned that people are enthusiastic about transparently posting the information and feel safe when collecting money (Interviewee 1, personal communication, April 02, 2020).	
	Keep the continuity collaboration	- The Province has collaborated with the CF platform and other financial and knowledge partners to facilitate civic engagement in the green collective action (Provincie Noord-Brabant, 2020b; Provincie Noord-Brabant, n.d.c), and the Province is looking forward to integrating citizens' contribution to its nature network policy (Salverda et al., 2016)	
	Capitalise citizens' input into SNGs institutional capacities	- Not all initiators look to continually use CF (Interviewee 1, personal communication, April 02, 2020).	

5.2.4 Resources

The research determined that SNGs' collaboration with CF platforms should be part of a transdisciplinary knowledge network and information network that can deliver timely information and short-term financial resources for citizens who initiated NBS projects. The Province has set up a long-term funding partnership with a CF platform to facilitate the continuously collective action between the Province and its civil society (see Table 5-4, analysis outcome of funding factor). As part of the Province's transdisciplinary knowledge network, the CF platform has collaborated with an environmental NGO to assist campaign initiators in exploring and adopting environmental expertise (see Table 5-4, analysis outcome of environmental expertise factor). Moreover, the CF platform's online resources can be seen as an information network for initiators and the public to understand the experience of existing CF cases and find additional non-governmental funding sources (see Table 5-4, analysis outcome of information and social capital factor). For civic engagement in urban NBS governance, according to the abovementioned analysis outcome, the CF platform needs to expand its partner network to provide NBS and CF-related knowledge and information along with its donation matching service.

The Noord-Brabant case study has partially matched with the assumption of Proposition #5: *For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants' groups, promoting information and social capital flow and supporting land acquisition*. Because it is important to establish a mechanism to exchange information and knowledge among participants and mobilise the public for the NBS projects (Ferreira et al., 2020; Yamaki, 2016), the Noord-Brabant case study has shown that CF platforms can connect third parties with financial resources and environmental expertise in the CF campaign, which can complement the authority's policy resources for collective action with citizens. However, although funding is one of the crucial resources for implementing civic engagement in NBS projects (Ershad Sarabi et al., 2019; Buijs et al. 2019; Wamsler et al. 2020), CF cannot provide a long-term finance source for individual NBS projects. Also, considering the previous literature, which suggests that SNGs need to offer physical spaces for generating stewardship of urban green spaces (Langemeyer et al. 2018), the CF platform cannot provide physical spaces for citizens' initiatives.

To adopt the Province's matching funds, the CF initiators must arrange the land permissions with the landowner (see Table 5-4, outcome of land acquisition factor). To implement Proposition #5, the Noord-Brabant case study implies that SNGs can offer an annual budget to the CF platform as a long-term funding partnership to the whole society but not to the individual initiators. Moreover, the webpages' content can include the following: (1) successful CF cases, (2) additional financial and knowledgeable resources for NBS projects and (3) an incentive function. In other words, based on its NBS-related partner network, the CF platform's resources arrangement can fuel the development of civic engagement in NBS projects. Yet, lack of land acquisition support from the CF platform's service can hinder the civic engagement in urban NBS governance from reaching Proposition #5.

Table 5-4. Analysis results of the Noord-Brabant case study's resources dimension

Factors	Success factors operation	Outcome	Propositions
Funding	Establish long-term funding partnerships with citizens and other urban NBS actors	- The SNG has set up a long-term funding partnership with the CF platform (Geerts, 2018; Interviewee 1, personal communication, April 02, 2020). - From the individual project, CF cannot be the long-term finance source. Some initiators still face the challenge of maintaining the project's operation or depend on the resident's volunteer work (Stolvoort, 2019; Karssen, 2016).	
Environmental expertise	Initiate environmental education about the benefit of NBS and citizens' options	- The CF platform cannot initiate environmental education. - The CF platform encourages collaboration with local environmental NGOs and can assist initiators in exploring and adopting environmental expertise. - The Province wants to establish a network to support citizens' initiatives by connecting different financial and expertise resources (Interviewee 1, personal communication, April 02, 2020). - The CF platform can support local environmental NGOs with knowledge about community engagement through social media; In contrast, local environmental NGOs can help the CF platform with their environmental knowledge and network resources (Interviewee 1, personal communication, April 02, 2020).	Proposition #5
	Exploit and adopt existing skill and expertise		
	Transfer transdisciplinary knowledge between experts and other urban NBS actors		
Information and social capital	Establish information network for learning the success and failures of existing cases	- The CF platform's online resources can be seen as an information network for initiators or the public to understand the experiences of existing CF cases (Voor je Buurt, n.d.; Crowdfunding VoorNatuur, n.d.f). - The CF platform provides the initiator with information about additional funding sources and environmental knowledge expertise (Interviewee 1, personal communication, April 02, 2020). - In the Liduina campaign, the initiator discovered that the CF campaign could become a topic for a local news report, which caused more people to mobilise and support the campaign (Stolvoort, 2019). - The CF platform's incentive function can help initiators attract more backers and strengthen the sense of community belonging (Interviewee 1, personal communication, April 02, 2020).	
	Provide citizens with useful and timely information, incentives and equitable legal process		

Factors	Success factors operation	Outcome	Propositions
		- The equitable legal process to acquire SNG support is first come, first served (Crowdfunding VoorNatuur, n.d.e).	
Land acquisition	Offer physical spaces for civic initiative	- The CF initiators must arrange the land permissions with the landowner (could be the province or municipality) before they start the campaigns (Crowdfunding VoorNatuur, n.d.e).	

Chapter 6: City of Manchester

6.1 Case introduction

In Manchester, the city has announced a long-term development vision called Our Manchester in 2015, which aims to offer a guidance framework to support every city actor to contribute to Manchester's development (Manchester City Council, n.d.a). Besides the government's responsibility, Our Manchester also considers how citizens, local business and city-partnering NGOs can play a role in forming a better city life (Manchester City Council, n.d.a). The policy has established five strategies to implement its long-term development vision before 2050: (1) a thriving and sustainable city, (2) a highly skilled city, (3) a progressive and equitable city, (4) a liveable and low-carbon city and (5) a connected city (Manchester City Council, n.d.a). Under Our Manchester's strategy to create a liveable and low-carbon city, the city aims to improve the quality of Manchester's green and blue spaces and integrate them more in the city (Manchester City Council, n.d.a). The city has further set up the Green and Blue Infrastructure Strategy to realize its vision of attracting and benefiting residents by improving living quality (Manchester City Council, n.d.a). The strategy will adopt a collaborative approach with all types of city stakeholders to fulfil the following objectives: (1) improve the quality and function of existing green and blue infrastructure, (2) develop new green and blue infrastructure to support the growth of neighbourhoods and cities, (3) enhance the green and blue infrastructure's connectivity and accessibility and (4) increase the public's understanding and awareness of the benefits of green and blue infrastructure (Manchester City Council, 2015).

Within the abovementioned governance context, the city has announced the Our Manchester Movement on the CF platform Spacehive, which was funded by Chris Gourlay in 2012 (Spacehive, n.d.a). The platform's general mission is to connect individuals, governments, businesses and foundations' financial support to realise the local community's demands (Spacehive, n.d.a). In the Our Manchester Movement, the city would like to encourage innovative spatial campaigns that are initiated and adopted by local communities and businesses (e.g., sport and play, arts and culture and food) (Spacehive, n.d.b). Moreover, the city has become interested in using the CF platform to support civil society's contributions to improving and using the park and green spaces (Spacehive, n.d.b). The city has offered seven steps to manage the matching funds process: (1) initiator self-assessment of campaign idea, (2) open campaign page on the CF platform, (3) platform assessment based on the city's matching funds rule, (4) third-party verification, (5) implement fundraising, (6) reach the target before the deadline and (7) realise the campaign (Spacehive, n.d.b). Also, Spacehive has organised offline workshops to teach people about using CF to develop the neighbourhood's green spaces and allowing initiators to discuss their CF challenges and plans (Spacehive, n.d.c). Furthermore, the CF platform can provide information about additional funding providers to the initiators (Spacehive, n.d.b).
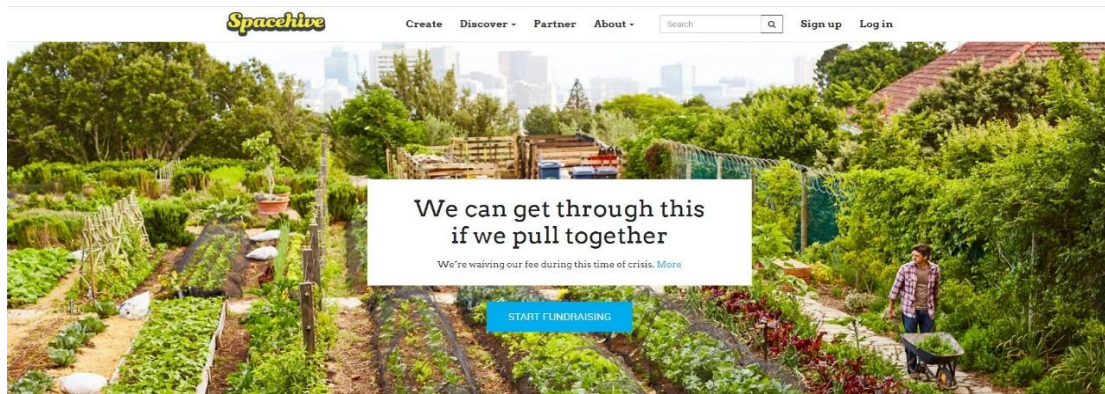
Figure 6-1. Spacehive homepage

The research has focused on one NBS-related CF campaign that contributes to the Green and Blue Infrastructure Strategy: the Stevenson Square Green Makeover campaign (Manchester City Council, 2015). The campaign was initiated by environmental NGO Red Rose Forest and aimed to install trees along streets, plant baskets and green roofs around the Stevenson Square (Spacehive, 2013). Through planting 11 street trees, the campaign's main sustainability contributions include supporting the city's cooling in summer and flooding prevention (NATURVATION, n.d.). During the campaign, the city council, environmental NGOs, local business sectors and citizens worked together to create a green oasis in the northern part of the city centre (Manchester City Council, 2015; Spacehive, 2013). Within this cooperation, the city has joined the campaign's implementation process, including by financially supporting the campaign in the form of purchasing trees (Spacehive, 2013). Hence, consider the city's policy and CF matching funds campaign designs, the Manchester case study can shed light on how SNGs can establish an NBS-related CF and integrate their urban development vision through a CF matching funds campaign to promote civic engagement in urban NBS governance.
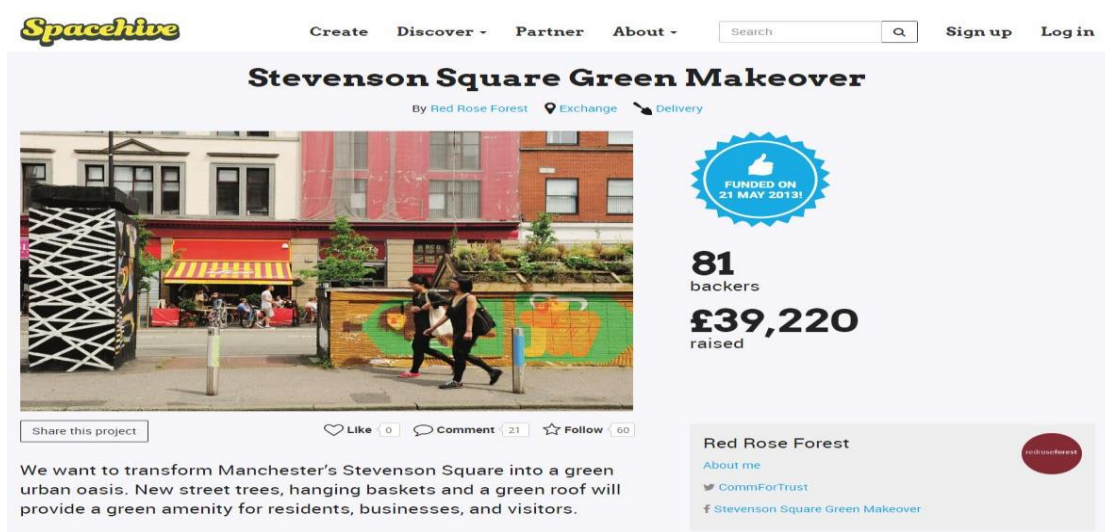
Figure 6-2. Pages for Stevenson Square Green Makeover campaign
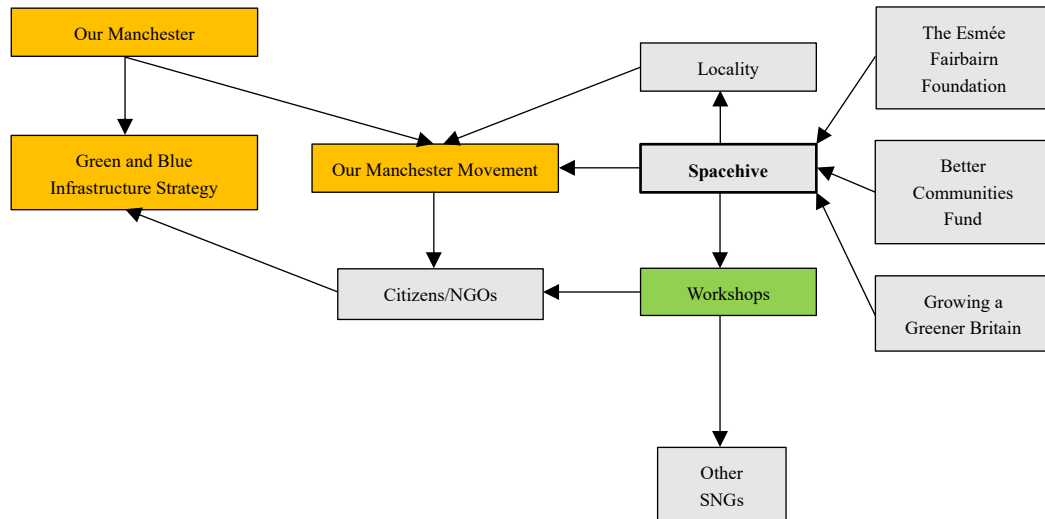
Figure 6-3. Relation between Spacehive and Manchester City
(Grey boxes represent the CF platform and participants; Orange boxes represent the SNG's policies; Green boxes represent the workshops and interaction activities).

6.2 Analysis results and CF propositions reflection

To validate the CF propositions for the SNG's civic engagement in urban NBS governance, the research has used the analytical framework in Table 3-2 to assess the governance relationship between CF and the city for the urban NBS development. In the following sub-sections, the data analysis results and key findings will be shown through four PAA dimensions. Moreover, based on the data analysis outcome, the research reflects the CF propositions' validation after describing the key finding in each PAA dimension. In each sub-section, a summarising table is provided that includes four parts: factors, success factors operation, outcome and propositions. Following Section 3.3's data processing method, the summarising tables indicate the performance of each proposition's related factor and validation. Overall, most of the factors were partially fulfilled. The relationship between CF and the city fully fulfils six factors for civic engagement in urban NBS governance: value adding and sharing, the project's functions, bottom-up collaborative network, social cohesion and learning, authority capacity and information and social capital. However, the relationship between CF and the city did not provide land acquisition support. Regarding the results of the Manchester case study, one CF proposition was valid, and four CF propositions were partially valid.

6.2.1 Discourse

Firstly, the research revealed that SNGs' NBS policy discourse should identify citizens' roles and CF's governance functions for NBS development. Considering Manchester's long-term development strategy, the city wanted to strengthen people's contributions to enhance the urban living environment (see Table 6-1, analysis outcome of citizens' awareness factor). The city's CF campaign and NBS-related policy reflected the city's collaborative governance value that 'everyone needs to play their part' and empowered

civil society's role for urban development (**Table 6-1**, analysis outcome of value adding and sharing). In other words, green and blue spaces have become the target areas to enhance Manchester's living quality and can be seen as the CF campaign's main working areas to strengthen NBS's legitimacy toward urban development.

Secondly, the research found that SNGs' matching funds campaign and related policy discourse can focus on a specific type of NBS project. Through CF, the city wanted to consolidate communities and to create local supporters of the activities related to urban green and blue spaces (see Table 6-1, analysis outcome of project's functions factor). For civic engagement in urban NBS governance, the case study provides a policy discourse sample, which suggests that SNGs can consider CF as a policy tool to support community actions that utilise or develop urban green and blue spaces to enhance urban living quality.

The Manchester case study has partially matched with the assumption of Proposition #1: *CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing, and foster NBS projects' discourse congruence*. Aligning with the literature review, which demonstrated that the CF process can be a dialogue mechanism to advocate people for actions (Vlachokyriakos et al., 2016; Light & Briggs, 2017; Bernadino & Santos, 2016), the city's NBS-related policy narratives and its expectations for the CF campaign have focused on advocating for the civil society's contributions toward a liveable and low-carbon city (see Table 6-1, analysis outcome of citizens' awareness factor). According to the literature review, SNGs need to make citizens aware of their options and legal responsibility to enhance citizens' awareness of the NBS projects (Brink & Wamster, 2018). However, the city's policy did not provide NBS-related legal responsibilities that it asked citizens to follow. Instead, the CF campaign used a volunteering approach. Moreover, the city did not emphasise promoting discourse congruence between the government and NBS projects' participants. Yet, the CF matching funds campaign has defined the character of a legitimate civil project and allowed the CF platform's consultant partner to review the initiatives' content (see Table 6-1, analysis outcome of discourse congruence factor). To implement Proposition #1, the Manchester case study implies that the SNGs' policy discourse should describe the notion of adopting CF to attract citizens' volunteering contributions toward urban NBS development.

Furthermore, the Manchester case study has matched with the assumption of Proposition #2: *In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions*. The city has a clear vision about managing different types of NBS projects regarding the existing green and blue infrastructure context. The city encourages citizens' CF initiatives to focus on developing green and blue spaces for a 'Park Life' urban landscape. According to the literature review, the academic understanding of CF's role in enhancing NBS projects' functions is unclear. Through Manchester's case study, to implement Proposition #2, the research discovers that SNGs' policy narrative can ask CF campaigns to focus on specific types of NBS projects, such as urban parks. Through defining the CF

campaign's NBS functions, SNGs can provide a sample of feasible civic engagement in urban NBS projects that complements the general urban NBS performance.

Table 6-1. Analysis results of the Manchester case study's discourse dimension

Factors	Success factors operation	Outcome	Propositions
Citizens' awareness	Intensify the public acceptability, confidence, consciousness and sense of belonging according to the NBS	- The city is looking forward to promoting people's understanding of NBS' benefits and would like to empower people's contribution to the city's living environment (Manchester City Council, 2015). - In the Stevenson Square Green Makeover campaign, the city believed that the collaboration between residents, businesses and environmental NGOs could change the square into a new, vibrant spot in the city centre (Sevendale House, 2011). - The city wanted to introduce CF as a new, democratic tool to empower citizens by realising their ideas about the streets, community spaces and activities, etc. (Griffiths, n.d.). - CF is a volunteering approach instead of a legal responsibility.	
	Raise citizens' awareness of their options and legal responsibilities		
	Include citizens' strong attention and involvement when co-creating and co-designing the projects		
Value adding and sharing	Enhance the sharing of concerns and interests for collaborations between citizens and governments	- The city's Green and Blue Infrastructures Strategy has established an action framework that aims to guide different city actors who are working on the city's green and blue infrastructure together (Manchester City Council, 2015). - In the Stevenson Square Green Makeover campaign, both the city and CF initiator believe that the CF campaign will provide the local community with more business opportunities ("Donations sought for Northern Quarter square project," 2013). - To create a liveable and low-carbon city, the city would like to emphasise the value that 'everyone needs to play their part' (Manchester City Council, n.d.a).	Proposition #1
	Identify the urban NBS projects' value added in terms of natural and social capital		
	Promote common values, beliefs and worldviews between citizens, governments and other participants		
Discourse congruence	Discourse congruence between government and active citizenship	- The main goal of evaluating the content of CF initiatives is to protect potential backers, enhance the campaigns' success rate and strengthen people's confidence toward CF's civic function (Spacehive, n.d.b). - The CF platform has defined the characteristics of the civil project: (1) as a clear and tangible form of project outcome,	
	Prevent and manage conflicting points of		

Factors	Success factors operation	Outcome	Propositions
	view and interest	the projects' value must be civic-oriented and publicly sharable and (2) the project cannot aim for business revenue, an equity purpose, etc. (Spacehive, n.d.b).	
	Ensure citizen involvement is legitimate/just governmental action, measure impact on private land	- The public has shown positive feedback on CF's role in civic projects (Gourlay, 2019). - The city has provided a public press release to introduce its CF movement on Spacehive, which enhances the governance legitimacy (Griffiths, n.d.). - The discourse about measuring impacts on private lands is unclear.	
Project's functions	Contextualize functions with ecosystem services Benefit from multifunctionality Increase biodiversity Connect people with nature (i.e., reachability, accessibility and usability)	- The city's Green and Blue Infrastructures Strategy was based on the previous survey of the city's existing NBS practices (i.e., Manchester Green Infrastructure Strategy: Technical Report 2015) (Manchester City Council, 2015). - The Technical Report 2015 identified 11 environmental, social and economic benefits from existing nature-based practices and the city's diverse environmental contexts (Manchester City Council, 2015). - The city would like to provide a high-quality living environment by integrating greens spaces, parks and a network of waterways into urban spaces (Manchester City Council, n.d.a) - The city has identified the advantage of using CF on the civic project: consolidating communities and creating local supporters (Manchester City Council, 2015). - The city's work on planting trees and constructing different scales of green spaces aims to build a 'Park Life' city (Manchester City Council, n.d.a). - The *Green and Blue Infrastructure Strategy* will contribute by increasing the connectivity and accessibility between urban green and blue spaces and residents (Manchester City Council, 2015). - The Stevenson Square Green Makeover campaign would like to demonstrate that nature and urban can coexist in harmony through planting trees on the street and establishing green roofs around the concrete jungle (Mason, 2017).	Proposition #2

6.2.2 Rules of the game

Firstly, the research found that SNGs' campaign design on the CF platform can link the CF campaign to the general NBS development plan. From the bottom-up collaboration perspective, the city has actively adopted CF as a strategic tool to engage with citizens and local communities. The design of the city's matching funds rule aims to create more green and blue open spaces around the city, which aligns with the city's vision about urban green network development (see Table 6-2, analysis outcome of bottom-collaborative network factor). From the institutional structure perspective, the city has offered seven steps and created a new internal administration process to support the CF campaign (see Table 6-2, analysis outcome of institutions structure). The CF rule and administration arrangement have enhanced the city's flexibility to cooperate with citizens and local communities when implementing its general NBS development plan. Secondly, the research determined that SNGs can adopt CF for a new institutional image. According to the Spacehive's research, working with a CF platform has forced the city to adjust their language and the way they communicate to the public (see Table 6-2, analysis outcome of bottom-collaborative network factor). In general, through Manchester's experience, SNGs' CF rule design can aim to engage and empower the communities' initiative for the development of city-wide NBS green and blue spaces network.

Manchester's case study has partially matched with the assumption of Proposition #3: *CF can support SNGs to facilitate a bottom-up collaborative network and provide a feasible institutional structure within its urban NBS policy rules*. The rule design and administrative work for the CF campaigns have reflected the literature review, which indicated that CF can contribute to higher compliance and decrease the information asymmetry between participants (Miglietta & Parisi, 2017; Hong & Ryu, 2019). Also, the CF's influence on the city's institutional image has supported the previous literature noting that SNGs need to prevent bureaucracy's negative impact on citizens' participation and stimulate civic stewardship for urban NBS (Ferreira et al., 2020; Langemeyer et al., 2018). The CF's effect on softening the city's institutional image can be seen as responsive management for civic engagement in NBS governance. However, besides the matching funds budget, it is unclear whether the city can provide additional institutional supports to the CF campaign. To implement Proposition #3, the CF rule should allow the SNG to engage with local communities and link the civic-initiated campaigns with the SNG's general NBS spatial plan. The SNG can explore more institutional support that focuses on the CF initiative and its NBS function to prevent hindering the civic engagement in the urban NBS governance from reaching Proposition #3

Table 6-2. Analysis results of the Manchester case study's rules of game dimension

Factors	Success factors operation	Outcome	Propositions
Bottom-up collaborative network	Create grassroots innovation and transition initiatives as collaborative networks or allow citizens to play a significant role in advocating and practising urban NBS and re-establishing green urban commons	- The city's Our Manchester Movement campaign on Spacehive has been seen as an integral strategy to engage with citizens and local communities for better collaboration (Griffiths, n.d.). - The vision of the city's NBS practices is creating a network of urban green (Manchester City Council, 2015). - The role of the CF campaign was more focused on integrating the public's contributions toward creating green and blue open spaces, such as a vegetable patch (Spacehive, n.d.b).	
	Prevent localist trap that civic initiatives that limit the community scale		
Institutions structure	Provide clear and lateral institutions	- The city offers seven steps for the matching funds process to support the CF campaign and mainly focus on NBS-related community activities (Spacehive, n.d.b).	Proposition #3
	Enhance organizational flexibility to facilitate diverse actors' and citizens' participation	- To adopt CF as a policy tool, the city created a new internal administrative process to act more flexible toward different CF campaigns' timescales (Griffiths, n.d.).	
	Prevent bureaucracy and various formalities when dealing with community groups	- This new process includes a scoring methodology and assessment guidelines to strengthen the city's case-by-case management capabilities, which is different from the conventional subsidy regulations (Griffiths, n.d.). - In the Stevenson Square Makeover campaign, CF let the city performs a co-governance set-up, in which the authority and civil actors share the governance responsibility (NATURVATION, n.d., "Press Release about #Manchester Stevenson Square makeover #northernquarter," 2013).	
	Provide institutional support (e.g., property rights and decisions capacity) for civic initiative	- The CF platform lets cities adjust their language and the way they communicate to the public (Gourlay, 2019). - The CF platform's services on branding, marketing and public relations activities have lightened the SNG's traditional institutional image when they interact with the communities (Griffiths, n.d.). - It is unclear whether the city can provide institutional support to the CF campaign besides the matching funds budget.	

6.2.3 Actors and coalition

Firstly, the researcher determined that the CF workshop supports both initiators and SNGs through sharing and learning from each other's experiences on civic engagement in NBS development. The CF platform organised offline workshops so that people and SNGs can learn CF's role in developing green and blue spaces and can discuss their CF challenges and plans (see Table 6-3, analysis outcome of social cohesion and learning). A CF campaign creates an opportunity for initiators to collect information and resources from various actors and has the potential to persuade local actors to join the civil initiative movement (see Table 6-3, analysis outcome of project participants factor). Furthermore, Manchester's experience shows that CF can allow members of civil society and SNGs through co-working and co-learning from the civic engagement in urban NBS development. In other words, the CF campaign process can generate more diverse social interactions between urban, NBS-related actors.

Secondly, the research shows that SNGs can participate and sustain the actor coalition for NBS by sponsoring specific CF campaign materials. Instead of directly giving a subsidy amount for campaign initiators, the city joined the campaign's implementation process and sustained the coalition between the environmental NGO through the CF campaign (see Table 6-3, analysis outcome of authority capacity factor). Hence, according to Manchester's case study, SNGs can use CF to understand the civic action's demand and sustain its compliant role when interacting with actors and coalitions through civic engagement in urban NBS governance.

Furthermore, Manchester's case study has partially matched with the assumption of Proposition #4: *For the policy's actors and coalition arrangement, CF can support SNGs by connecting project participants, promoting social cohesion and learning, and providing feasible, collaborative capacity*. The city's policy's actor and coalition arrangement for the CF campaign aligns with the literature review and suggests that civic engagement in NBS governance should connect feasible NBS-project-related participants to form an effective collaborative network (Ferreira et al., 2020) and should require the authority to change their governance behaviour and mindset, including by collaborating with and learning from other groups of actors (Walmsler et al., 2020; Ugolini et al., 2018). However, even though the CF platform can introduce additional funding institutes and provide consulting to support the campaign, it is unclear whether these actors have actively provided knowledge or other forms of support that are specific to the NBS project. To implement Proposition #4, Manchester's case study implies that CF-organised workshops can support both initiators and SNGs in sharing and learning from each other's experiences from civic engagement in NBS development. It is necessary to consider whether the SNG's and CF platform's cooperative partners can provide support from both the CF campaign and the NBS perspective. Most importantly, besides directly giving a subsidy amount, the Manchester case shows that SNGs can also participate and sustain the actor coalition for NBS by sponsoring specific CF campaign material.

Table 6-3. Analysis results of Manchester case study's actors and coalition dimension

Factors	Success factors operation	Outcome	Propositions
Project participants	Include and connect diverse actors with citizens to co-create and co-design the NBS projects	- In the Stevenson Square Green Makeover campaign, CF provides the opportunity for initiators to collect resources from the SNG, urban development consultant, local businesses and citizens (City of Trees, n.d.; NATURVATION, n.d.).	
	Introduce knowledgeable and powerful actors to citizens	- The matching funds movement on the CF platform received the support of the city's high-level administrators through public press releases (Manchester City Council, n.d.b).	
	Acquire politicians' and key administrators' support	- The CF platform can introduce professional consultancy, i.e., Locality, and other funding institutes to support the campaign (Spacehive, n.d.b; Griffiths, n.d.). - It is unclear whether the platform introduced actors who have actively provided knowledge or other forms of support specific to the NBS projects.	
Social cohesion and learning	Promote cooperative working, mutual learning, experience sharing and different forms for NBS co-creation	- The CF platform has organised offline workshops to teach people how to use CF for the development of the neighbourhood's green spaces and to allow initiators to discuss their CF challenges and plans (Spacehive, n.d.c). - The CF campaign also facilitates cooperative learning and working with campaign participants who increase the community capital through more than financial success (Stiver at al. 2015).	Proposition #4
	Promote social learning and innovation	- In the Stevenson Square Green Makeover campaign, the cooperation between the local environmental organisation, web design company and student volunteers have created the 'Tree-LC' that strengthens the plants' growing performance (Mason, 2017). - The CF platform provides offline communication opportunities for different cities to share and learn from each other's CF movement design (Gourlay, 2019).	
Authority capacity	Collaborate with related actors and citizens instead of only using regulative and	- In the Stevenson Square Green Makeover campaign, the city council used its matching funds to support the initiator in purchasing street trees, hanging baskets and planting tools for the green roof and in even covering the	

Factors	Success factors operation	Outcome	Propositions
	consultative modes	planning permission (Spacehive, 2013).	
	Build trust with citizens on urban NBS projects' aim and process	- In the Stevenson Square Green Makeover campaign, the participants showed a positive attitude toward the collaboration between the city, local business sectors and citizens, and they feel the confidence to continue the relationship with the campaign partners to maintain the green roof (Mason, 2017).	
	Keep the continuity collaboration	- According to the Stevenson Square Green Makeover campaign, CF has the potential to produce a ripple effect	
	Capitalise citizens' input into SNGs institutional capacities	for participants who are looking forward to persuading others to join the movement (Mason, 2017). - In the Stevenson Square Green Makeover campaign, the CF campaign also sustained the existing, working network between the city and the environmental NGO to realise their urban greening idea (Mason, 2017). - Collecting citizens' ideas and resources can make Manchester become a better and more liveable place, and the city is looking forward to integrating civil contributions into its urban development agenda (Spacehive, n.d.b).	

6.2.4 Resources

The research showed that SNGs and CF platforms can facilitate resource deliberation and collection for NBS-related CF campaigns through their partner networks. The city established a long-term partnership with the CF platform (see Table 6-4, analysis outcome of funding factor). Combining the city and CF platform's resources, the city's matching funds page can provide resources like additional funding institutions and online learning materials for initiators to reference (see Table 6-4, analysis outcomes of environmental expertise factor and information and social capital factor). In general, for civic engagement in urban NBS governance, Manchester's experience demonstrated that a CF campaign allows SNGs and CF platforms to collaboratively deliver and collect resources for civic engagement in an urban NBS project. The partnership can introduce new resources and trigger the flow of new forms of resources between SNGs, local communities and individual citizens.

Moreover, Manchester's case study has partially matched with the assumption of Proposition #5: *For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants' groups, promoting information and social capital flow, and supporting land acquisition.* Because it is crucial to provide a mechanism to exchange information and knowledge among participants and to mobilise the public for the NBS projects (Ferreira et al., 2020; Yamaki, 2016), the case study has shown that the CF platform can connect third parties' financial resources and community management skills to CF initiator. However, it is unclear whether the consultation will transfer environmental expertise to the campaign initiators. Yet, the participants' online communication was most likely in a unidirectional form, allowing people using the social media to show their support and share the campaign page instead of conducting multi-directional conversations that establish a network and feedback content. Furthermore, although funding is a crucial resource for implementing civic engagement in NBS projects (Ershad Sarabi et al., 2019; Buijs et al. 2019; Wamsler et al. 2020), it is also unclear whether the individual project has established a long-term funding partnership with the city after the CF campaign. Lastly, considering that SNGs need to offer physical spaces for generating stewardship of urban green spaces (Langemeyer et al. 2018), the city and the CF platform's collaboration cannot provide physical spaces for citizens' initiatives (see Table 6-4, analysis outcome of land acquisition factor).

To implement Proposition #5, Manchester's case study implies that SNGs can offer a long-term funding partnership with the CF platform. Moreover, the partnership can establish an information network for public and governmental authorities communicating, learning and sharing the success of the CF experience. A lack of environmental expertise, multi-directional online conversations and land acquisition support can hinder the civic engagement in urban NBS governance from reaching Proposition #5.

Table 6-4. Analysis results of Manchester case study's resources dimension

Factors	Success factors operation	Outcome	Propositions
Funding	Establish long-term funding partnerships with citizens and other urban NBS actors	- The partnership between the city and the platform began in 2014 and included 25 projects until 2019 (Spacehive, n.d.b). - It is unclear whether the initiator has established a long-term funding partnership with the SNG.	
Environmental expertise	Initiate environmental education about the benefit of NBS and citizens' options	- The city has worked with independent CF consultants to provide workshops for CF initiators, which focused on strategies like campaign promoting, crowd engagement and fund attracting (Griffiths, n.d.).	
	Exploit and adopt existing skill and expertise	- It is unclear whether the abovementioned consultation will transfer environmental expertise to the CF initiators.	
	Transfer transdisciplinary knowledge between experts and other urban NBS actors		
Information and social capital	Establish information network for learning the success and failures of existing cases	- In addition to the initiators and the general public, the CF platform also aims to establish an information network for SNGs to learn CF's functions and to share the successful experiences (Gourlay, 2019).	Proposition #5
	Provide citizens with useful and timely information, incentives and equitable legal process	- The CF platform can provide information about additional funding sources and online learning materials by combining the city's and platform's resources (Spacehive, n.d.b). - On the CF campaign page, the initiators can show timely information to the backers and have online communication with the backers (Spacehive, 2013). - Online discussions on the CF platform were most likely unidirectional, instead of multi-directional conversations that create a network and feedback content (Stiver et al. 2015). - The city's assessment and the Locality's verification can be seen as an equitable legal process (Spacehive, n.d.b).	
Land acquisition	Offer physical spaces for civic initiative	- The CF platform cannot provide physical spaces for citizens' initiative.	

Chapter 7: Discussion

By comparing case studies, the research revealed that the Manchester case had the highest performance that matched the theoretical propositions for civic engagement in urban NBS through CF. The Noord-Brabant's case ranked as the second case that matched the theoretical propositions, and Ghent's case had performed the lowest (see Table 7-1). The difference between three research cases were related to its embedded governance context which will further discuss in the following sections.

7.1 CF propositions for NBS policy discourse

According to the PAA definition, policy discourse represents the policy participants' viewpoints narrative (i.e., norms and values), and the definition of problems and solutions (Arts et al., 2006). When SNGs want to promote civic engagement in urban NBS, the literature review identified that successful policy discourse should include following factors: (1) citizens' awareness on NBS project, (2) NBS project's value adding and sharing among its participants, (3) discourse congruence between NBS project's participants and (4) project's functions. Proposition #1 implies that SNGs' CF campaign discourse framing should link the CF's contributions to the emergence of smart cities to support the abovementioned discourse factors. Mentioned in Section 2.4, the CF's contributions to the emergence of smart cities which support the setup of Proposition #1 are: CF can (1) create high public consensus for civic projects, (2) enhance the community's belonging and respect to the common resources and (3) increase governance transparency and greater compliance with society demand performance.

The Proposition #1 was partially valid in all three cases. When it comes to citizens' awareness, the common point between three cases is that SNGs did not consider CF as the legal responsibility of citizens to enhance citizens' awareness of NBS. Instead, all three SNGs adopt CF as a volunteering option to attract civil society participating in urban NBS development. Furthermore, the research founds that it is necessary for SNGs to have discourse setting about connecting CF campaigns' outcome to urban NBS development goal. In the Noord-Brabant and Manchester's cases, the SNGs have delineated CF campaigns under NBS-related governance context to promote civic engagement in NBS projects, i.e., Noord-Brabant's Brabant: Inviting Green and Manchester's Our Manchester. In contrast, in Ghent's case, the city's policy discourse only identifying four CF themes that they were especially interesting and did not specifically describe the kinds of outcomes that CF campaigns must offer to support these themes. According to the collected data, the policymaker has reflected that this issue will cause the CF campaigns' policy influence to become unclear.

When it comes to NBS projects' value adding and sharing, the Noord-Brabant and Manchester's cases have fulfilled the description of success factors operation. Namely, the two SNGs have present their vision about strengthening societal and natural value added within civic engagement in urban NBS through CF campaigns. For example, in Noord-Brabant, CF has been seen as a part of the Province's building block for attracting supporters to advocate projects which match the Province's NBS-related

Table 7-1. Comparison of case studies

Dimension	CF propositions	Factors	Success factors operation	Ghent	Noord-Brabant	Manchester
Discourse	*Proposition #1: CF can perform a role in SNGs' urban NBS policy discourse to enhance citizens' awareness, promote NBS projects' value adding and sharing, and foster NBS projects' discourse congruence.*	Citizens' awareness	Intensify the public acceptability, confidence, consciousness and sense of belonging according to the NBS	yellow	green	green
			Raise citizens' awareness of their options and legal responsibilities	yellow	yellow	yellow
			Include citizens' strong attention and involvement when co-creating and co-designing the projects	yellow	green	green
		Value adding and sharing	Enhance the sharing of concerns and interests for collaborations between citizens and governments	green	green	green
			Identify the urban NBS projects' value added in terms of natural and social capital	yellow	green	green
			Promote common values, beliefs and worldviews between citizens, governments and other participants	green	green	green
		Discourse congruence	Discourse congruence between government and active citizenship	yellow	yellow	red
			Prevent and manage conflicting points of view and interest	green	green	green
			Ensure citizen involvement is legitimate/just governmental action, measure impact on private land	green	yellow	yellow
	Proposition #2: In urban NBS policy discourse, CF has been considered to support SNGs by enhancing the NBS projects' functions.	Project's functions	Contextualize functions with ecosystem services	yellow	yellow	green
			Benefit from multifunctionality	red	green	green
			Increase biodiversity	yellow	green	green
			Connect people with nature (i.e., reachability, accessibility and usability)	yellow	green	green
Rules of game	*Proposition #3: CF can support SNGs by facilitating a bottom-up collaborative network and providing a feasible institutional structure within its urban NBS policy rules.*	Bottom-up collaborative networks	Create grassroots innovation and transition initiatives as collaborative networks or allow citizens to play a significant role in advocating and practising urban NBS and re-establishing green urban commons	yellow	green	green
			Prevent localist trap that civic initiatives limit in the community scale	green	red	green
		Institutions structure	Provide clear and lateral institutions	green	green	green
			Enhance organizational flexibility to facilitate diverse actors' and citizens' participation	green	green	green
			Prevent bureaucracy and various formalities when dealing with community groups	green	green	green
			Provide institutional support (e.g., property rights and decisions capacity) for civic initiative	green	yellow	yellow

Dimension	CF propositions	Factors	Success factors operation	Ghent	Noord-Brabant	Manchester
Actors & coalition	*Proposition #4: For the policy's actors and coalition arrangement, CF can support SNGs by connecting project participants, promoting social cohesion and learning and providing feasible, collaborative capacity.*	Project participants	Include and connect diverse actors with citizens to co-create and co-design the NBS projects	yellow	green	green
			Introduce knowledgeable and powerful actors to citizens	red	green	yellow
			Acquire politicians' and key administrators' support	green	yellow	green
		Social cohesion and learning	Promote cooperative working, mutual learning, experience sharing and different forms for NBS co-creation	yellow	green	green
			Promote social learning and innovation	red	green	green
		Authority capacity	Collaborate with related actors and citizens instead of only using regulative and consultative modes	green	green	green
			Build trust with citizens on urban NBS projects' aim and process	red	green	green
			Keep the continuity collaboration	red	yellow	green
			Capitalise citizens' input into SNGs institutional capacities	green	green	green
Resources	*Proposition #5: For policy resources, CF can support SNGs by establishing long-term funding partnerships with citizens and other urban NBS actors, channelling environmental expertise to participants' groups, promoting information and social capital flow and supporting land acquisition.*	Funding	Establish long-term funding partnerships with citizens and other urban NBS actors	yellow	yellow	yellow
		Environmental expertise	Initiate environmental education about the benefit of NBS and citizens' options	red	red	red
			Exploit and adopt existing skill and expertise	red	green	red
			Transfer transdisciplinary knowledge between experts and other urban NBS actors	red	green	yellow
		Information and social capital	Establish information network for learning the success and failures of existing cases	green	green	green
			Provide citizens with useful and timely information, incentives and equitable legal process	yellow	green	green
		Land acquisition	Offer physical spaces for civic initiative	red	red	red

policy discourse. In Manchester, the city's CF campaigns on Spacehive and Our Manchester policy reflected the city's collaborative governance value that 'everyone needs to play their part' and empowered civil society's role for urban sustainable development. The common point between all three cases is that SNGs were actively promoting the cooperation between citizens and government. However, in Ghent's case, the targeted CF function is more about its governance effect on civic engagement instead of the climate and NBS-related purpose. In other words, the city did not consider to link citizens' awareness to NBS projects or identify NBS projects' value added in the policy discourse.

Regarding the discourse congruence between NBS project participants, all three cases' policy discourses have shown the attitude to prevent and to manage conflicting points of view and interest between project participants. This attitude has reflected on the CF platforms' service and CF campaigns' requirement. For example, in Noord-Brabant's case, the Crowdfunding VoorNatuur's service and campaign outcomes have shown CF's effect on enhancing discourse congruence for civic engagement in NBS governance. However, the research founds that all three cases did not support discourse congruence between government and active citizenship. In Ghent's case, the collected data have shown that the CF motivation behind the initiators and the city was unmatched. The primary motivation behind the CF initiators focused more on increasing the projects' publicity instead of collaborating with the government. Furthermore, to ensure citizens' involvement is legitimate, all three cases have set up a screening process on CF platforms for civic initiatives. It is noteworthy that except for Ghent's case, the other two SNGs did not provide policy announcement to aware CF campaigns' impact on private land.

The three cases' policy discourses have supported the research's theoretical concept that SNGs can enhance citizens' awareness and increase value and sharing on NBS projects through considering CF as a dialogue mechanism for triggering collaborative actions and collecting project-related feedback. Moreover, CF platforms' service and CF campaigns' requirement have shown that SNGs can decrease information asymmetry between projects' participants to prevent and to manage conflicting points of view and interest between NBS project participants. Except for considering CF as the legal responsibility of citizens to enhance citizens' awareness of NBS, the multiple case studies' result supports the idea that SNGs can frame its CF campaign to fulfil the successful policy discourse for civic engagement in urban NBS. Based on the multiple case studies, the research revises the original Proposition #1 by summarising three perspectives that SNGs' urban NBS policy discourse can consider. Firstly, SNGs' policy discourse can consider CF as a policy tool to facilitate civil society's volunteering actions for urban NBS development. Hence, besides introducing CF as a financing tool to support the civic initiative NBS projects, SNGs need to show the motivation to co-work with the civil society through CF. Secondly, the policy discourse can connect the CF campaign's outcome to the NBS development (i.e., identify citizens' roles and integrate citizens' initiatives into the SNGs' NBS policy agenda) to prevent CF campaign's policy influence become unclear for the policymaker. In other words, in the policy discourse, SNGs' matching funds campaign can be described as a civic volunteering initiative that contributes to SNGs'

NBS development goals. Thirdly, the SNGs can reflect CF platform's service for preventing and managing conflicting points of view and interest in the policy discourse. According to the Noord-Brabant case, support from the CF platform can enhance discourse congruence for civic engagement in NBS governance. Hence, the research revises the original Proposition #1 as follows:

To enhance an NBS project's citizens awareness, value adding and sharing and discourse congruence, policymakers can identify CF initiatives' policy contributions and reflect CF as a policy tool to facilitate civil society's volunteering actions for urban NBS development. Furthermore, SNGs can reflect CF platform's service for preventing and managing conflicting points of view and interest in the policy discourse in order to generate legitimacy for civic engagement in urban NBS governance.

The scientific understanding of CF's contribution to the emergence of smart cities did not explain how can CF enhance NBS projects' functions. Hence, Proposition #2 aims to explore CF's role in SNGs' policy discourse that related to NBS project's functions. According to the case studies results, Proposition #2 was fully valid in Manchester's case. The city has a clear vision about managing different types of NBS projects with regard the city's environmental condition. Through CF, the city wants to consolidate communities and to create momentum of local support for the activities related to urban green and blue spaces. For civic engagement in urban NBS governance, the Manchester's experience provides a policy discourse sample, which suggests that SNGs can consider CF as a policy tool to advocate community actions that utilise or develop specific type of urban green and blue spaces to enhance urban living quality. On the contrary, in Ghent's case, the city's policy narratives did not describe the environmental NBS functions that a CF campaign needs to provide, i.e., increasing biodiversity and connecting people and nature. An unclear policy position and expectation toward CF campaigns' NBS societal and environmental functions can influence SNGs' governance effectiveness for enhancing NBS projects' functions through civic engagement.

To implement Proposition #2, the research revealed that SNGs' urban NBS policy discourse can identify successful functions of CF campaigns for NBS development. Defining campaigns' functions ensures the effectiveness and performance of civic engagement in NBS projects. According to the three cases, there are two perspectives that SNGs can consider in order to enhance CF campaign's multifunctionality, e.g., ecosystem services and connecting people with nature. Firstly, SNGs can set the NBS-related match funding conditions to shape the outcome of CF campaigns. For example, SNGs can ask the CF initiators to focus on urban parks so CF campaigns become a mechanism to collect civil society's contribution for enhancing urban green spaces' societal and natural functions. Secondly, SNGs can define CF campaigns' expected societal and environmental functions based on contextualize ecosystem benefit and biodiversity, multifunctionality and connecting people with nature. SNGs can identify the expected NBS functions that CF campaigns need to provide (e.g., realising green spaces, making green spaces accessible,

enhancing biodiversity, etc.) Hence, according to the multiple case studies, the research revises the original Proposition #2 as follows:

To enhance the NBS projects' functions, SNGs' urban NBS policy discourse can set the NBS-related match funding conditions for the CF campaign and define CF campaign's societal and environmental functions, i.e., contextualize ecosystem benefit and biodiversity, multifunctionality and connecting people with nature.

7.2 CF proposition for NBS rules of the game

According to the PAA definition, policy rules of the game represent the actual and formal rules related to policy participants' interactions and decision-making processes (Arts et al., 2006). When SNGs adopt CF to promote civic engagement in urban NBS, the literature review identified that the successful policy rules of the game should consider following factors : (1) bottom-up collaborative network for urban NBS project governance and (2) institution structure that prevent bureaucracy's negative impact on the willingness and effectiveness of civic participation. Hence, Proposition #3 implies that SNGs' CF campaign rule setting for the civic engagement in the urban NBS should link the CF's contribution to the emergence of smart cities to support the abovementioned factors. Mentioned in Section 2.4, the CF's contribution to the emergence of smart cities which support the setup of Proposition #3 is: CF can increase governance transparency and greater compliance with society demand performance.

The Proposition #3 was partially valid in all three cases. When it comes to bottom-up collaborative network, the Noord-Brabant and Manchester's CF rule designs have aimed to support the creation of local community's collaboration network for urban NBS development. According to Spacehive's research, working with CF platform has forced the city to adjust their language and the way they communicate to the public, which enhances the effectiveness for SNGs engaging and empowering the communities' initiative. However, in Ghent's case, even though the city's CF regulatory design aims to support the citizens forming a working group, the connection between CF regulation and NBS-related tasks was overlooked, which can hinder the CF campaign's outcome for civic engagement in urban NBS governance. Also, in the Ghent and Manchester's cases, the two SNGs have encouraged civic initiatives to expand beyond the community scale. The CF platforms' regulatory design can reflect SNGs' attitude toward different scales of citizens' activities. For example, the city of Ghent provides CF regulation that guild CF platform supports different scales of CF campaigns (i.e., street, neighbourhood, and city). In contrast, in Noord-Brabant's experience, the CF rule setting is more focused on a community-scale. However, even though CF regulatory design can show SNGs' attitude toward promoting different scale of civic initiatives, the research did not find that how can CF regulatory design equips CF platforms or SNGs with the capacity to interlink local campaigns' contributions into a larger-scale civic NBS development strategy.

For institutional structure, the three cases have shown different ways to provide an institutional structure that support civic engagement in urban NBS through CF. In Ghent's case, as the city itself established the platform, the CF platform's regulatory provides flexibility for the city and CF initiators to manage the campaign design together. In Noord-Brabant's case, the authority adopts the CF platform as a working partner outside the governmental system to enhance the institution's flexibility and to prevent bureaucracy. In Manchester's case, the city has offered seven steps on the CF platform and created a new internal administration process to support the CF campaign. In general, no matter SNGs create a CF platform by itself or cooperate with private CF platforms; it is essential to make sure that CF rule setting can create an institutional structure for SNGs to interact with CF initiators flexibly and prevent bureaucracy. Furthermore, the research founds that in the Noord-Brabant and Manchester's cases, the SNGs' directly institutional support for the CF campaign was match fund budget. If the initiators need additional authority support or resources, they must search and contact the right person within the government. It is unclear whether the SNGs can provide other institutional supports to expand the CF platform's NBS-oriented service capacity.

The three research cases have supported the research's theoretical concept that SNGs can facilitate the bottom-up collaborative network and provide a feasible institution structure that prevents bureaucracy on NBS projects through adopting CF's contribution to governance transparency and compliance. The research concludes that CF can become an institutional innovation that enables SNGs to conduct flexible and less bureaucracy urban NBS governance. The SNGs' NBS-related CF regulatory design can give SNGs and CF platforms right to provide customised support for individual NBS initiative to implement Proposition #3. According to the three cases, no matter SNGs create a CF platform by itself or cooperate with private CF platforms, the research discovers three principles that SNGs can consider in its CF regulatory design for civic engagement in urban NBS development. Firstly, SNGs need to form or to commission a management team (e.g., private CF platforms or NGOs) which can provide customised and networking service to the campaign initiators. The management team's work needs to assist CF initiator in organising the working group within local social network and to support different scales of CF campaigns for NBS development. The goal of this policy action is to create a new interaction mechanism between SNGs and civil society with less bureaucratic burden. Secondly, SNGs can adopt CF to change its institutional image when communicating with civil society about the NBS initiative, including making sure the CF regulation can generate marketing and branding effects for the civic engagement in urban NBS governance. Thirdly, SNGs can explore more institutional support by connecting CF regulations to NBS-related tasks and re-establishing green urban commons (e.g., property rights and decisions capacity for civic initiatives). Hence, based on the multiple case studies, the research revises the original Proposition #3 as follows:

To facilitate a bottom-up collaborative network and to provide a feasible institutional structure for civic engagement in urban NBS governance, SNGs' CF rule design can announce a management

*team to support the different scales of NBS CF campaigns, adopt CF to create a new institutional
image for civic engagement and connect institutional support to CF campaigns, which can be based
on NBS-related tasks and re-establishes green urban commons.*

7.3 CF proposition for NBS policy actors and coalition

According to the PAA definition, policy actors and coalition represent the actors who related to the policy
arrangement (Arts et al., 2006). Specifically, in the civically engaged urban NBS context, policy actors
and coalition also imply that how the policy arrangement mobilises new actors (Buijs et al., 2019). When
SNGs adopt CF to promote the civic engagement in the urban NBS, the literature review identified that
the successful policy actors and coalition arrangement should include following factors: (1) project
participants' connection, which can establish an effective collaborative network for up-scale outcomes
of urban NBS, (2) social cohesion and learning between project participants during the urban NBS
governance process and (3) authority capacity to support civic engagement in urban NBS governance.
Hence, Proposition #4 implies that SNGs' networking capacity for civic engagement in urban NBS
governance should link the CF's contributions to the emergence of smart cities to support the
abovementioned factors. Mentioned in Section 2.4, the CF's contributions to the emergence of smart
cities which support the setup of Proposition #4 are: CF can (1) enhance actor diversity and inclusiveness,
(2) create high public consensus for civic projects, (3) enhance the community's belonging and respect
to the common resources and (4) increase governance transparency and greater compliance with society
demand performance.

The Proposition #4 was partially valid in all three cases. When it comes to project participants, the
common point between the three cases is that all platform's management teams can introduce government
actors and form a co-working network to support citizens' initiatives. Moreover, in Noord-Brabant's case,
the CF platform can further introduce knowledgeable and powerful actors to citizens through its partner
networks. In other words, the CF platform can work as a mediator to consolidate cooperation between
community members and local actors. However, if the CF platform cannot connect knowledgeable and
powerful actors, it may influence the effectiveness of collaborative participants network for civic
engagement in NBS governance. For example, in Ghent's experience, the collected data did not indicate
whether the CF platform can connect non-governmental actors and organisations to NBS-related CF
campaigns. A cross-sectoral network for working and learning is missing within the platform's actors
and coalition arrangement.

As for social cohesion and learning, the Noord-Brabant and Manchester's cases have shown that the
collaborative network between CF campaign participants can support social learning and innovation for
NBS development. For example, in Noord-Brabant's experience, besides directly providing feedback on
the campaign design at the proposal stage, the CF platform has organised workshops for initiators to
improve their campaigns. Also, in Manchester's case, the CF platform's workshops allow people and

SNGs learning CF's role in developing green and blue spaces and discussing their CF challenges and plans. The two cases have shown that CF platform's networking service can generate crowd learning opportunities through online communication and the arrangement of offline workshops. In contrast, in Ghent's experience, a cross-sectoral network for working and learning is missing within the platform's actors and coalition arrangement. This generates the problem where the initiators need to establish a connection with non-governmental actors who have NBS-related professions or resources by themselves.

When it comes to authority capacity, all three cases' SNGs have shown the authority capacity to collaborate with citizens in different ways. In Ghent's case, the SNG's management capacity for the CF platform was based on channelling related governmental departments and acquiring technical and information support from a Dutch CF company. In Noor-Brabant's case, through providing matching funds and commission to the CF platform, the SNG can have a less regulative role to interact with the citizens' initiatives. In Manchester's case, instead of directly giving a subsidy towards campaign initiators, the city joined the campaign's implementation process by purchasing specific campaign materials, like trees on the street. Compared with the other two cases, particularly in Ghent's case, the research did not uncover evidence suggesting that the interaction between the SNG and its citizens can generate trust and lasting collaboration. To create trust and lasting collaboration for NBS development, SNGs can consider commissioning CF platforms to interact with civil society (i.e., Province of Noord-Brabant and Crowdfunding VoorNatuur) or participating individual campaign's implementation process (i.e., City of Manchester and Spacehive).

The case studies have supported the research's theoretical concept that SNGs can connect feasible project participants through CF's contribution to enhancing actor diversity and inclusiveness. To promote social cohesion and learning among NBS project participants, CF's contributions for creating high public consensus and enhancing the community's belonging and respect to the common resources have reflected on the platform's online communication functions and offline workshops. To have authority capacity for supporting civic engagement, CF's contribution to increasing governance transparency and greater compliance with society demand allows SNGs to interact with small-scale citizens' initiatives. The multiple case studies' result supports the idea that SNGs can frame its CF campaign to fulfil the successful policy actors and coalition arrangement for civic engagement in urban NBS. Based on the multiple case studies, the research revises the original Proposition #4 concerning three perspectives.

Firstly, the collaboration between SNGs and CF platforms needs to provide cross-sectoral networking services to introduce knowledgeable and powerful actors to the citizens. An example of this could be bridging related governmental actors and environmental NGOs to reflect SNGs' and civil society's co-working idea. Secondly, SNGs or CF platforms can organise offline workshops to support social cohesion and learning during civic engagement in urban NBS development. It is necessary to consider whether SNGs and CF platforms' cooperative partners can provide support from both CF operation and the NBS

implementation perspectives. Thirdly, SNGs can use CF to change their governance behaviour and mindset by participating in and sustaining the actor coalition for NBS development. For example, according to the Manchester experience, SNGs can use CF to understand civic society's demands and financially support the initiator by purchasing specific campaign materials instead of directly giving a subsidy amount. Hence, based on the multiple case studies, the research revises the original Proposition #4 as follows:

To connect project participants, promote social cohesion and learning and provide feasible collaborative capacity in NBS projects through CF, the collaboration between SNGs and CF platforms can provide CF initiators with a cross-sectoral networking service and organise offline workshops to support participants' experience sharing and learning. Also, to participate and sustain the actor coalition for the development of NBS, SNGs can use CF to understand civic society's demands and financially support the initiator by purchasing specific campaign materials.

7.4 CF proposition for NBS policy resources

According to the PAA definition, policy resources represent land, money and expertise that can contribute to policy outcomes (Arts et al., 2006; Buijs et al., 2019). When SNGs adopts CF to promote the civic engagement in the urban NBS, the literature review identified that the successful policy resource factors include: (1) funding, (2) environmental expertise, (3) information and social capital flow and (4) land acquisition. Hence, Proposition #5 implies that SNGs resources arrangement for the CF campaign should link the CF's contributions to the emergence of smart cities to support the abovementioned successful policy resource factors. Mentioned in Section 2.4, the CF's contributions to the emergence of smart cities which support the setup of Proposition #5 are: CF can (1) connect any individual to the urban civic project, (2) enhance the community's belonging and respect to the common resources and (3) increase governance transparency and greater compliance with society demand performance.

The Proposition #5 was partially valid in all three cases. When it comes to funding, the research founds that all three SNGs have established long-term funding partnership with CF platforms but not with the individual CF campaign. For example, in the Noord-Brabant's case, even though the Province provides annual matching fund to the Crowdfunding VoorNatuur, individual initiators still face the challenge of maintaining the NBS project's operation or depend on the resident's volunteer work after CF the campaign.

In terms of environmental expertise, the case studies shown that all three CF platforms cannot provide environmental education by itself. However, if the cooperation between SNGs and CF platforms can set up a cross-sectoral network which includes NBS-related expertise, CF initiators can still receive environmental knowledge to implement their campaigns. For example, in Noord-Brabant's case, the CF platform has collaborated with an environmental NGO to assist campaign initiators in exploring and

adopting environmental expertise. In contrast, in Ghent's case, it is unclear whether the CF platform can provide environmental expertise to the citizens' initiatives, which could cause the platform to lose its supporting foundation.

In regards to information and social capital, all three cases have shown that SNGs can adopt a CF platform as an online information network for civil society to learn the success and failures of existing NBS projects. Also, CF platforms can provide citizens with useful and timely information, incentives and equitable legal process according to its cooperation with SNGs. In Noord-Brabant's case for instance, the CF platform provides CF initiators with information about additional funding information and environmental knowledge expertise. In both the Noord-Brabant and Manchester's cases, CF campaigns allow SNGs and CF platforms to collaboratively deliver and collect resources for civic engagement in urban NBS projects. The partnership can introduce new resources and trigger new forms of resources flowing between SNGs, local communities and individual citizens. In contrast, as shown in Ghent's case, the supporting network will influence the platform's service capacity on connecting different public and social actors' resources to civic initiatives.

Concerning land acquisition, the research founds that all three SNGs did not assist CF campaigns acquiring the land resource. In other words, the initiators need to arrange land access rights before the campaigns started. In Noord-Brabant, the CF initiators must arrange the land permissions with the landowner (could be the province or municipality) before they start the campaigns. Considering that SNGs need to offer physical spaces for generating stewardship of urban green spaces (Langemeyer et al. 2018), the case studies shown that the three SNGs did not give CF platforms the right to offer physical spaces for civic engagement in urban NBS development.

The research has found that SNGs can adopt CF to provide finance, environmental expertise and informational and social capital toward civic engagement in urban NBS projects. However, in contrast to the theoretical assumption, the research cannot find evidence that CF can support land acquisition. The case studies have shown that CF's contribution toward connecting individual has supported the funding and environmental expertise demands for civic engagement in urban NBS development. On the other hand, CF's contribution toward promoting value sharing and enabling has channeled the environmental expertise to CF initiators, which promotes information and social capital flowing between campaign participants. Lastly, CF's contribution to governance transparency and compliance also supports the information and social capital flow because it established an interaction mechanism for SNGs to collaborate with other non-governmental actors, including citizens.

In general, SNGs can provide three types of resources for CF platforms. Firstly, SNGs can offer annual budget to the CF platforms as a long-term funding partnership. Moreover, CF platforms can also connect third parties' financial resources to match the NBS CF campaign. However, it is still possible for

individual initiators facing financial challenge to sustain NBS projects' operation. Secondly, the collaboration between SNGs and CF platforms needs to connect third parties to introduce environmental expertise and transdisciplinary knowledge. This collaboration can complement the authority's policy resources and empower the citizens' NBS action. Thirdly, regarding informational and social capital, SNGs need ensure that CF's webpages include following resources: (1) successful CF cases, (2) tutoring material for organising CF campaign, (3) process regulation, (4) multi-directional online conversation box, (5) additional financial and knowledgeable resources for NBS projects, and (6) incentive functions for community action. Hence, based on the comparative case study, the research revises the original Proposition #5 as follows:

To provide resources for civic engagement in NBS projects, SNGs can adopt CF to provide a short-term funding partnership and introduce third parties' finance resources for individual NBS projects. Furthermore, SNGs can ensure that its collaboration with CF platforms can connect third parties to provide environmental expertise and transdisciplinary knowledge to empower the citizens' NBS action. Lastly, the online resources on the CF webpage can include the following information: (1) successful cases, (2) tutoring material for organising CF campaign and implementing NBS projects, (3) regulations about the CF process, and (4) network and feedback conversation content.

7.5 Research limitations and contributions

Although the research has followed Chapter 3's methodology to test the five CF propositions through three case studies, uncontrollable factors can still occur. The main research limitation is the collection of interview data. The researcher only successfully conducted two interviews due to low invitation response (see Appendix B). Two of potential interviewees rejected the invitation due to business considerations. Consequently, this limitation meant that the researcher could not acquire all CF participants' viewpoints and had to depend on online sources. Most of the collected data were focused on SNGs and CF platforms' perspectives. In other words, the research might face critique about the case studies did not comprehensively catch different CF campaign stakeholders' participating motivation and practical experience. However, according to the range of collected sources, the research has explored different perspectives about CF's roles toward civic engagement in the urban NBS besides its financial function. Hence, as the main research question is aim to support SNGs' policy arrangement, the research outcome can still provide an insight for SNGs to promote civic engagement in the urban NBS governance through CF. The amount of interview data also cause lack of in-depth explaination about CF's role for civic engagement in urban NBS through smart cities' perspective. More case studies were needed to test the five CF propositions. Especially acquire insights from civil society, i.e., (1) campaign initiators, (2) backers and (3) citizens who are beneficiaries of the local public good. Through more case studies, a deeper understanding about the influence of CF's contributions toward the emergence of smart and sustainable cities can be identified.

About the research contribution, in the sense of adopting PAA approach and literature review as CF propositions' building foundation, this research has addressed the research gap: systematically understanding CF's contributions toward civic engagement in urban NBS governance besides its financing function. For sustainable urban development with NBS, the research outcomes implicate that CF can play additional roles in SNGs' policy arrangements to strengthen public-civic collaboration. The research discover that CF has following roles in urban NBS governance: (1) facilitating policy discourse for civic engagement in urban NBS governance, (2) becoming an institutional innovation that enables SNGs flexibly interact with civil society, (3) diversifying the NBS projects' participants and strengthening the coalition between the authority and civil society, and (4) providing finance, environmental expertise and informational and social capital. The research outcomes can contribute to the theoretical development of how an urban society can adopt information and communication technology to support the smart and sustainable urban transition regarding the cooperation between SNGs and citizens. From a societal perspective, the propositions can offer SNGs a policy arrangement design guideline for using CF to promote civic engagement in urban NBS development.

The research proposes three directions for future studies. Firstly, future research can focus on the interrelation between the four dimensions of the CF policy arrangement. The research adopts PAA as the conceptual foundation to build CF propositions for facilitating civic engagement in urban NBS governance. However, besides understanding the content and organisation of the environmental policy, the PAA policy analysis can also focus on the interrelation between the arrangement of policy participants and the policy's influence on changing the social and political process (Arts et al., 2006). Hence, future research can further explore the casual relation between five CF propositions to create a positive interaction that strengthening the civic engagement in urban NBS governance. Secondly, future studies can explore the relationship between the CF policy arrangement for urban NBS and the type of NBS projects. In this research, the cases were all located in the urban grey infrastructure and green spaces. However, every SNG has its own unique, environmental context, so the feasible types of NBS projects might differ. Facing this civic engagement in governance background, future research can focus on what types of NBS projects are suitably supported by CF. Lastly, future research can focus on the relationship between CF policy arrangements for urban NBS and the scale of civic engagement in urban NBS projects. Even though CF can be seen as a collaborative governance approach that allows SNGs to work with civil actors to promote urban NBS development, SNGs might have different expectations toward collaborative NBS governance. Hence, future research can explore whether the scale of the civic engagement will influence CF's feasibility in supporting SNGs' collaborative NBS governance.

Chapter 8: Conclusion

Although CF is a recognised alternative financing tool to support the urban NBS projects, there is a research gap that systematically understand CF's contributions toward civic engagement in urban NBS governance besides its financing function is lacking. Hence, by developing and testing a set of CF propositions, the research had answered the main research question: ***How can CF complement sub-national government's policy arrangements for facilitating civic engagement in urban NBS through its contribution toward the emergence of smart cities?***

The research shows that SNGs need to consider CF's meaning and functions for civic engagement in urban NBS beyond its financial roles. In other words, SNGs can comprehensively consider CF's role in the urban NBS policy arrangement to maximise CF's policy contribution for civic engagement in urban NBS. Hence, when SNGs want to support civic engagement in urban NBS development through CF, it can organise its actions based on four policy arrangement dimensions, i.e., (1) discourse, (2) rules of the game, (3) actor and coalition and (4) resources. Through the literature review and the multiple case studies, the research proposes that SNGs can adopt CF with the following five principles to complement their policy arrangement for facilitating civic engagement in urban NBS governance (see Table 8-1):

Firstly, SNGs can consider CF as a dialogue mechanism to collect project-related feedback, thus reducing participants' information asymmetry. SNGs' urban NBS policy discourse can identify CF initiatives' policy contributions and reflect CF as a policy tool to facilitate civil society's volunteering actions in order to enhance an NBS projects' citizens awareness, value adding and sharing and discourse congruence. Furthermore, SNGs can reflect CF platform's service for preventing and managing conflicting points of view and interest in the policy discourse in order to generate legitimacy for civic engagement in urban NBS governance.

Secondly, SNGs' urban NBS policy discourse needs to identify CF campaign's expected functional outcomes. SNGs' urban NBS policy discourse can set the NBS-related matching funds conditions for the CF campaign and define CF campaign's societal and environmental functions, i.e., contextualise ecosystem benefit and biodiversity, multifunctionality and connecting people with nature.

Thirdly, SNGs' CF rule design can announce a management team to operate government-owned CF platform or to cooperate with private-own CF platform. Furthermore, based on NBS-related tasks and re-establishes green urban commons, CF rule design needs to support different scales of NBS CF campaign, create a new institutional image for civic engagement and connect SNGs' institutional support to the CF campaigns. In other words, consider CF's contributions to increasing governance transparency and greater compliance with society demand performance, SNGs' NBS-related CF regulatory design can give platform management team a feasible right to provide customised support for individual NBS

initiatives in order to facilitate a bottom-up collaborative network and to provide a feasible institutional structure for civic engagement in urban NBS governance.

Fourthly, the collaboration between SNGs and CF platforms can provide CF initiators with a cross-sectoral networking service and also to organise offline workshops to support participants' experience sharing and learning. To participate and sustain the actor coalition for the development of NBS, SNGs can use CF platforms to understand civic society's demands and financially support the initiator by purchasing specific campaign materials. Namely, consider CF's contributions to enhancing actor diversity and inclusiveness, strengthening community's belonging and respect to the common resources, and increasing governance transparency and greater compliance with society demand, SNGs can adopt CF to connect project participants, promote social cohesion and learning can provide feasible collaborative capacity in NBS projects.

Finally, to provide resources for civic engagement in NBS projects, SNGs can adopt CF to provide a short-term funding partnership and introduce third parties' finance resources for individual NBS projects. Furthermore, SNGs need to ensure that its collaboration with CF platforms can connect third parties to provide environmental expertise and transdisciplinary knowledge to empower the citizens' NBS action. In conclusion, the online resources on the CF webpage can include the following: (1) information about successful cases, (2) tutoring material for organising CF campaign and implementing NBS projects, (3) regulations about the CF process, and (4) network and feedback conversation content. Regarding CF's contributions to connecting individual, promoting value sharing and enabling and increasing governance transparency and compliance, SNGs can adopt CF to provide resources for civic engagement in NBS projects.

Table 8-1. SNGs CF policy arrangement for civic engagement in urban NBS governance

Dimension	Factors	Factors operation	Propositions
Discourse	Citizens' awareness	Consider CF as a policy tool to facilitate civil society's volunteering actions for urban NBS development	#1
		Show the motivation to co-work with the civil society through CF.	
	Value adding and sharing	Connect the CF campaign's outcome to the NBS development (i.e., identify citizens' roles and integrate citizens' initiatives into the SNGs' NBS policy agenda)	
	Discourse congruence	Reflect CF platform's service for preventing and managing conflicting points of view and interest	
#2	Project's functions	Set the NBS-related match funding conditions to shape the outcome of CF campaigns	#2
		Define the CF campaigns expected societal and environmental functions based on contextualize ecosystem benefit and biodiversity, multifunctionality and connecting people with nature	
Rules of game	Bottom-up collaborative networks	Form or commission a management team (e.g., private CF platforms or NGOs) which can provide customised and networking service to the campaign initiators	#3
		Adopt CF to change SNGs institutional image when communicating with civil society about the NBS initiative, making sure the CF regulation can generate marketing and branding effects for the civic engagement in urban NBS governance.	
	Institutions structure	Explore more institutional support by connecting CF regulations to NBS-related tasks and re-establishing green urban commons (e.g., property rights and decisions capacity for civic initiatives)	
Actors & coalition	Project participants	The collaboration between SNGs and CF platforms needs to provide cross-sectoral networking services to introduce knowledgeable and powerful actors to the citizens	#4
	Social cohesion and learning	SNGs or CF platforms can organise offline workshops to support social cohesion and learning	
		SNGs and CF platforms' cooperative partners can provide support from both CF operation and the NBS implementation perspectives	
	Authority capacity	SNGs can use CF to participant in and to sustain the actor coalition for NBS development	
Resources	Funding	Offer annual budget to the CF platforms as a long-term funding partnership	#5
		Connect third parties' financial resources to match the NBS CF campaign	
	Environmental expertise	The collaboration between SNGs and CF platforms should connect third parties to introduce environmental expertise and transdisciplinary knowledge	
	Information and social capital	Ensure that CF's webpages include following resources: (1) information about successful cases, (2) tutoring material for organising CF campaign and implementing NBS projects, (3) regulations about the CF process, and (4) network and feedback conversation content.	

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Appendix A – Case study interview outline

Introduction

In the invitation emails, the researcher has explained the research concept and the interview's purpose to the interviewees. Besides that, ethical issues (e.g. anonymous, transcript reviews) has also be mentioned. Based on each interviewee's positions, the following question outline has further tailor-made and attached in the invitation email.

Background information

- Interviewee's role during the CF campaign or direct subsidy.
- The interviewee's motivation to adopt/participate CF campaign or subsidy project.

Actors' diversity and inclusiveness

- What are the main types of CF campaign/subsidy project initiators and participants?
- Does the CF platform/Province authority mobilise new actor to support the CF campaign initiator/subsidy applicants for coordinating community members' contribution?

Public consensus

- To what extent do you think the community belonging increases?
- How enthusiastic is the community member supporting and sharing the campaign?
- Does the campaign/project foster the offline dialogues between the community member and advocate the campaign? What is the role of CF platform/Province authority in organising this kind of conversation?

Resource coordination

- To what extent do you think CF/direct subsidy is an efficient way to collect money or reach the NNB's goal?
- Have you organised/participated workshops-liked events to teach/learn designing and implementing the CF campaigns/subsidy project? What do these events include?
- Does the Province authority provide additional guidance and resources, which related to legal permits, policies, property, other funding, tools, and training, to assist the campaign/project initiative?

Value sharing and enabling

- Will you introduce successful and unsuccessful cases for CF initiators/subsidy applicants to reference?
- To what extent do you think the function of feedback relationship between platform, campaign initiator, community, business sector and the Province authority?
- What are the reasons and benefit to share the campaign's progress?
- Have you observed participants' attitude changing toward each other and about the

community/authority?

- Have you observed the emergence of leadership or ambassador on creating functional green commons? Do these people advocate communication between citizens, politician, authority, exert or business sectors?

Governance transparency and compliance

- Does the Province authority provide clear governance procedure? How does it influence the CF campaign/subsidy project's implementation?
- What was the Province authority's attitude toward the CF campaign/subsidy project?
- Do you think the government are openness and willingness to discuss and listen to citizen's needs?

Closing questions

- Is there anything you want to add for this interview?
- Can you introduce some initiators or authority people that I can talk with to understand more about his campaign?

Appendix B – Interviewee invitation list

Interviewee #	Interviewee type	Organisation	Position	Respond	Interview date
Interviewee 1	CF platform	Voor je Buurt	Project leader for Noord-Brabant	Accept	April 02, 2020 (Skype)
Interviewee 2	CF initiator	Onze Eethare Straat Gent	CF Campaign initiator	Accept (informal)	April 22, 2020 (Facebook)
-	SNG	Green Development Fund Brabant	Director	Reject	-
-	SNG	Province of Noord-Brabant	Team member of Natura and Social Programme	Reject	-
-	Participator	IVN Brabant	South communication advisor	No respond	-
-	Participator	IVN Brabant	Senior project leader	No respond	-
-	SNG + CF platform	City of Ghent	Not sure yet	No respond	-
-	CF initiator	Samenlevingsopbouw Gent	Body worker (opbouwwerker)	No respond	-
-	SNG	Manchester city council	-	No respond	-
-	CF initiator	City of trees	Special project manager	No respond	-
-	CF platform	Spacehive	Contact centor	No respond	-