The integration of climate adaptation and sustainability policies on the local level:

A study of the degree of policy integration in cities

and the influence of actor collaboration on this process

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List of abbreviations

| CG | Collaborative Governance |
|------|---|
| FFF | Fridays for Future |
| GHG | Greenhouse Gases |
| IPCC | Intergovernmental Panel on Climate Change |
| PI | Policy integration |
| SD | Sustainable development |
| SDG | Sustainable Development Goal |

Abstract

The amount of empirical research on sustainability and climate adaptation policies in cities is steadily growing. Inherent in this advancement in research is also the enhanced importance of cross-cutting and interdisciplinary. Acknowledging and directly responding to these research trends, the present research seeks to investigate the integration of adaptation and sustainability policies on the local level. It does so with the objective of detecting actors and their collaborations in the process of policy integration (PI) as they provide the basis for successful integration of two policies in cities. Consequently, this research takes three German cities as case studies and uses policy document analysis and semi-structured expert interviews as methods to investigate PI and actor collaboration on the local level.

The analysis of PI among adaptation and sustainability polices in this research shows that the degree of integration in all three analysed cities is already particularly high. It therefore became apparent that all cities recognised the urgency for a comprehensive and integrated approach regarding climate adaptation and sustainability. Sustainability polices indicate their commitment and interest in facilitating integration with other policies and especially with adaptation as intersection among both can be found. This is due to their cooperation and collaboration with a great number of actors and networks and the incorporation of various topics, among them adaptation. Inversely, the field of adaptation barely include sustainability as a stand-alone topic in their policies, which can be traced back to the fact that all three adaptation policies predominantly focus on urban heat as their main topic. Furthermore, this research revealed that common actors and collaborative relationships among them significantly enhance the likelihood of two policies being integrated. Especially direct communication among actors contributes towards discovering common grounds as well as mutual gains and building trust. Collaborative relationship among actors' further favours joint feelings of responsibility and joint decision making which in turn is beneficial for PI.

In sum, this thesis proports the fact that policy integration among climate adaptation and sustainability policies is already at an advanced stage, however, climate adaptation policies further need to integrate sustainability into their scope.

Keywords: Policy integration, collaborative governance, climate adaptation, sustainability, sustainable development, cities

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1 Introduction

1.1 Research Problem Statement

Given the significant amount of political, scientific and media attention, it is hard to ignore the fact that the climate is changing at an increasing speed and challenges humankind at an unprecedented scale. Mounting emissions of greenhouse gases (GHG) are causing an alarming rise of the global average temperatures (IPCC, 2014), which leads to rapidly changing climatic conditions and entails serious consequences like extreme precipitation, droughts, floods or water scarcity (Bazaz et al., 2018). Such changes affect every part of the world in one way or another, but research has shown that the most heavily affected are cities and their habitants (Wamsler, 2015). Due to their density of population, buildings and infrastructure, cities are particularly affected by disturbance or fast change (Hoornweg et al., 2011). Thus, urban areas and their social, economic and environmental processes will be directly and indirectly impacted by the results of climate change (Kuttler et al., 2017).

The vulnerability of cities results from the high concentration of population, infrastructure and economic activities in a small area. In addition, cities can exacerbate the climate impact through building development, a high degree of sealing or a lack of green spaces. In this regard, the building structure of urban areas contributes to the fact that cities are already warmer than their surroundings, which is predicted to further accelerate due to rising temperatures. Ultimately, this can lead to greatly overheated urban areas, so called urban heat islands, which are jeopardising especially people with an underlying health condition and elderly people (Kuttler et al., 2017). Other serious consequences of climate change for cities are droughts river flooding, heavy rainfall and storm surges on the coasts. In sum, adapting to these changing climatic circumstances is of outmost importance in order to protect social, environmental and economic activities in cities.

Following the definition formulated by the IPCC, adaptation is the "need of adjustment in [...] human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (IPCC, 2007). However, adaptation to changing climate conditions is not the only challenge cities are facing. Given its negative impacts on societal, economic and environmental activities, climate change also poses a significant constraint for sustainable development in cities (Rietig, 2012). Adapting to and combatting its impacts thus is of crucial importance for sustainable urban development. In 1987, the Brundtland Report linked environmental problems for the first time to social equity and economic growth and advocated for comprehensive sustainable development to address this challenge (Hopwood et al., 2005). Today, linking sustainability with climate challenges is being increasingly highlighted.

In the last decades, major successes have been achieved as can be seen in the thirteenth Sustainable Development Goal (SDG) that targets climate action with a focus on both adaptation and mitigation (UN, n.d.). The IPCC (2014) highlights the need to confront climate change in an integrated manner that links adaptation and mitigation with sustainable development. Multiple researchers emphasise: the ever-growing quest for sustainability cannot be effectively met without adaptation (Locatelli,

2010). This makes adaptation policies a crucial component of sustainability policies (Ahmad, 2009; Briassoulis, 2004). Goals targeted by adaptation policies are likely to not take potential constraints for other sectors such as the sustainability sector into account. An example for this is the favoured urban planning approach of inner development that focusses on already developing areas within the city to dispense the further designation or development of areas in the outskirts of cities (Stallmann, 2014). This approach can conflict with the sustainability goals to reduce inequalities between people living in urban or rural areas.

In order to combat those challenges, multiple policies have been and are currently being developed that are often found to be either overlapping, contradictory or simply inefficient given their unidimensional and uni-disciplinary character (Briassoulis, 2004). Yet, the complexity of adaptation and sustainability demands a cross-cutting, interdisciplinary approach as they are touching multiple sectors likewise and cannot be dealt with independently (UNFCCC, 2005). In order to allow for sustainable protection of cities, its citizens, infrastructure and economy, sustainability policies and measure must be combined with adaptation policies on the local level (Briassoulis, 2004). In this regard, this research proports the fact that policy integration (PI) proves to be a helpful and goal-oriented way to address these problems and provides answers and possibilities to facilitate the sustainable protection of cities (Briassoulis, 2004). Specifically, PI aims at integrating climate policy goals and processes into other relevant domains, in this case sustainability (von Lüpke & Well, 2019).

A crucial component of PI are actors as their way of interaction, communication and cooperation provides the basis for successful integration of two policies (Briassoulis, 2004). Despite their varying policy backgrounds, collaboration and agreement about PI related issues must be existing among involved actors (Tosun, Lang, 2017). If actors do not succeed in uniting their approaches and views on similar topics, PI is endangered (Wamsler et al., 2020). Facilitating actors from both policy fields enhance the degree of PI greatly and enable cities to effectively deal with the complexity of climate change and sustainable development. Given the inherent nature of adaptation policies and the wide range of topics it entails, their success depends on the integration of adaptation policies into relevant sectors such as the sustainability sector (von Lüpke, Well, 2019; in Tosun, Lang, 2017; Ahmad, 2009). In order to successfully study the integration between both policies the following research aim and questions have been developed.

1.2 Research aim and research question

Following from the section above, this research argues that climate adaptation measures can enhance sustainable development and vice versa, and at the same time help to reduce vulnerability in virtually all fields (Ahmad, 2009). Given the great importance of the topic for safe and sustainable cities, this thesis seeks to measure and analyse the degree of integration of sustainability and adaptation policies in three selected German cities. A special focus is placed on actors involved in this process and their

collaboration. In order to be able to conduct this research the two theories of PI and collaborative governance (CG) are being applied. In doing so, and as a practical outcome of the analysis and lessons learnt, this research aims to offer other German cities recommendations and suggestions to further enhance PI. Consequently, the focus of this research lies on the local level. This is not only due to the current research gaps, but it also justified as local authorities are key in establishing and implementing adaptation and sustainable development measures in order to reduce the vulnerability of urban society, economy and environment (IPCC, 2014).

In practical and empirical terms, I will focus on internal, that are actors from the city administration, and external, actors from civil society, business and public institutions outside the administration, as well as networks, and their role and impact on the integration of adaptation and sustainable development policies. This is because actors are a crucial component of successful PI (PI) and their collaboration is central for solving policy problems, enhancing mutual trust and thus fosters implementation (Tosun & Lang, 2017). Moreover, analysing the involvement of actors, their role and the collaborations among them is crucial for understanding the policy processes (Arts et al., 2006) as the involvement of different actors grew due to the shift from government to governance (Ansell & Gash, 2007). Furthermore, this shift implies a "change in the pattern and exercise of state authority" (Rhodes, 2012, p. 1) away from the sole power of the government to govern society to the successful governing by various actors from government, civil society and market. Following this, it becomes apparent that collective action of different local actors are a promising approach to respond to urban challenges (McCarney, 2013).

This leads to the following research questions:

<u>RQ</u>: "To what degree are climate adaptation and sustainability policies on the local level integrated and how is this process influenced by actor collaboration?"

In order to systematically answer the research question, this research follows three steps that are all guided by a sub-question. The first step is to analyses the current degree of PI in the three selected cities by means of the developed conceptual framework (see 2.5) as to answer the former part of the research question concerning the degree of PI on the local level. The guiding sub-question here is:

<u>SQ1</u>: "Using the experiences of three German cities as a case study, what is the state of integration among adaptation and sustainability policies on the local level?".

Subsequently, the influence of involved actors and networks in each of the cities will be analysed to determine their role and the collaboration among them in this process. Consequently, the subquestion is:

<u>SQ2</u>: "What influence do actors and networks have and how does their collaboration influence the process of PI in cities?".

As a final step, this thesis will close with the aim to develop recommendations for other cities based on the research that has been carried out in the steps prior to this:

<u>SQ</u> 3: "What lessons learnt for advanced policy integration can be derived from the analysis of three cities?".

1.3 Societal relevance

The social dimension of adaptation and sustainability is based on the fact that there is an increasing danger posed by climate change. Furthermore, cities are home to about 70% of the population worldwide and are highly sensitive to any kind of disturbance or fast change (Hoornweg et al., 2011) (UN, 2018). As a result of climate change heat island effects, deterioration of air quality or growing risk of floods pose significant jeopardies and danger to urban infrastructure and activities (Kuttler et al., 2017). In 2008 urban flooding as a consequence of heavy precipitation caused damages and losses of EUR 17,2 million in Dortmund, Germany, (Rözer et al., 2016) while in 2013 river flooding on the Danube and Elbe caused damage of EUR 2.1 billion (Sieg et al., 2019). In 2018, increasing formation of urban heat islands led to significant rises in heat-related mortality rate and the death of 1,230 people in the German states of Berlin and Hessen alone (RKI, 2019). This underlines how significantly climate change jeopardises people's life and the entire urban system at large (World Bank, 2010). Thus, societies interest in successful and powerful adaptation and sustainability measures is substantial (WHO, 2018).

Given the local variations of climate change impacts, specific and targeted approaches and policies must be developed and implemented locally. Consequently, local authorities carry a great responsibility towards society by implementing and stimulating adaptation measures in order to reduce the vulnerability originating from climate change (Measham et al. 2011, Roberts et al. 2011, IPCC 2014, Rauken et al. 2014, Wamsler, 2015, Bulkeley and Kern, 2006). In this regard, since the Earth Summit in Rio in 1992, when the Local Agenda 21 was established, the importance of cities for sustainable development became apparent (UN, n.d.). This importance has not changed, indeed the necessity for local governments to take action only became stronger, as clearly reflected in the current SDGs (Hartinger, 2018). In an act of recognising their crucial role and responsibilities, in Germany 147 cities signed a Model Resolution in which they commit themselves to take action for sustainability at the local level (SKEW, 2020).

Despite the great accordance among climate adaptation and sustainability policies potential conflicts can arise and incorrect implementation and transposition of the individual policies. Furthermore, conflicting goals and targets can attribute for the deterioration of both policies. Fortunately, the potential for conflicting issues among both policies is rather low. However, potential causes can be the expansion of green and water areas within the city on behalf of adaptation policies and the demand for densification of the housing stock pushed for by sustainable development. Here environmental reasons are clashing with societal ones despite the fact that both policies are ultimately targeting to reduce society's vulnerability. Yet, sustainable development further aims at reducing societal inequalities while adaptation policies are focusing on the society as a whole. These minimal conflicts but most of all the majority of resembling targets are underlining the importance of PI to enhance both policies likewise.

In sum, the societal relevance of climate adaption and sustainable development is unquestionable. Furthermore, by developing policies that are conscious about climate adaptation on one side and sustainability on the other, the likelihood of successfully protecting cities, citizens and infrastructure can be significantly increased (Epstein & La Hoz Theuer, 2017).

1.4 Scientific relevance

Despite the growing amounts of literature and research devoted to investigating how policies can be integrated into other relevant sectors so far, no work could be found that is directly focusing on the integration of adaptation and sustainability policies on the local level. A major share of the research focusses on the European or national level to enhance governance and avoid uni-dimensional and fragmented policymaking. Dupont and Oberthür (2012) as well as von Lüpke and Well (2019) contribute to the popularity of examine PI in the energy sector. While the former research duo focusses on European energy policy the latter puts the focus on the national level in Mexico. Dupont and Obertür (2012) conclude that the level of climate PI in such sectors still remains insufficient and focusses on short-term goals rather than long-term perspectives while von Lüpke and Well (2019) found that political discourses and negotiations can foster the integration of energy and climate policies. The work of Metz et al. (2020) illustrates the progress that has been made in the field of PI as it focusses on the somewhat complex topic of actor- and law-based issue integration of flood risk management on the national level of Switzerland. Wamsler et al. (2020) on the other hand come the present research comparably close as they consider PI on the local level yet examine PI of nature-based approaches and climate adaptation. For this, they identify, among others, stakeholder collaboration and citizens involvement as contributing to PI. Also Di Gregorio et al. (2017) focus on integrating climate mitigation and adaptation and attempt to "re-conceptualise CPI in the land use sectors" (p. 35).

As already expressed in the prior sections, the importance of the local level to achieve PI is indeed high and thus requires a scientific foundation to be successfully carried out. Locatelli (2010) emphasises the role local stakeholders play in this and argues to take their interests into account when it comes to policymaking and implementation. Despite the increasing interest in this topic, a lack of comprehensive frameworks for evaluating PI continues to exist. Only few researcher have been engaged with developing and testing frameworks for PI such as Briassoulis (2004), Abramczyk (2013) and Candel and Biesbroek (2016). Further, there is a significant deficiency in terms of case studies and practical examples of local PI. The theoretical discourse about PI is a valuable and important foundation for practical work, however these practical implementation and analysis are up to date still lacking. (Stead & Meijers, 2004) are one of the few researchers who published a paper about the practice of PI of transport, land-use planning and environmental policies on the local level. More recently Praharaj et al. (2018) investigated "opportunities of urban policy integration by conceptualising a smart city policy reference framework".

Thus, the vast amount of research published about PI focusses on rather theoretical ways to examine it or on superordinate levels. Given this scientific gap coupled with the absolute contemporary importance of the topic, this thesis aims to further examine the integration of adaptation into sustainable development policies. Specifically, this serves to better understand the nexus among both topics and to further facilitate their integration on the local level. The pressure to mainstream adaptation and sustainable development policies becomes urgent for every country and every city as scientist agree that climate change will impact places worldwide (Bazaz et al., 2018). The present research therefore aims at contributing to the existing knowledge in the field to close the knowledge gap.

1.5 Outline of the thesis

The structure of this thesis is as follows. Chapter 2 presents the context in which this thesis takes place by providing background information on climate adaptation (2.1) and sustainability (2.2). Subsequently, the key theories are discussed (2.2 & 2.3) to develop the theoretical framework of this thesis. Based on this, the conceptual framework (2.4) and the operationalisation (2.5) thereof will be presented. Chapter 3 then proceeds by setting out the methodological approach to test the theoretical framework. Subsequently, chapter 4 analyses the findings from the empirical activities for each case study and tests the validity of the theoretical framework. Section 5 reflects on the outcomes and answers the expectations and research questions of this thesis. Finally, chapter 6 concludes on the main findings, reflects upon the limitations of this thesis (6.1) and includes recommendations for future research (6.2).

2 Literature review and theoretical framework

This chapter offers an exploratory and critical review of the state of the art of research on the concept of sustainability and adaptation, in particular on local policies. The first two sections are dealing with the subjects of this research, sustainability and climate adaptation. Section (2.1) presents a brief discussion on the emergence of sustainability and examines the current state of the art to adequately conceptualise local sustainability strategies in Germany. The same structure is followed for climate adaptation (2.2) to enable the reader to arrive at a better understanding of the concept and its local dimension. Both concepts are outlined in a German context which is attributable to the decision to work with German cities as case studies. Subsequently, the theories that create the foundation of the conceptual framework of this thesis are presented: policy integration and collaborative governance. Section 2.3 offers information on PI, the key theory for this research as well as the chosen methodological framework to analyze policy integration by Briassoulis' (2004). In section 2.4 the theory of collaborative governance is executed and supplemented by Ansell and Gash's (2007) model of collaborative governance. Following this, the conceptual framework that has been developed on the basis of the prior theories as well as the operationalisation thereof will be described.

2.1 Concept of Sustainability

Before explaining the meaning of this concept, it must be noted on the outset that this thesis makes use of both termini sustainability and sustainable development (SD). However, the overarching term used will be sustainability as it is a broader, superordinate term that includes SD as well.

The term sustainability was first used by the Hans Carl von Carlowitz in 1713 as part of the forestry vocabulary and implied to only cut down as many trees as could be regrown (Grober, 2007). With this definition, Carlowitz paved the long way of sustainability. 250 years later, the term gained global importance again due to the Brundtland report that was published in 1987. The report introduced the concept of SD for the first time and focused on linking environmental problems to social equity and economic growth (Brundtland Commission, 1987). SD can therefore be described as bridging and linking environmental with societal, political, economic and development concerns (Hopwood et al., 2005). Three decades later, in 2015, all United Nation member states adopted the Agenda 2030 with the 17 Sustainable Development Goals (SDGs) at its core. The SDGs have encountered a number of critiques, such as being: "fairy tales, dressed in the bureaucratese of intergovernmental narcissism, adorned with the robes of multilateral paralysis, and poisoned by the acid of nation-state failure" (Horton, 2014, p. 53). These critiques have been countered, and it has been said the great achievement of bringing all 193 UN member states to agree upon and sign a pre-defined set of targets concerning global and local sustainability and development can be recognized as remarkable (Stafford-Smith et al., 2017). Another special characteristic of the Agenda 2030 and its SDGs is the strong emphasis on localising the SDGs to the local level, and by this, promoting the influence and the capacities of local governments (Reddy, 2016). This underlines the importance of the SDGs and the topic of sustainability to this research.

Consequently, local governments carry great responsibility in ensuring the implementation of targets concerning health, education, inequality and poverty reduction as well as economic growth while ensuring development and tackling climate change (Reddy, 2016; UN, n.d.). The alignment and integration of both targets and strategies among the national and local level is thus of utmost importance in working towards the SDGs (Stafford-Smith et al., 2017).

In its Agenda 2030, the UN (2015) declares itself in favour of addressing "decisively the threat posed by climate change" (p. 12) and in a rather subordinate clause mentions adaptation as a means to this end. Moreover, the document refers to the COP¹ in Paris and the resulting climate agreements and reaffirms them (United Nations, 2015). Indeed, this sounds rather vague and does not precisely connect adaptation with the issue of sustainability, however, the individual SDGs reintroduce the topic again. Multiple SDGs include adaptation as a crucial means to reach the desired goal. One example, among others, is SDG 11, where adaptation is mentioned as a key in making cities more sustainable. Here, the importance for the local level to implement adaptation into sustainability efforts is shown. This shows that the sustainability debate, does take adaptation into account, however rather poorly as it should be part of almost each SDG (Epstein & La Hoz Theuer, 2017). Due to its effect on virtually all areas of life, adaptation in sustainability efforts is thus of mounting importance for cities, nations as well as for the globe as a whole (Epstein & La Hoz Theuer, 2017).

In order to contextualise local sustainability policies of German cities, the broader national context shortly will be outlined as national policies often serve as a framework and foundation for local action.

2.1.1 National Sustainability Policies

In the following, a brief overview about German sustainability policies will be given. As the cities selected as case studies are all located within Germany, this context was chosen.

In Germany, sustainability as a (stand-alone) policy field on its own was created in 2002, only shortly before the World Summit on SD in Johannesburg. The latest version was published in 2018 and is foreseen to be updated in 2020 and places a strong focus on the integration of sustainability challenges into all other policy areas and formulates precise cross-sectoral targets (Die Bundesregierung, 2014).

Climate protection is a topic of great importance for the German government; this can be illustrated by the establishment of the so called Climate Cabinet, that exclusively deals with topics regarding

¹ Conference of the Parties 2015 in Paris, France.

climate protection (Presse- und Informationsamt der Bundesregierung, 2019). Although climate protection and adaptation are mentioned as key challenges for sustainable development, adaptation as a concrete target is mentioned only once under the SDG 13 Climate action (Die Bundesregierung, 2018). The criticism thereof is twofold: first, given the increasing knowledge about the need of adaptation towards climate impacts, the result of only one target concerning adaptation is rather sobering. Second, as this very target focusses explicitly on financing international adaptation efforts, measures targeting the national level are lacking completely. The Federal States of Germany express critique towards this deficiency by demanding a stronger focus on underrepresented topics such as adaptation for further development of the strategy (Die Bundesregierung, 2018).

2.1.2 Local Sustainability Policies

The nexus of cities and sustainable development has been subject of discussion since the late 1980s, early 90s. The Brundtland report was among the first to mention the link between sustainable development and cities, with an own chapter on urban issues. Only a few years later, in 1991, the United Nations Centre for Human Settlements developed a first definition of sustainable cities which, despite its vagueness, in parts still serves as a solid foundation for the current definition (UN-Habitat), 2002). Throughout the years, multiple conferences and summits on this topic have been held. As a result of the follow-up of these conferences, the initially rather general components "social and economic development" were supplemented by two important attributes, namely environmental management and urban governance (United Nations, 2013).

This strong focus on cities in the realm of sustainability ultimately leads to the recognition of the great responsibility of local governments to foster and guide the process towards sustainability. This increasing importance is recognised and advocated by several authors and researchers (see (Gustafsson & Ivner, 2018; Reddy, 2016; Koch et al., 2019; Koch & Ahmad, 2018) as well as national, European and international governments and organisations such as the German Government (Die Bundesregierung, 2020), the European Commission (2018) and the OECD (2010). The former UN Secretary General, Ban Ki Moon, states that the aim for sustainability "will be won or lost in cities" (UNESCAP 2014, p. 1 in Koch & Ahmad, 2018). The truth of this statement is evidenced by the strong local focus of almost all of the 17 SDGs (Fenton & Gustafsson, 2017). The 17 SDGs list 169 targets of which 45% foresee a strong involvement of urban stakeholders in order to ensure their successful and appropriate implementation (Misselwitz et al., 2015). Misselwitz et al. (2015) further found that another 20% of the targets require stronger involvement of local actors, which nevertheless is not directly stated in the wording.

The German Federal Government strengthens the role of municipalities and grants them a great deal of freedom in the implementation of the sustainability objectives (Die Bundesregierung, 2020). German municipalities are taking this responsibility serious and are engaging in the field of sustainability in an increasing manner. This is proven by the growing number of municipalities that are committing themselves to locally implement the SDGs. According to the Service Agency Communities

In One World, up to date 147 German municipalities signed the resolution "Agenda 2030 for Sustainable Development: Shaping Sustainability at the Local Level" developed by the Association of German Cities (SKEW, 2020). However, signing the resolution does not imply that all these municipalities have developed a sustainability strategy yet – they committed themselves to localising the SDGs in their city. The greater majority of municipalities are indeed working towards a more sustainable development and are recognising their own responsibility to implement the SDGs on the local level, however, concrete municipal sustainability strategies with concrete measures and indicators are still rather rare (Hasse & Willen, 2019).

Municipal sustainability strategies typically encompass a wide number of topics ranging from socioeconomic development including eradicating poverty and hunger through dissolving any kind of inequalities as well as protecting the environment and its resources to sustainable consumption.

2.2 Concept of Climate Adaptation

Even if humankind would succeed in combatting climate change, its consequences would still be ubiquitous and perceptible, hence adaptation measures and policies increasingly gain importance (Brouwer et al., 2012). The IPCC² (2012, p. 838) defines adaptation as the anthropogenic "adjustment to actual or expected climate and its effect" in order to reduce or even avert negative implications by it. Given the necessity of integrating adaption policies into sustainability policies the former concept will be conceptualised in the following. In order to do so, a brief introduction into the history of climate adaptation will be given and illustrated on two concrete examples: the German national (2.2.1) and local level (2.2.2).

Adaptation is a complex concept that represents the capacity and the ability of a system to address changing circumstance and change accordingly (Kern & Alber, 2009; Zolnikov, 2019). The complexity of adaptation stems from the uncertainty about the nature, extent and timing of climate change impacts and possible measures taken (Carter, 2011; Eisenack et al., 2014). Despite the considerably long and reliable science of climate change, information and measurements to predict future trends can be subject to errors which in turn poses uncertainty to adaptation processes (EEA, 2020).

Actors involved in adaptation processes encounter a large array of barriers that can potentially hinder their planning and implementation. According to Ekstrom and Moser (2014), especially on the local level institutional, attitudinal, financial and political barriers seem to frequently occur. Based on Biesbroek et al. (2011) work, Eisenack et al. (2014) further specified barriers such as the fragmentation of adaptation across different sectors as a "persistent problem" (Eisenack et al., 2014, p. 868).

² Intergovernmental Panel on Climate Change

Furthermore, as the political nature of adaptation is rather short-term, yet successful interventions have to be enduring, hence have a long-term character, conflicting timescales are practically impossible to avoid (Eisenack et al., 2014). More commonly known barriers such as lack of awareness, willingness to act or resources further hampers planning and implementing adaptation measures (Biesbroek et al., 2011).

While mitigation long received full attention, adaptation was predominantly neglected in climate change policy (Biesbroek et al., 2010; Carter, 2011; Kern & Alber, 2009; Swart & Raes, 2007). Own research on google scholar and worldcat³ have shown that the first publication regarding climate change adaptation was published in 1980 by Roger G. Noll. However, this was rather an exception than the rule as further publications were only slowly published in the late 90s /early 00s (see Burton (1998); Neil, 1999, Mendelsohn (2000)). The vast majority of the research on climate change policies mainly focussed exclusively on mitigation and adaptation thus long lagged behind (G. R. Biesbroek et al., 2010; Carter, 2011; Kern & Alber, 2009). This is illustrated by the fact that the IPCC's First Assessment Report on climate change regarding mitigation was published in 1992 whereas the first report on adaptation was published only around ten years later (Houghton & IPCC, 2001; IPCC, 1992). This is also evident in the European context: The first EU climate policy was adopted in 1990 and only 23 years later in 2013 an adaptation strategy followed (Ecologic Institute, n.d.; European Commission, 2016).

Due to this single-sided focus, research on and literature about adaptation long remained limited, however this circumstance began to shift in the last ten years and in recent debates, both topics have been gaining equal attention and recognition (European Commission, 2016; Prahl & Hofmann, 2014). The most comprehensive research about climate adaptation in the international context has been done by the IPCC in 2014 (Mechler et al., 2020). The novelty of this report was the shift in focus from the prevailing biophysical perspective to a rather societal and economic point of view (Noble et al., 2014). Yet, not only in scientific research but also in practice, adaptation is catching up. From 2000 onwards, most inter- and transnational climate change networks such as ICLEI⁴ or the Climate Alliance of European Cities integrated adaptation into their work (Kern & Alber, 2009). Further, in 2015 the Paris Agreement, which entailed the first targets on adaptation for the 188 signing countries, emphasized the equal importance of adaptation and mitigation as key in responding to climate change on a both local and global level (Magnan & Ribera, 2016).

As the Paris agreement and the 5th assessment report published by the IPCC state, adaptation is important at all geographical scales and usually implemented in form of national, federal/provincial or local adaptation strategies (Noble et al., 2014). The overarching aim of those strategies is to reduce

³ Search engine of Radboud University

⁴ Local Governments for Sustainability

the vulnerability of a given place posed by climate change and protect society, economy and environment (Biesbroek et al., 2010, p. 441). However, different strategies have diverse approaches in reducing the vulnerability to climate change. Those can range from distributing risks and vulnerability to a broader population, relocating activities or livelihoods from endangered zones, creating incentives for behaviour change or prohibit certain harmful behaviour (McCarney, 2013).

To date most national, regional and local governments have established climate adaptation plans and understand the need thereof in order to safeguard people as well as cultural and economic processes and protect local nature (Carter, 2011). However, despite the urgency to reduce the vulnerability of people, economy and nature, the transition towards a rigorous and stringent implementation of local adaptation measures is only slowly achieved (WHO, 2018).

2.2.1 National adaptation policies

As one of the first EU member states, Germany adopted its national adaptation strategy in 2008 and the corresponding adaptation plan in 2011. Since then, both have been revised in 2015 and 2020 to provide an overview about the current state to further define the development thereof (Umweltbundesamt, 2019). The strategy constitutes a national framework for climate adaptation and further supports the state and local level to take action (BMU, 2014). The German adaptation strategy defines important structures for local governments by providing the political base at the national level for their local adaptation measures (Die Bundesregierung, 2015). According to the European Environment Agency (EEA, 2020), the national level should provide legal and financial frameworks as well as knowledge about climate adaptation measures. Further, it is desirable to establish a feedback loop that facilitates the process of feeding back local experience into national policymaking (EEA, 2016).

A study conducted by the Federal Environment Agency suggests that the German adaptation strategy indeed has a significant influence on local governments in terms of enhancing the knowledge about adaptation measures and particularly opportunities to receive funding for it (Hasse & Willen, 2019).

2.2.2 Local adaptation strategies

As climate change impacts are most visible on the local scale, cities are most impacted and thus at the heart of adaptation efforts (Bulkeley & Kern, 2006; Serrao-Neumann et al., 2014; Wamsler et al., 2020). Global climate change affects cities in various ways directly and indirectly. First of all, cities contribute to climate change through the high emission of greenhouse gases (GHG) generated at the local level, and are at the same time most affected and vulnerable to climate impacts (Kuttler et al., 2017). This vulnerability arises from the high concentration of societal, economic and environmental activities in relatively small areas (Kuttler et al., 2017). The German Federal Environment Agency predicts that German cities have to grapple with water problems given the accumulating river levels or heavy

precipitation in winter and heat waves and precipitation shortages in summer (Kartschall et al., 2007). This results in a high level of concern which urges a growing number of cities to take action.

Various international institutions, the EU and most national governments acknowledge the importance of local governments in successfully planning and implementing adaptation measures (Die Bundesregierung, 2015; European Commission, 2013; Mimura et al., 2014). Given this increasing recognition of the importance and competencies of cities, local government have established themselves as crucial players in the global context of climate policy (Kern & Alber, 2009). To further increase the impact and capacity of local governments to act, they receive comprehensive support from national governments and governenmental institutions (Kern & Alber, 2009). An example is a guideline⁵ (Klimalotse) that supports cities in reducing their vulnerability towards climate change impacts and pursuing opportunities in a targeted manner developed by the German Environment Agency. The guide consists of five modules that provide information and assistance to municipalities for adaptation. The first module helps to understand and describe climate change, followed by identifying and assessing vulnerabilities and developing measures. Building on this, information is provided to create and integrate strategies and to monitor and evaluate them (Umweltbundesamt, 2020). Another tool to support actors from local politics, but also for private or civil society actors in their adaptation effort, the federal government and the federal states developed a portal for climate protection services⁶ (KliVO Portal) which combines data and information on climate change as well as services for targeted adaptation to climate impacts (BMU, 2018).

The implementation of adaptation measures varies from city to city and usually depends on, firstly, the actual or predicted local impacts by climate change, secondly the capacities and competences of the city to carry out action and thirdly on the involvement in (inter-) national networks such as the Covenant of Mayors, climADAPT or the Global Adaptation Network (Kern & Alber, 2009). A study analysing 147 local adaptation strategies in Europe (Aguiar et al., 2018) found that the existence of adaptation strategies steadily increases. This can be supportd by the fact that within five years (2011-2016), the number of strategies tripled (Aguiar et al., 2018). According to the German Environment Agency, in 2016, 49 out of 81 major German cities (> 100.000 inhabitants) either have published or were in the developing phase of an adaptation strategy (Hasse & Willen, 2019).

Despite the lack of strategies for about 40% of major cities, almost all remaining cities are nevertheless undertaking individual adaptation activities (Sander, 2017). A study conducted in 2019 by the German Institute of Urban Affairs under the authority of the German Environment Agency however draws a slightly different picture of the current state of affairs regarding adaptation in German municipalities.

⁵ For further information (only available in German): https://www.umweltbundesamt.de/themen/klima-energie/klimafolgenanpassung/werkzeuge-der-anpassung/klimalotse#Einführung

⁶ For further information: https://www.klivoportal.de/EN/Home/home_node.html

In total, the answers of 249 municipalities of various sizes⁷ with different framework conditions were evaluated. This study came to the conclusion that 40% of the participating cities either have existing or planned adaptation action programs or municipal adaptation strategies (Hasse & Willen, 2019). The differentiating results of both studies can be traced back to the fact that cities that are bigger in size and population are predominantly more advanced in their adaptation processes (Hasse & Willen, 2019). However, the study by Hasse and Willen (2019) confirms the statement of the German Environment Agency (2016) that despite the need to catch up in terms of adaptation strategies, 74% of the municipalities are implementing or planning some kind of adaptation measures. Frequent obstacles hindering adaptation processes among the participating municipalities are scarce resources for both the preparation and implementation stage (Hasse & Willen, 2019).

Potential conflicts among adaptation and sustainability policies can occur which require the integration of both as to successfully implement goals and targets from each policy. The intention on behalf of adaptation policies to increase green and blue infrastructure and reduce building development in urban areas to ensure good ventilation of the city on one side can conflict with the need for more housing requested by sustainability policies. To stick with the example of housing, it can further be argued that the development of resilient buildings against natural hazards is needed to adapt the housing sector to climate change. As these endeavours are cost intensive and affordable living is increasingly needed, further potentials for conflicts among both policy fields can be derived from here. However, those conflicts are conquerable when values and goals of actors involved in both fields are similar or non-conflicting to enhance collaboration. For this, PI is required, which will be explained in detail in the following chapter.

2.3 Policy Integration

As the name already reveals, policy integration (PI) describes the integration of certain policies into other (relevant) policy fields (Mickwitz et al., 2009). The term was firstly introduced in the 1990s by a variety of international governmental organisations (IGOs) and since then gained mounting attention (Tosun & Lang, 2017). The main characteristic of this concept is cooperation and solution-oriented problem solving of different policy actors and sectors on different levels (Tosun & Lang, 2017).

Despite the vast amount of scientific work done on this topic, finding sufficient literature fitting the topic turned out to be more complicated than assumed. This is mainly due to the multitude of different designations for very similar concepts. Tosun and Lang (2013) examined the existing literature on this topic and found that at least nine different names for very similar approaches exist. Those are holistic

⁷ 33% of the participating municipalities have more than 100.000 inhabitants, 30% between 20.000 and 100.000 and another 35% less than 20.000 inhabitants. The remaining 2% did not provide information on their size (Hasse & Willen, 2019).

government, policy coherence, horizontal governance to holistic governance and PI, to name just a few. The absence of concrete definitions or theoretical considerations of those concepts additionally adds to this confusion (Tosun & Lang, 2013).

Since this thesis sought to examine the integration of two policies (adaptation and sustainability), the thesis will proceed with the term PI as it is the one used most often in the literature (see Tosun & Lang, 2013) and focusses on "coordinating and integrating policies" (Tosun & Lang, 2013). Moreover, the topics sustainability and environmental and climate policy are the main policy domains of PI, which indeed fits the purpose of this research well as both will be the main objectives of this research (Tosun & Lang, 2013).

Further, it is important to mention that two concepts are popular for dealing with the integration of environment related issues in the scientific literature of PI, namely Environmental Policy Integration (EPI) and Climate Policy Integration (CPI). Jordan & Lenschow (2010) define CPI as a novel term which goes beyond the scope of EPI and takes the more recent discussion of climate change into account (Adelle & Russel, 2013). In the recent past the term environmental has repeatedly been replaced with climate in order to highlight the need for mitigation and adaptation policies as to combat climate change and its impacts (Lafferty, 2004). Thus, CPI describes the process of integrating climate policies into other (non-) environmental sectors in order to enhance the leverage and the coherence on one hand and to minimise trade-offs and conflicts among policies with similar targets on the other (Klein et al., 2005; Mickwitz et al., 2009). Since the focus of this thesis will be on integrating adaptation policies, the concept of CPI will be used in examining the integration of adaptation into sustainable development policies.

Neither adaptation nor sustainability policies can be dealt with independently from other policy fields as both the consequences of climate change and sustainability are touching multiple sectors likewise (UNFCCC, 2005). Maladaptation and trade-offs are two considerable characteristics of adaptation policies which can be either prevented or better dealt with due to the integration into other related policy sectors (Tompkins et al. 2008, Barnett and O'neill 2010 in Serrao-Neumann et al., 2015). Maladaptation can be described as the adverse effect adaptation measures have on decreasing vulnerability of systems, people and places (Barnett & O'Neill, 2013; Juhola et al., 2016). A potential trade-off of adaptation and sustainability policies can be derived from the conflicts arising from increasing areas for green and blue infrastructure versus creating space for new buildings. Here trade-offs are required to meet both targets.

Given the inherent nature of adaptation policies and the wide range of topics it entails, their success depends on the integration of adaptation policies into other relevant sectors (von Lüpke, Well, 2019; in Tosun, Lang, 2017; Ahmad, 2009). In order to do so, PI has to be conceptualised as will be done in the following chapter.

2.3.1 Conceptualising policy integration

Different researchers developed frameworks to conceptualise PI such Candel and Biesbroek (2016), Underdal (1980) or Briassoulis (2004). The former duo divided PI into four dimensions: policy frame, subsystem involvement, policy goals and policy instruments, while Underdal (1980) defines only three criteria that need to be met as to archive PI: comprehensiveness of the inputs, aggregation to a common measure to reach the goal, and consistency of the output. Briassoulis' (2004) framework is based on a multitude of indicators such as policy object, goals and objectives, actors and networks, procedures and instruments. As the aim of this research is to analyse PI and the influence of actor collaboration on this process Briassoulis' (2004) methodological framework to analyze policy integration has been chosen to conceptualise PI. This selection was made given the "[i]nstitutionalist, actor-centered perspective" (p. 14) of her framework which provides a comprehensive approach to analyse the degree of integration among two policies and on top of that offers solutions to enhance integration. The framework describes actors as "reflective beings" that are actively shaping policies and policy procedures through their action. Policy actors and their relationship among each other are a main component of the research at hand as to better understand their influence on the PI process on the local level. Emphasis has been put on policy actors as they are the main contributors and components of policy making processes in direct, indirect, formal or informal way (Shannon, 2003). The term actor encompasses a broad spectrum of individuals or groups from governments, public administration, businesses, NGOs or civil society and takes different roles in the policy process (Shannon, 2003). Depending on their background and relationship to the process, the role of actors varies greatly from being directly involved in defining and evaluating policy goals to being affected by the outcomes of a policy (Shannon, 2003). Popoola (2016, p. 47, 49, 50) distinguishes between different kinds of actors such as primary policymakers, administrators or citizens. As the name indicates, primary policymakers are usually engaged with formulating policies, while administrators are defined as supplementary policy makers who are dependent on primary policymakers to give them authority to act. Despite their dependence on the higher level, administrators are increasingly gaining importance that "transcended mere implementation of policies" (Popoola, 2016, p. 49). Citizens in turn represent societies' interests towards the government and by doing this can either indirectly or directly be involved in the policy making process. Despite differences in background and role, they share the motivation to influence the "outcome of a policy process through either direct or indirect action" (Shannon, 2003).

Briassoulis' (2004) framework and PI in general can be seen as a "sustainable answer" to overcome the "sectoralized, uni-dimensional, uni-disciplinary and uncoordinated" (p. 2) nature of policies. Given the aim of this research to better coordinate, mainstream and implement targets, purposes and resources of adaptation into sustainability policies and vice versa, Briassoulis' framework offers a feasible solution to encounter this circumstance. In order to analyse the integration of two policies, the relationship among five components of the object of PI has to be examined. As can be seen in Figure 2, those are the relationships between policy objects, goals and objectives, actors and actor networks, procedures as well as instruments. All components have a direct relationship with the opposing component as well as a cross-relation with at least one non-opposing component (Briassoulis, 2004). Each component of policy A has a direct relationship with the same component of policy B (in this case adaptation and sustainability policies) which determines the degree of integration among both. According to Briassoulis (2004), the likelihood of two policies to be integrated increases the more same components resemble each other. An example: If two policies peruse the same goal such as to secure and expand bicycle and pedestrian traffic, albeit from different motivations, then the probability of these policies to be integrated rises. The more of these direct relationships among components are met, the higher the overall integration. Each component also has at least one cross relationship with a different component. One is the relationship among policy objects and actors: "When the objects of two (...) policies exhibit commonalities it is likely that the policies have common actors, with common interests and outlooks" (Briassoulis, 2004, p. 16).

By focusing on these five main components which are further divided into several sub-components, the comparison and analysis of the integration of two policies follows a clear and stringent way. This makes the framework easy to follow on one hand, yet, due to the multitude of components, rather complex and extensive. This complexity allows the researcher to generate some valuable information about the degree of integration among two policies and additionally insight on how the integration process can be taken further. Based on this, Briassoulis developed criteria for assessing the degree of integration among two policies and draws solutions to improve integration. Such criteria are tightly bound to the aforementioned components with one exception that is not formally assigned to any component, namely general criteria that facilitate PI when satisfied. As examples for general criteria, Briassoulis (2004) lists "political commitment and leadership for PI in general" or "Favourable policy tradition and administrative culture" (p. 22). Criteria related to the components are predominantly met when the same components show congruence or compatibility. This can either be common actors, complementary policy goals or resembling policy instruments. Moreover, administrative capacity for PI, or political leadership are criteria that have to simply be existing (Briassoulis, 2004).

Generally speaking, the integration of two policies can be determined as successful, the more criteria are satisfied. In turn criteria that are little to not satisfied at all can be evident for further improvement of integration. This enables the researcher to develop recommendations and assistance for municipalities for the process of PI of local adaptation and sustainability policies can be generated.

2.4 Collaborative Governance

Drawing on the presented literature, collaborative governance (CG) can be conceptualized as an important feature for cross-sectoral policy integration (PI). Consequently, Briassoulis' (2004) framework for PI will be enriched and supplemented by the concept of CG as it allows to distinguish actors and their influence on policy and governance processes. Given the strong focus on actors and collaboration among them, this concept is of high relevance for answering the research question. Briassoulis' concept by itself indeed considers actors as a crucial component of PI, yet their collaboration is not reflected upon. To fill this gap, the concept of CG will be used to enrich the analysis of actors and their collaboration. In the following an overview about the concept of collaboration will be given and argues in what sense the concept contributes towards answering the research question.

The origin of CG lies in the field of education and health, however due to its scientific usefulness it has spread to the sector of planning and environment where it is known under a wide range of names (Kirk, Emerson & Gerlak, 2014). At the heart of this concept lies the interaction of actors across different levels of government and spheres. People from public, private and civic sphere are thus engaging in various processes and structures of public policy (Emerson et al. 2012, p. 3 in Emerson & Gerlak, 2014). This is a crucial element of Briassoulis' (2004) framework who refers to actors as actively



Figure 1: The object of policy integration by Briassoulis (2004)

shaping policies and policy procedures through their actions. Her actor-centred approach can be further deepened by connecting it with the theory of CG. In order to delve deeper into actors included

in the process and their relation among each other, CG presents itself as a useful tool. Through the incorporation and collaboration of different stakeholders, better informed decisions and plans can be ensured as well as an increasing quality of their implementation. This makes CG a flexible and responsive approach to adequately carry out public purposes such PI (Emerson et al. 2012, p. 3). Moreover, the concept is thought of as more responsive and flexible to change and uncertainty in public policy processes (Emerson & Gerlak, 2014). However, giving all stakeholders a fair voice in the decision-making process turns out to be complicated and conflicting. This is on one hand due to the varying perception of problems and goals as well as the unequal capacity of groups or individuals to advocate for their interests and priorities towards other stakeholders (Challies et al., 2016). Another cause is the high ambiguity of the roles of stakeholders (Emerson & Gerlak, 2014). The biggest problem emanating from CG is that weak stakeholders are often unheard which leaves stronger stakeholders exploiting their power to manipulate and influence the process and outcomes. A fair and meaningful distribution of power among all stakeholders is thus of high priority for CG (Emerson & Gerlak, 2014).

Multiple actors with administrative, policy, non-governmental and private backgrounds are included in the process of public policy making and implementation and thus bringing a wide range of ideas, demands and topics into the process. Consequently, CG is key for establishing and ensuring a collaboratively accomplished consent-seeking discussions (Ansell & Gash, 2007).

2.4.1 Conceptualising Collaborative Governance

Collaborative governance as a subject is dealt with by many scholars and researchers. Two different frameworks of CG have been considered for this research, one of which is the integrative framework for collaborative governance developed by Emerson et al. (2012) as well as the model by Ansell & Gash (2007). The former is a complex system consisting of system context that allows to define "processes and structures [of actors] across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres" (Emerson, Nabatchi, & Balogh, 2011, p. 2). Ansell and Gash's (2007) framework is comparably complex and aims at determining whether CG can be successful in a given context. Due to this and the strong focus on collaborative processes among actors, this framework has been chosen. The framwork is shown below (Fig. 2). By means of its four variables starting conditions, institutional design, collaborative process and facilitative leadership the degree of successful collaboration can be examined. If all variables are existing in an adequate and satisfying manner, CG can be considered as successful (Ansell & Gash, 2007). The key feature of this model is the collaborative process that entails the "virtuous cycle of collaboration" and the core values of successful CG: trust, commitment, and shared understanding (Ansell & Gash, 2007, p. 543).



Figure 2: Model for collaborative governance by Ansell & Gash (2007)

The variable starting conditions constitutes conditions which can either foster or hamper collaboration among actors such as Power-Resource-Knowledge-Asymmetries, incentives for and constraints on participation or the prehistory of cooperation or conflict. Those are important components for the analysis of CG, yet they will not be further discussed in this research as it primarily focusses on the collaborative interaction among actors and less on means and incentives to participate or past histories of collaboration. Institutional design states the rules and requirements for collaboration. Collaborative processes is composed of five components which influence each other in a circular way. The first component face-to-face dialogue is an important feature to facilitate mutual trust, respect and understanding. The trust developed through those dialogues in turn enhances commitment to the process as actors are trusting each other's perspectives and interests. Arising from commitment is a shared understanding of the project at hand, possible problems and values. Last but not least are intermediate outcomes which show advantages of CG through "small wins".

Leadership is widely seen as a critical ingredient in bringing parties to the table and for steering them through rough patches of collaborative process; crucial for setting and maintaining clear ground rules, building trust, facilitating dialogue, and exploring mutual gains. The facilitator's role is to ensure the integrity of the consensus-building process itself (Tosun & Lang, 2017).

Having gained a deeper understanding of the key theories allows for a useful combination of both to appropriately answer the research question. Based on Briassoulis (2004), expectations for PI are formulated and tested for their veracity in the analysis. As PI is difficult to assess from the outside, various indicators have been developed in order to effectively measure the degree of PI. A fundamental key expectation guiding through this research is the assumption that the more indicators are satisfied and met, the higher the likelihood or the actual degree of PI. Policy actors play a crucial role on this as they are on the interface of defining the policy itself and its related goals, therefore it can be assumed that the integration of similar policy actors implies that policy goals are similar at its best. A further expectation concerning actors can be derived from Ansell and Gash's (2007) work and implies a linkage between the type of conversation between actors and their commitment to the process. Direct communication preferably in the form of face-to-face dialogues favours actor relationships and fosters the feeling of joint responsibility which ultimately leads to mutual trust and respect among actors. The role of one or multiple leaders in the role as facilitators can help to further improve this relationship by setting clear rules for communication, empowering all actors and facilitate dialogues. This way, trust among the actors is further enhanced and mutual gains can collectively be explored.

2.5 Conceptual Framework

In order to be able to answer the research questions this thesis aims to shed light on concerning the level of PI of adaptation and sustainability policies on the local level and the influence of actor collaboration on this process, a conceptual framework specially for this purpose has been developed. The framework is shown below (Fig. 3) and will be explained in a detailed manner in this section.

The conceptual framework is based on Briassoulis' (2004) Methodological framework to analyze policy integration and inspired by Ansell & Gash's (2007) model of collaborative governance, both discussed in the previous chapter. The outermost box with the dotted line represents the local context in which the case studies are embedded. As all chosen case studies are German cities that met a predefined set of requirements outlines in chapter 3. The context is the city itself and gives insight about political and administrative processes, number of inhabitants, geographic location and other indicators connected to the local context. The inner part of the framework is divided into two blocks that represent both policies to be analysed, namely adaptation and sustainability policies of each city. Each policy will be analysed with regards to the six components: policy object, goals and objectives, actors and actor networks, facilitated leadership, policy structures and procedures and lastly instruments and policy output. The illustration is a composition of the slightly simplified version of Briassoulis' (2004) methodological framework to analyze policy integration which strives to measure the degree of policy integration among adaptation and sustainability policies. However, as the present research focusses on actors and their role in the PI process, Briassoulis' framework has been extended by some crucial elements from the model of collaborative governance by Ansell & Gash (2007). The individual

components of the framework have been further differentiated by adding explanatory indicators in the middle of both policy blocks to further specify the component on the left and right. The six components accompanied by their indicators (which are explained in more detail in chapter 2.6) provide insight into the degree of integration of the two policies.



Figure 3: Conceptual framework (own source) based on Briassoulis (2004) and inspired by Ansell & Gash (2007)

Since the aim of this research is to analyse the degree of PI among adaptation and sustainability policies and, based on the outcomes, to determine factors that are facilitating or hampering the process of PI with a special focus on actors, the framework developed by Briassoulis (2004) was altered in order to make it more applicable and useful for the research at hand. The changes to the original framework and the added components are explained in detail in the following.

The framework is simplified as the original framework foresees to compare not only opposing components but non-opposing components as well, e.g. it not only compares policy object with policy object but policy object with goals and objectives as well. The framework was simplified insofar as to examine the direct relationship among similar components only, as adding the cross-relations would exceed the scope of this research. However, the discussion part (Chapter 5) reflects on certain key cross-relations, e.g. between actors and goals or actors and leadership. In order to allow for a clear and structured analysis, those cross-relations are not part of the conceptual framework. A minor change has been made by renaming policy object to elements of policy as to simplify the meaning of this component. Moreover, it seeks to prevent misunderstandings as Briassoulis' (2004) framework is named the object of policy integration which again entails the component policy object.

In order to analyse involved actors and their collaboration in the policy processes, certain parts of the model of collaborative governance by Ansell & Gash (2007) are utilised and integrated into the conceptual framework. Firstly, the element face-to-face dialogue has been added to the component actors and actor networks as the collaboration among actors builds heavily on face-to-face conversations among them. When analysing actors and their roles, face-to-face dialogues are an important element to break down barriers and develop trust, respect and understanding for each other and the process (Ansell & Gash, 2007). Thus, it may be concluded that including the element face-to-face dialogues is considered important for analysing PI.

To put further emphasis on involved actors and their roles, the second added component is facilitated leadership which is a crucial component for this research due to several factors. Jordan and Lenschow (2010) found that political leadership often is a precondition for successful PI, yet not sufficiently researched in the existing literature on this topic. Here, the term facilitated leadership is being used as according to Ansell and Gash (2007), "facilitation is the least intrusive" (p. 12) form of leadership in charge to ensure the "integrity of the consensus-building process itself" (p. 12). The authors describe leaders as crucial in uniting involved parties and stakeholders in a collaborative manner. Through their work they bring actors together, engage them with each other and steer the process. Chrislip and Larson) 1994 agree to this by describing leaders as stewards of any policy process that are promoting and safeguarding the process respectively. Since actors are playing a prominent role in this research, the determination of leaders among them cannot be left out. It is important to ascertain who and how many leaders are integrated in the process of PI in order to obtain a full picture of actor involvement and their role in this process. Next to leading and monitoring the process, leaders are assigned further tasks such as ensuring that all actors are given an equal voice. Particularly weaker stakeholders have to be empowered and represented as much as more powerful ones. Moreover, leaders are key in

ensuring that the rules are clear and complied with and support the trust building among actors (Ansell & Gash, 2007).

Additionally, a third change has been made to the original framework by combining policy output with the already existing component instruments. In order to define policy output, the definition by Schaffrin et al. (2015, p. 258) is employed, who describe it as the "actions of policy decisions of governments resulting from the policy process in which political actors interact, communicate, and bargain (...)". To express this in simpler terms, Knoepfel et al. (2011) refer to policy output as the "final products of political-administrative processes" (p. 161). This can be seen as supplementary to Briassoulis' component intruments which can be defined as means to reach successful PI (Briassoulis, 2004). Policy instruments aim to foster the effect of the policy itself and policy output refers to those actual outcomes achieved by this. Hence, from a methodological point of view they operate complementary, and will be examined jointly.

By means of analysing and comparing the different components of the framework, information about the degree of integration between both policies at hand can be obtained. Comparing the elements of both policies implies paying close attention to the similarities or differences of four different indicator. First, the policies' scopes, that is, the contents and topics it encompasses; second, the facets of problem situations at hand; third, the system of temporal and spatial reference and lastly, cross-scale integration of local and glocal issues. As already outlined in the previous section, generally speaking, it can be said that the greater the congruence of the different components, the higher the likelihood of the two policies to be successfully integrated.

The second component is actors and actor networks that is composed of four indicators: internal and external actors, actor networks as well as the relationship, communication and interaction among them. Actors too are suppose to be common in the sense that they share the same background. For internal actors this implies actors from common government departments. External actors are supposed to come from the same external institution whether this are universities, NGO's, civil organisations and the like. Briassoulis' (2004) indicates that PI benefits from "cooperative, collaborative, non-conflicting, and non-adversarial" relationships among actors (p. 15), however, does not offer further specifications on how to measure the relationship among actors. This is where Ansell and Gash's (2007) framework for CG gains importance: adding components of their framework allows for a comprehensive and detailed analysis of actor collaboration and their impact on the PI process. The relationship among the actors is analysed by means of Ansell and Gash's (2007) component faceto-face dialogues. Direct communication such as face-to-face dialogues are an important factor for PI as they favour actor relationships by breaking down communication barriers and facilitates the feeling of joint responsibility which ultimately leads to mutual trust and respect among actors (Ansell & Gash, 2007). Here another expectation from the previous section can be seized, namely that the existence of common actors usually results in common goals. This expecation will be tested for their verity in the discussion section.

Subsequently the component facilitated leadership will be explained. Despite political commitment and leadership for PI indicators from this section are predominantely derived from Ansell and Gash's (2007) work. According to Ansell and Gash (2007) leader are crucial for uniting different actors and steering them collectively through the process. Instead of relying on one leader, multiple leader may further enhance successful collaboration. Consequently, determination and number of leaders is an important indicator. Effective collaborative leadership aims to measure the success leader have in steering processes.

Policy structurs and procedures consist of administrative capacity, that is, a "central unit entrusted with supervision, coordination and implementation" (Briassoulis, 2004, p. 22) of policies processes, procedures and rules of decision-making in competent administrative bodies and joint decision making and joint responsibilities.

When it comes to policy instruments Briassoulis (2004), the type of instruments and their relationship as being compatible, non-conflicting and mutually reinforcing policy instruments as facilitating PI (Briassoulis, 2004). Moreover, she states that the "use of one policy as an instrument to achieve the goals of another policy" is further enhancing PI. For example, water- or soil-related goals might benefit from policies aiming at biodiversity protection and vice versa. Policy output is the last indicator and represents the actual outcome of the policies that should ne non-conflicting at best.

The framework as shown in Figure 3 constitutes extensive and comprehensive criteria to determine the degree of PI among adaptation and sustainability policies and further offers possible points of departure to improve PI by highlighting factors that either facilitate or hamper integration. By combining both frameworks it is possible to analyse the degree of integration among the two policies at hand and simultaneously determine actor collaboration in the given municipality. The desired outcome gives information about the interplay between the analysed factors and ultimately helps to answer the research question.

2.6 Operationalisation

In the following the components of the conceptual framework will be operationalised. With this operationalisation the researcher hopes to make more firm statements about the degree of integration of both policies and the role of involved actors and explore patterns that ultimately enable results and findings that help answering the research question. In order to make the conceptual framework more applicable for the research at hand, a multitude of different indicators to operationalise PI have been developed.

As illustrated in the conceptual framework, PI can be measured by means of the relationships among the six components policy objects, goals and objectives, actors and actor networks, facilitated

leadership, procedure as well as instruments and policy output. Indicators to determine the degree of PI are predominantly derived from Briassoulis' (2004) work on PI and supplemented by certain elements originating from Ansell & Gash's (2007) model for collaborative governance. Some of the indicators mentioned by Briassoulis (2004) are being left out completely as their relevance is too limited for answering the research question of this work. Examples for this are flexible general taxation, environmental and/or social fiscal reform or use of financial mechanisms/ incentives. Their strong focus on financial topics are of low relevance for the research at hand. The component policy output was added to the existing framework by the researcher as the analysis of the actual outcome of the policies are thought to be important for this work.

The following table shows the different indicators for each of the components that have been developed to measure the degree of PI among adaptation and sustainability policies.

| Component of | Indicators | Requirement for PI |
|---------------|--|--|
| PI | | |
| Elements of | Scope of policy | Scope of both policies are common |
| Policy | Perception and aspects of the problem | Perception and aspects of problem are |
| | situation | common, complementary or non-conflicting |
| | Systems of reference | Same or compatible spatial and temporal |
| | | systems of reference |
| | Cross-scale integration | Integration of global and local issues exists |
| Goals and | Goals and objectives | Common, shared, compatible and/or |
| objectives | | complementary policy goals and objectives |
| | Measurable, indicator-based targets and | Must be existing |
| | timetables | |
| Policy actors | Internal actors | Actors share same background (from common |
| and networks | | government departments) |
| | External actors | Actors share same background (same external |
| | | institution such as universities, NGO's, civil |
| | | organisations and the like) |
| | Actor networks | Coordination and crossovers between |
| | | networks from both policies sectors |
| | Relationship among actors (Face-to-face | Cooperative, collaborative, non-conflicting, and |
| | dialogue) | non-adversarial |
| Facilitated | Political commitment and leadership for PI | Must be existing for both policies |
| Leadership | | |
| | Determination and Number of leaders | One or multiple leaders steering with |
| | | coordinating function |

Table 1: Operationalisation

| | Effective collaborative leadership | Adequate management of the collaborative |
|---------------|--|--|
| | | process, ensuring successful collaboration |
| Policy | Administrative capacity | Central unit entrusted with supervision, |
| structures & | | coordination and implementation exists |
| procedures | Procedures and rules of decision-making in | Consistent, compatible and coordinated |
| | competent administrative bodies | procedures and rules |
| | Joint decision making and joint | Must be existing |
| | responsibilities | |
| Policy | Types of instruments | Common and Compatible instruments |
| instruments & | | |
| Policy Output | Actual Outcome of Policy | Non-conflicting outcomes |

3 Methodology

The previous chapters have outlined the context in which this thesis is placed. This chapter serves to explain the overall methodology chosen to more appropriately test the hypotheses and answer the research question and the sub-questions. First, the underlying philosophical assumptions and their subordinated dimensions ontology, epistemology and methodology will be defined (3.1). This is followed by the research method and the design (3.2), that is, the overarching strategy and rationale that guides the process of conducting the present research. Subsequently, the case selection (3.3) will be set out including a brief overview of the selected case studies. Then the chosen approach of collecting data (3.4) is supplemented by an explanation concerning the selection of the interviewees. In the following, the analysis of the afore gathered data (3.5) is briefly explained. Finally, the reliability and validity of this research (3.6) are considered in order to set out expectations and limitations of the research at hand.

3.1 Research philosophy

Each scientific research has an underlying research philosophy that guides the researcher in conducting her research. These research beliefs are divided into three dimensions, namely the ontology, epistemology and methodology of the research. Those are in turn made up of research paradigms that constitute a set of "basic beliefs" (Guba & Lincoln, 1994, p. 107) and represent the way the researcher perceives reality. The concept ontology deals with the nature of reality and whether it is believed reality is an external singular entity or is a multifaceted construct (Guba & Lincoln, 1994; Hansen, 2004). This research builds on a constructionist ontology, since constructivism rejects the idea of a single reality and assumes that reality is a subjective entity individually constructed through social

interactions. Reality therefore, can differ from individual to individual and is always created through the interactions with other people and thus a product of mutual understanding (Bryman, 2012a; Guba & Lincoln, 1994). This thesis follows this approach as it tries to entangle the different realities constructed by each individual through social interaction in direct and indirect manners. Direct ways of examining such realities are the interactions between the researcher and the interview participants, here the interview participants, which constitute the main source of information for developing a deeper understanding of the research question at hand. Analysing the interaction of actors involved in the process of policy integration (PI) can be considered as an indirect way of studying such realities.

Epistemology is concerned with questions about what knowledge is and how we can know about it (Creswell & Poth, 2018a). Constructivism also fits in the epistemological framework of this thesis as it emanates from the assumption that the engagement with others generates knowledge in an coconstructed manner (Guba & Lincoln, 1994). Generally speaking, it can be said that constructivism views people as reflective and social beings that construct their own perception of the world and constantly refine this perception based on previous subjective experience and the way those are processed (Creswell & Poth, 2018b). Since policy processes are constructed rather through social interaction and practices than given by nature, e.g. through the interaction of various actors within those processes, the definition of reality and the way we can know about it offered by constructivism is a sensible way of studying the topic at hand. Actors knowledge about PI is being constructed cooperatively through the engagement among social beings. Enhancing PI through successful collaboration among actors thus requires a point of view that considers human interactions and different subjective views of the same situations.

The last paradigm of the research philosophy is methodology which entails different research procedures and will be addressed in detail in the following sub-chapter.

3.2 Research method and design

The ontology and epistemology presented above are key in determining the chosen research method. Both call for a research method that "emphasizes words rather than quantification" (Bryman, 2012, p. 280). Therefore, in order to successfully measure the degree of PI, this research intends to qualify results rather than quantify them. This connects with the aforementioned research philosophy, as different realities are constructed through social interaction. Furthermore, given the interpretative nature of this research, the use of qualitative research methods is identified as most appropriate. The results gathered from both the interviews and document analysis are interpreted by the researcher in order to derive knowledge and information about PI from such data. In this regard, qualitative research focusses on "understanding (...) the social world through an examination of the interpretation of that world by its participants" (Bryman, 2012, p. 280) and by this assumes that social reality cannot be detached from the individuals shaping it.
As a first methodological step, an extensive and profound literature review was conducted in order to shape the context of the study at hand and give a systematic overview about the theoretical framework it is built on. Here, the focus lies on the two concepts of adaptation and sustainability as well as the main theory of PI which is supplemented by the theory of CG. In a second step, in order to delve deep into the gathered information and develop an understanding of underlying relationships among the topics studied, multiple case studies have been analysed. Given its detailed and applied nature, case study research seems appropriate in examining the relationship and collaboration among actors in the given policy context (Denscombe, 2017). Blatter and Haverland (2012) support this by describing case study research as "an intensive reflection on the relationship between concrete empirical observations and abstract theoretical concepts" (p. 19). To engage in-depth with the issue being studied and to account for its nuances and complexities, this method provides a promising opportunity to gather valuable data to test the conceptual framework (section 2.5). Case study research is further helpful for understanding certain "parts of a case within the context of the whole" (Vaus, 2001, p.231). As PI as a whole is too broad to be subject to an in-depth investigation, this research places particular attention to the specific aspect of PI of adaptation and sustainability policies on the local level and the involvement of actors in this process. Thus, deploying case studies helps the researcher to arrive at a deeper understanding of how CG facilitates PI in a given context (Yin, 2003). A further characteristic of case study research is that it is mostly used for small-N research which reflects the nature of the presented study (Blatter & Haverland, 2012). Case studies can vary in nature from being explanatory, descriptive or exploratory (Creswell & Poth, 2018). As the research at hand aims at exploring the relatively new field of local PI and the role of actors in this process, exploratory case studies have been chosen.

The research design supports the researcher in linking the gathered data with the research question guiding the research (Yin, 2003, p. 19). According to Aberbach et al. (2002) the study has to be designed according to the purpose of the research, that is, to determine the influence actors have on PI.

A deductive research design is adopted due to several reasons: the present research starts off with a broader account of the topic and gradually narrows it down by making use of supporting theories. Consequently it arrives at a own conceptual framework developed by the researcher on which the collected data will be applied (Thiel, 2014c). In order to avoid inaccuracies in deductive research designs, expectations are formulated and tested with the developed framework (Thiel, 2014c).

3.3 Case selection

Choosing the right selection of cases is key in determining the quality of the research. For this, the researcher has to make several decisions (King, Keohane & Verba, 1994). First of all, the unit of analysis has to be decided on (Bryman, 2012a). As this research aims at investigating the role of actors in PI on the local level, the case to be studied is a city with sophisticated adaptation and sustainability policies.

Within this case special attention is being paid to the actors that are involved in the adaptation and sustainability policy processes to ultimately examine their influence on the process.

Secondly, the technique of case selection has to be determined. Gerring (2007) identified several characteristics of cases such as typical, diverse, extreme, deviant, influential, crucial, pathway, mostsimilar and most-different cases. For this research the typical case techniques seem to be fitting. Typical cases are usually of representative nature and sampled in a purposive manner. The aim of such a study is to explore as to how a case is typical for a certain phenomenon (Gerring & Seawright, 2007). As mentioned in the previous section, this particular research is defined as being exploratory. Moreover, this technique fits this research in the sense that typical cases were selected with regard to local adaptation and sustainability efforts. The researcher has identified a particular outcome (in this case PI) and perhaps expectations which she wishes to investigate (see end of chapter 2.4) and looks for a typical example of that relationship (city with both strategies). Typical cases, that is, cities that developed both kind of policies, are analysed as the focus lies on the integration of that particular policies. Moreover, this technique is especially fitting for testing expectations, which this research aims to do (Gerring & Seawright, 2007).

Subsequently, the researcher has to decide on the number of cases to be studied. While findings of single case studies often run risk of being biased by the researchers subjectivity, the external validity suffers as well since the findings cannot be compared with other cases (Yin, 2003). In order to avoid these problems and to enhance the reliability and validity of the generated results, multiple case studies are conducted with three German cities as cases. Deploying a multiple case study enhances the generalisability of findings, that is, if the three case studies show similar results, the researcher can assume that those results are likely to be valid for other similar cases as well (Yin, 2003). As the cases are limited in number and selected intentionally based on predefined indicators, this study can be defined as a small-N case selection (Seawright & Gerring, 2008). According to Seawright & Gerring (2008) small-N samples are prone to deliver unreliable results due their small number, however, given their purposive selection, they can still greatly contribute to the research (p.295 f.). To ensure optimally homogenous results, the selected case studies, too, are of homogenous nature (Yin, 2003). According to the techniques deployed in typical case studies, the cases will be purposively selected based on a similar and comparable context, that is, the cities show comparable high efforts in the field of local climate adaptation and sustainability. The efforts manifest themselves in the existence of adaptation and sustainability policies. It is important that the examined cities implement those policies in order to be able to analyse how both can be integrated. Further, indicators such as the number of inhabitants, political and administrative processes, institutional circumstances and the geographical location are taken into account.

Taking into account these requirements the cities of Nuremberg, Bonn and Freiburg were selected. The reason for this choice was twofold: firstly, they matched the indicators set out in the beginning. All three cities show similarities in population size, political and administrative processes, economic and institutional circumstances and most importantly in adaptation and sustainability efforts. All the cases can be seen as best practice examples when it comes to local sustainability strategies and efforts.

3.3.1 City of Nuremberg

The age structures are balanced with the majority of the population being between 34 and 64 years old (Amt für Stadtforschung und Statistik, 2019). Since 2020 the Christian-socialist Markus König governs the city and replaced the social democrats after many years of being in charge. Since a couple of years the city benefits from a strong financial household (Axians IKVS GmbH, n.d.). The city administration is divided into six departments of which each contains various subordinate offices. The focus of the present thesis will be on the Department for Environment and Health as the offices of interest, since the Office for Local Agenda 21 and the Environment office are located in this department. Since many years, the city has been exceptionally dedicated in both climate adaptation and sustainability, shown by the long history and the magnitude of both policies. The city council decided to implement the Local Agenda 21 and its goals in Nuremberg as early as 1995, which is exceptional as the original Local Agenda 21 was only developed 3 years prior to this (Stadt Nürnberg, 2020). Climate adaptation, as a younger topic, received attention since the year 2009 which is comparably early as well taking into account that the first adaptation strategy for Germany was only published one year earlier (Stadt Nürnberg, n.d.). Next to this long tradition of engaging with both topics, the great magnitude of both policies is proven by a wide number of policy documents concerning adaptation and sustainability. Given this dedication, Nuremberg was chosen as a case study of this research. In the sections 4.1.1 and 4.1.2 Nuremberg's adaptation and sustainability policies will be further described and analysed.

3.3.2 City of Bonn

Bonn is the former German capital and nowadays still the country's second political centre. It is located in the west of the country and has a population of more than 330.000 inhabitants with an with increasing tendency (Bundesstadt Bonn, 2020a). In 2015 the Christian-democrats won the mayoral elections and replaced the social-democrats after governing for 21 years (SPIEGEL, 2015). Since the last few years Bonn's budget has been stable and in the black. For the coming years the city plans to continue making no debts (Axians IKVS GmbH, n.d.). This has a positive effect on financing adaptation and sustainability policies. The spending's for environment-related issues maintains to be constant between EUR 3 and 4 million since 2017 (Axians IKVS GmbH, n.d.). The coordination of both adaptation and sustainability lies within Department III out of the five local departments with 38 offices.

Bonn, too, proves great commitment to the implementation of both adaptation and sustainability policies. Opposed to Nuremberg, Bonn's commitment for adaptation and sustainability is not based on a long tradition of both, but rather found in its great variety in policies. Next to an extensive and comprehensive strategy alighted to the SDGs, the city published sustainability reports, set up a sustainability network with several actors from public, private and civic institutions, participated in the

pilot project Global sustainable community in North-Rhine Westphalia and was rewarded several times for its engagement in the field of sustainability (Bundesstadt Bonn, 2020h). Compared to climate mitigation, adaptation in Bonn is still in its infancies. Yet, adaptation gains increasing attention which is demonstrated in the integrated climate mitigation and adaptation concept that was published in 2013 (Greiving & Fleischhauer, 2013). Also the mission statement concerning climate topics incorporates adaptation as an equal part to mitigation (Bonn, 2019). What makes Bonn exceptional and greatly supports the implementation of both policies is its outstanding civil engagement for both topics. More about Bonn's climate adaptation and sustainability policies can be found in the analysis in section 4.2.

3.3.1 City of Freiburg

Freiburg is a young and dynamic city with a large share of 31% of its 231.200 inhabitants being between 25 and 45 years (Stabstelle Nachhaltigkeitsmanagement, 2018). Given its high quality of life the numbers of inhabitants are steadily growing over the last decades (Stabstelle, 2018). In 2018, the independent mayor Martin Horn was elected as one of the youngest reigning mayor of a German major city and represents the dynamics for which Freiburg is known in the national and international context (Stabstelle, 2018). As the distribution of seat in the local parliament shows, the political situation is in favour for sustainability and climate related topics. The local parliament is composed of 11 seats for the green party, nine seats for the Christ-democrats and eight for the social democrats (Stabstelle, 2018).

The administrative capacity of Freiburg consists of a total of five departments with almost 40 offices and 3,800 municipal employees that run the day-to-day business (Stabstelle Nachhaltigkeitsmanagement, 2018). Not only the staff resources, also financial capacities seems to be well developed: in 2017, Freiburg received EUR 828 million and spent EUR 787 million, which left the city with a positive budget at the end of the year (Stadt Freiburg i. Br., 2017). For 2019/2020 the budget with the volume of more than EUR 2 billion and EUR 258 millions respectively of investments has been approved by the municipal council (Freiburg, 2017). Interesting for the research at hand are department I, II and V as they are in charge of the city's climate adaptation and sustainability policies. The latter, however, stretches through all municipal departments and offices with Department I in the coordinating role. For the 2020 budget, department II was allocated the largest share of funds with round about EUR 305 million. Department I and II received the smallest budget with EUR 66 million and EUR 186 million respectively (Freiburg, 2019, p. 201).

Within the administration as well as within the society and private field, Freiburg presents itself as highly engaged in both fields under research. In 2012 already, the WWF praised Freiburg as "the single best city for sustainable urban development" (Thomas, 2012). Several national and international cities are taking the city as an role model for successful development with regards to sustainability and climate related topics (Greenhouse, 2017). The city has been working on adaptation issues since 2007 with a focus on decreasing urban temperatures and heat (berchtoldkrass space&options, 2019).

Similar things can be said for the field of sustainability. Next to sustainability goals exclusively developed for Freiburg that are closely aligned to the SGDs the city regularly publishes sustainability reports that monitor the process and inform the public about such processes (Stabstelle Nachhaltigkeitsmanagement, 2017, 2018). Striking is Freiburg's exceptional high concentration of professionals working within the realm of sustainability and climate-related topics (Greenhouse, 2017). This is supported by a very active civil society (Sustainability manager, personal conversation, June 10 2020).

3.4 Data collection

Case studies can include different forms of data collection such as interviews, observations, focus groups or document analysis. This research made use of triangulation, that is, more than one method has been employed to generate data. By using triangulation the reliability and validity of the findings can be enhanced through "double checking (...) the data collection and research results" (Thiel, 2014a, p.52). That is, if the same conclusion can be drawn from different research methods, the veracity of the results increases (Thiel, 2014a). Further, triangulation counteracts the "one-sided methodological view" (Thiel, 2014a, p.87) case study research is often criticised for. In this case the sources are both of primary and secondary nature and include extensive and profound document analysis as well as semi-structured interviews. The triangulation also manifests itself in interviewing actors from different spheres, rather than from the same group. The selection of interviewees is further described in the following section. In order to arrive at a comprehensive result, it is important to amalgamate the outcomes of the analysis eventually (Shoaib & Mujtaba, 2016). As a first step of data collection an extensive document analysis of secondary data was conducted. While documents such as (online-)research article and books were key in gathering general information about the various topics included in this thesis, reports and policy document from the cities selected as case studies helped to collect specific information about the processes and actions in the cities themselves.

According to Denscome (2012) it is important to consider the authenticity, representativeness and validity of the documents in order to assure the collected data fits the research in the best possible way. Besides the document analysis, interviews were used as a way to gather primary data that support and enhance the results from the document analysis. Like the analysis of municipal reports, also interviews enable for an in-depth understanding of the specific situation in the city itself. In order to arrive at a deep understanding of the situation, Mahoney (2007, p. 39) advises "interviewing those involved on all sides, asking them what they were trying to make happen, and then seeing what actually occurred". Indeed, interviews are particular fitting for small-N studies such as the one at hand (Blatter & Haverland, 2012). In order to allow the interviews to be more open to various outputs of the conversation, semi-structured interviews were conducted (Bryman, 2012b). Semi-structured interviews are characterised by open questions about specific topics that allow the researcher to

spontaneously go deeper into a certain topic if it adds additional and unexpected content to the research (Thiel, 2014a).

As a crucial part of this research, interviews with key persons from each policy field in each city respectively have been conducted. Attention was paid on their position and remit within the city in order to ensure receiving similar information for each policy field in each city given the respondents resembling background. The position of each respondent is summarised in the following table:

Table 2: Position of interview respondents

| City | Policy field | Position of respondent | |
|-----------|----------------|--|--|
| Nuremberg | Adaptation | Coordinator of local climate change adaptation | |
| | Sustainability | Coordinator of local sustainability strategy and efforts | |
| Bonn | Adaptation | Coordinator of local climate change adaptation | |
| | Sustainability | Coordinator of local sustainability strategy | |
| Freiburg | Adaptation | Climate adaptation manager | |
| | Sustainability | Sustainability manager | |

Concerning the interviews, every interviewee was asked for permission to record the interview prior to recording. Moreover, he or she was informed that they could interrupt or abort the interview at any time and not need to answer questions if they do not want to. Finally, each interview participant was assured that their names would remain anonymous and transcripts would not be made publicly available. In order to avoid that interviewees may possibly be retraced, for instance due to disclosure of their job description at the cities, neither the latter information nor data on gender or age has been released. In the analysis, the respondents will be referred to as stated in the table above (see position of respondent).

3.5 Data analysis

After having gathered data from document review and interviews, the next step is to analyse the gathered data in an appropriate manner. Aberbach et al. (2002) ascribe great importance to the coding of interviews especially when open questions were used. As a first step, the interviews were therefore fully transcribed and subsequently reviewed and analysed as to discover possible knowledge gaps that have to be filled. This iterative process included the constant alternation between theory and data to complete the findings. Since all interview followed a predominantly similar structure the analysis of the interview transcripts followed the same procedure. The pre-prepared topic list covered the themes where no data could be derived during the prior document analysis. Given this circumstance, the crucial parts of the respondents' answers were highlighted and commented in order to create an

overview about the gathered information. This process was inspired by open coding and thematic analysis and followed a rather loose structure. First, the researcher familiarised herself with the data by listening, transcribing and reading through it several times. Subsequently important parts were highlighted with commentaries in order to generate a better overview about the topics of the interview. In a last step such comments were unified to superordinate themes related to the individual indicators (Bryman, 2012a; Evans & Lewis, 2018). Like this the researcher was enabled to find the needed information for answering the indicators in a quick manner.

3.6 Reliability and validity

The credibility and trustworthiness of each research depends to a large extent on the validity and reliability of the present research and its findings. First of all, the use of multiple sources of data collection enhances the reliability and validity of the research as the findings are not exclusively based on a single data source. As already explained in the previous sections the sources used are document analysis and semi-structured interviews with key respondents. The latter further ameliorate the reliability of the findings as special attention has been paid to the selection of the respondents in order to ensure high relevance of the gathered data. Consequently, exclusively people in charge of adaptation and sustainability respectively have been interviewed (see Ch. 3.4).

According to Yin (2003) case study research must contribute to constructed, internal and external validity and reliability. The constructed validity requires that "correct operational measures" are being studied (Yin, 2003, S. 34). For this, a specific phenomenon has to be connected to the main objective of the research. In this research, the role of actors within different cities was related to the process of PI of adaptation and sustainability policies. Given the explorative nature of this research, internal validity plays a less important role as it refers to the logic of the presented explanations (Yin, 2003). External validity indicated whether the findings can be generalised and replicated to a broader domain beyond the case under study (Yin, 2003). The external validity of the research at hand lies within the carefully selected case studies and their representativeness for a larger group. In this research three German cities have been selected as case studies based on characteristics that enhance the generalisation of the findings to a larger sample of other cities. The focus on only German cities and the size between 100.000 to 500.000 inhabitants ensure high comparability and generalisability for other German cities with similar contexts. The cases were selected on the basis of further indicators that facilitate the analysis and comparison of the findings of each case with another. The indicators help to ensure a similar and comparable context of the cities and concern population size, political and administrative processes, economic and institutional circumstances and most importantly efforts towards adaptation and sustainability. All cities matched the indicators set out in the beginning with one exception to the rule which is population size of the city of Nuremberg which, strictly speaking, slightly exceeds the previously defined number of inhabitants. The choice can be explained by the fact that it was extremely difficult to find cities within the size range of 100.000 to 500.000 inhabits that

have developed both an adaptation and sustainability strategy. Since Nuremberg was found as the city that fit best into the size range and has both kind of strategies it was selected as one out of three case studies. The slightly bigger number of inhabitants does not have an impact on the findings and results.

However, as the study at hand is of qualitative nature and the present data was generated from a small sample problem can arise from this. In order to balance out these inadequacies and ensure the data to be free of "errors and biases" (Yin, 2003, p.37), special attention was paid to analytical explanations of the findings.

4 Case description and Findings

The following chapter will assess the degree of integration among adaptation and sustainability policies in Nuremberg (4.1), Bonn (4.2) and Freiburg (4.3). First, an introduction into both adaptation and sustainability policies of each city is given, followed by an analysis of PI based on the priorly conducted document and interview analysis. The analysis of PI pays special attention to the indicators set out in the conceptual framework and the operationalisation thereof. Important to mention here is that each city deploys varying labels to describe their internal administrative structure. In order to allow for the reader to follow and compare the administrative structure of each city the designation of the deviating terms was unified: accordingly, the highest entity within the city is referred to as department with offices being subordinated to the former. One department on average consists of five offices.

4.1 Adaptation and Sustainability in Nuremberg

The high quality of life in Nuremberg can be derived from the exceptional dedication for sustainability and sustainable development of the city as well as the decreasing exposure to negative impacts of climate change that is shown in its multiple polices concerning this (Stadt Nürnberg, 2018; Umweltamt, 2012). For both policy fields comprehensive and extensive measures exist which are successively extended and intensified. Multiple actors are part of such processes and are adding significant value to the outcomes. In the following sections Nuremberg's adaptation and sustainability policies will be described and analysed in detail. Based on this analysis the degree of PI among both policies is assessed.

4.1.1 Adaptation policies

It can be said that climate adaptation has long been a priority in Nuremberg which can be demonstrated by the longstanding efforts in this particular field. Already in 2009, the city implemented climate adaptation as an equivalent component into their climate strategies, that up to this point solely focussed on mitigation. In order to pursue the aim at enhancing the city's adaptive capacity ⁸, in 2011 the council commissioned the department of environment and health to set out measures and targets concerning adaptation that can be achieved by 2050 (Stadt Nürnberg, n.d.). Over the last 11 years the city published numerous objectives, programs and initiatives with regards to climate adaptation. In order to address the impacts and challenges caused by climate change, Nuremberg brought the project "Summer in the city – a sensible approach to climate change" into life. The project was designed to

⁸ Adaptive capacity is "the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences" (IPCC, 2012, p. 1758).

identify dangers and develop measures to counteract them. The increasing heat stress in summer is currently the greatest danger to city and citizens, therefore the central task is to develop and implement measures to reduce the exposure to increasing urban temperatures (Stadt Nürnberg, n.d.). The outcomes of the project were compiled in a so-called handbook with the fundamental aim to decrease the consequences of temperature rise as a result of climate change (Umweltamt, 2012). In order to pursue this goal, the handbook lists measures concerning the main fields of action: urban development and urban land use planning, green space and open space design as well as health care and information. Among others, concrete measures targeting the increasing heat are: the maintenance and development of inner-city air exchange lanes, the creation of public green spaces, adaptation measures on buildings and the effective management of rainwater (Umweltamt, 2012). Next to the handbook, the so called climate roadmap was developed and is currently under revision (Adaptation coordinator, personal conversation, June 3 2020). Like the handbook, it focusses on adaptation measures and particularly on changing the local climatic situation and its nexus with further urban development (Stadt Nürnberg & Umweltamt, 2014). Actors from various backgrounds are involved in adaptation processes to root the topic into the city administration.

4.1.2 Sustainability policies

In 1997 Nuremberg developed its own Local Agenda 21 which is coordinated and run by the city's agenda 21 office. Six years later in 2004, the city committed itself to sustainability and developed indicators in order to adequately measure the process. Since 2009 four sustainability reports were published with the last one being released in 2019. Moreover, Nuremberg is one of the signing municipalities of the model resolution Agenda 2030 by the German Association of Towns and Municipalities. In addition to this, the city received several awards for their exceptional work and activities in the field of sustainability. In 2015 the city was given the title "Eco-model region" as well as "Fairtrade town". The latter was given to Nuremberg again in 2017 and can be seen as both a confirmation and obligation concerning fair trading conditions in the city. Their efforts towards more sustainability were also honoured in 2016 with the German Sustainability Award and a year later with another Fairtrade seal (Stadt Nürnberg & Referat für Umwelt und Gesundheit, 2018). The fourth and at the time of writing latest sustainability report includes the SDGs for the first time and further more than 400 indicators that are recorded and evaluated in an annual interval (Referat für Umwelt und Gesundheit, n.d.).

4.1.3 Policy integration among adaptation and sustainability policies in Nuremberg

In order to assess the degree of PI among adaptation and sustainability policies in Nuremberg, policy documents from both sectors have been examined. The analysed policy documents for adaptation are the handbook on climate adaptation and the climate roadmap published by the city in 2012 and 2014 respectively. The handbook is a result of a research project about urban strategies for climate change in which the city participated and entails building blocks for Nuremberg's adaptation strategy. Based on this, the climate roadmap has been developed, which is being updated frequently, and contains the

two pillars climate protection and climate adaptation for the first time. As documents of sustainability policies, the 4th sustainability report from 2019 and the indicator-system has been analysed. The information gathered from policy document analysis were supplemented by expert interviews with the Nuremberg's coordinator of climate adaptation and the sustainability coordinator.

Elements of Policy

The first component to be analysed is elements of policy. In order to determine them, first the scope of the policies at hand has to be defined. Nuremberg has two comprehensive adaptation policies; the handbook on climate adaptation the climate roadmap (Adaptation coordinator, personal communication, June 3 2020). Both focus primarily, yet not solely on adaptation measures, with a clear focus on heat and heavy rain. The handbook determines 15 measures and each measure sets out its own goals and objectives, which ultimately aim at reaching the same greater cause of reducing the heat stress in the city particularly in summer times. Each measure is explained with regards to its positive climatic effect as well as its planning aspects in order to get a detailed overview of the urgency of the individual measure. Subsequently, local deficiencies are discovered and shown through assessing the necessity of each measure (Umweltamt, 2012). Alike the handbook, the climate roadmap addresses the changing local climatic situation and combines this with urban development. Here too, the aim is to establish measures that are appropriate to this development and can be implemented precautionary (Stadt Nürnberg & Umweltamt, 2014). The scope of the sustainability policy is comparably comprehensive, however summarized in one broad policy document; the 4th sustainability report. This report differs from its predecessors as it is structured according to the SDGs for the first time. The targets of this SDG-report are based on the 17 global SDGs and are amended to serve the purpose of sustainable development of Nuremberg (Referat für Umwelt und Gesundheit, n.d.). Further, the process is monitored and supplemented by a comprehensive monitoring system with 450 indicators that lays the foundation for the reports and provide the data basis for the analyses and evaluations (Sustainability coordinator Nuremberg, personal communication, May 26 2020).

While It can be said that the comprehensive scope of the policies at hand resemble each other, nonetheless they vary in their extent as adaptation policies not yet have established an indicator and monitoring system and thus lack behind sustainability policies. The broad scope and wide range of topics paired with the aspiration of adaptation policies to establish an own indicator and monitoring system, suggests having positive impacts on the integration of both policies.

Similar things can be said about the perception of the problem situation. Indeed, both policies focus on their own set of problems and challenges, however most of them are partly common, complementary or non-conflicting at its best. The main problems perceived from the lens of adaptation are the loss of urban green, increasing heat and heavy rain (Adaptation coordinator, personal communication, June 3 2020). Most of the measures presented in the handbook are targeting these very problems. Naturally, the sustainability policies perceive a broader spectrum of topics as problematic encompassing climate change, migration, unsustainable consumption or unjust work and life conditions (Referat für Umwelt und Gesundheit, n.d.). Here, connections can be drawn between climate change and the loss of urban green and increasing heat and heavy rain as the former is the main contributor for the latter. Moreover, by tackling topics that are regarded as problematic by adaptation policy, the sustainability report implies the existence of a problem behind them. Consequently, a common perception of problems and challenges can be derived from targets and measures. Despite the fact that not each goal of one policy resembles the goals of the other, no conflicting goals could be found, that is, the goals and targets of one policy do not hinder the targets of the other policy from being implemented.

A further component for PI is spatial and temporal systems of reference. Generally speaking, the handbook for adaptation aims at discovering medium- and long-term prediction of climate change and especially of the temperature increase over the next 50 – 100 years. However, it also foresees a continuous implementation without a concrete time limit. The climate roadmap in turn can be seen as a long-term strategy that sets measures and targets to be reached by 2050 (Stadt Nürnberg & Umweltamt, 2014; Umweltamt, 2012). The temporal system of reference of the sustainability policy is comparably equivocal. On one side it takes a similar approach as the adaptation handbook since it does not indicate specific temporal determinations for targets. Rather, they remain in place until they are fully achieved (Sustainability coordinator Nuremberg, personal communication, May 26 2020). One has to consider that the targets are aligned with the Agenda 2030 which foresees the implementation by 2030 (UN, 2015). Hence, it can be assumed that the targets have a similar timeframe.

The determination of the spatial reference system is rather easy to grasp as both policies focus merely on the city itself. To be precise, adaptation policies focus on two distinct urban areas of the city: The Old town and the Weststadt. Those two areas were selected due to their high vulnerability to negative consequences and complex urban planning characteristics. Important to mention is that the measures are transferred to the whole city area (Adaptation coordinator, personal communication, June 3 2020). The targets and measures derived from the sustainability report focus on Nuremberg at large with some small exceptions such as the target to develop partnerships with cities from other countries or continents (Referat für Umwelt und Gesundheit, n.d.).

While cross-scale integration is not considered in any policy documents, the sustainability report repeatedly points out the necessity of jointly tackling global problems and thus commits itself to combatting global problems such as climate change, poverty or education (Referat für Umwelt und Gesundheit, n.d.). As no cross-scale integration for adaptation policies could be found, this indicator for PI cannot be satisfied.

Goals and Objectives

The overarching goal of Nuremberg's sustainability policy is, as the name indicates, the development of the city towards a more sustainable future focussing on social, ecological and economic aspects.

This includes various topics such as health, education, production and consumption, ecology, peace and justice (Referat für Umwelt und Gesundheit, n.d.). The wellbeing of citizens and nature lies at the fundamental level of the sustainability policy. The essence of adaptation policies mainly is of social nature and has citizens and their wellbeing in focus that are jeopardised by the impacts of climate change (Stadt Nürnberg, n.d.). However, most of the objectives improve ecological and economic circumstances as well, yet rather indirectly. For instance, the expansion of green areas primarily targets the reduction of urban heat and limits the vulnerability of people; in an indirect way it also contributes to increasing urban green spaces. Another example are flood protections which ultimately seek to protect people's life, yet also contribute in economic terms as costs of damage are lowered. At a more detailed level, it is shown that both policies integrate the content of each other's objectives into their own. By doing so, they acknowledge and highlight the urgency of jointly tackling common problems. Such common objectives are sustainable urban development, zero-emission transport or health (Referat für Umwelt und Gesundheit Nürnberg, n.d.; Stadt Nürnberg, n.d.). Hence, it can be concluded that both policies concern similar topics and provide a solid foundation for them to be integrated. Despite adaptation policies seeming to be restricted to social aspects a closer look at individual measures proves differently. Consequently, both policies focus on social, ecological and economic aspect with the sustainability policy going more into depth.

After having studied both policy documents intensively, it became evident that neither of the documents set out specific timetables. As discussed earlier, some policy documents indeed mention a timeframe for achieving their goals, however, a further differentiation of these timeframes e.g. in the form of tangible timetables does not exist. When it comes to quantitative, measurable, indicator-based targets especially the sustainability sector stands out with its comprehensive monitoring system with more than 450 indicators to measure the process. Those indicators allow for a comprehensive and clear overview of sustainability actions carried out by the administration (Sustainability coordinator, personal communication, May 26 2020). Adaptation documents do not provide specific indicators. Here, each measure and objective as well as their requirements are briefly outlined, followed by an overview of planning approaches and examples to provide an overview about the necessity and implementation thereof. Lastly, influences that either hamper or facilitate the process and the implementation are explained to avoid conflicting goals and in turn create synergies in order to successfully implement the measure. The information provided is useful and sufficient to offer an understanding of what is ought to be achieved, however the description is lacking quantitative or measurable targets (Umweltamt, 2012). A comprehensive set of Indicator-based targets for sustainability exist, yet not for adaptation. Indicator-based timetables are non-existent in both policies, therefor this criterion cannot be considered as satisfied.

Policy actors and actor networks

Both policy sectors involve several actors with the same background as to enhance synergies among them, foster interdisciplinarity and cross-sectorality and attain the best possible anchoring of the topic in the city administration and the city itself. This leads to a highly interdisciplinary communication

particularly within the city administration as various concerned city departments are held responsible for collectively achieving the planning and implementation of climate adaptation and sustainability in the city. Next to the environment office, actors from multiple administrative offices are involved in the adaptation process such as the urban planning office, health office, office for public spaces (Umweltamt, 2012; Adaptation coordinator, personal communication, June 3 2020). The field of sustainability goes one step further and incorporates actors from all offices into its process. Each office carries own responsibility and freedom to shape their process individually (Sustainability coordinator Nuremberg, personal communication, May 26 2020).

The additional integration of external actors from local universities as well as climate, meteorology and landscape planning offices add supplementary competencies to the process of both policies. In order to gather supplementary knowledge that is locally bound and consequently particularly helpful, more than 80 local actors were involved in the development process of adaptation measures (Umweltamt, 2012). A feasible package of measures could be developed which is based on the practical and technical experiences of the actors involved. Furthermore, a better understanding of the topic itself and constructive discussions about deviating perspectives is achieved. Next to this, citizens and companies play another major role for both sectors (Umweltamt, 2012). It can be said that internal actors from three offices (environment office, urban planning office, health office and, office for public spaces) resemble each other, while external actors of both policies are common too.

Adaptation is considered a sustainability theme that ought to be integrated into current urban development processes (Referat für Umwelt und Gesundheit, n.d.). In order to integrate adaptation as a major sustainability issue into the ongoing processes of urban development, an interdepartmental working group on climate change with representatives from municipal departments and external experts was created (Umweltamt, 2012). The institute of geography of the University Erlangen-Nuremberg worked closely with the municipality in order to develop adequate measures that enhance the adaptive capacity of the city and its citizens (Stadt Nürnberg & Umweltamt, n.d.). A number of initiatives have been launched as part of the sustainability effort. One is the newly implemented *Agendarat* (EN: agenda council) that can be seen as a platform where all initiatives meet several times a year. The Agendarat ensures cohesion and exchange for the sustainability process. Moreover, the climate protection and sustainable development forum was developed which comprises 92 members from politics and administration. They all target sustainability and adaptation likewise and comprise a multitude of internal and external actors and experts (Referat für Umwelt und Gesundheit, n.d.). All networks are intersected by design as they purposely include actors from the other policy field and thus foster integration.

The communication among actors and within the networks are similar for adaptation and sustainability processes. In both cases, communication is predominantly personal and direct, that is, face-to-face dialogues in frequent and infrequent meetings. Direct communication and decision making in form of regular meetings with involved internal and external actors are practiced (Adaptation coordinator, personal conversation, June 3 2020). Face-to-face dialogues also take informal character in form of

unscheduled meetings such as ad-hoc meetings or the informal involvement of citizens. One example for informal meetings are cycling trips done by the mayor as to engage in exchange with citizens about important topics, including sustainability and adaptation. These enable citizens to request information and bring in ideas and concerns. The existence of direct communication suggests a constructive and cooperative relationship among actors as barriers of communication can be broken down and trust among actors develops.

Facilitated Leadership

Political commitment and leadership for PI in both policy sectors exists, yet stronger in the sustainability field than for adaptation. Most of the policies do not directly mention policy integration (PI) as a substantive part of their policies, however, this does not mean integration is not thought of. As proven in this analysis, both adaptation and sustainability policies are incorporating topics of other policy sectors into their own. In particular sustainability policies cover the whole spectrum of topics dealt with in the administration (Sustainability coordinator, personal communication, May 26 2020). Given their close collaboration with each individual department, their political commitment and leadership for PI can be classified as strong. This circumstance seems to be different for adaptation which can be traced back to the rather recent history thereof. The number of offices and departments included in adaptation policies is much smaller compared to the field of sustainability. This might be closely related to the limited range of topics dealt with. Yet, since sustainability offers a relatively high commitment for PI, in particular with the topic of adaptation, integration of both topics can be assumed. Both policy fields show the determination to connect with other policy fields in order to widen and strengthen their own topics.

According to Ansell and Gash (2007) "successful collaborations may also use multiple leaders" (p. 554). This is indeed the case for sustainability policies as their implementation depends on all departments (Sustainability coordinator, personal conversation, May 26 2020). Like this, leadership for sustainability is distributed among the whole administration. The highest leading entity, however, is the environment office. For adaptation, the situation is slightly different: here only few offices within the environment department are carrying out adaptation measures. Leadership also lies within the environment office and specifically with the adaptation coordinator (Adaptation coordinator, personal conversation, June 3 2020). Consequently, both policy fields are relying on multiple leaders rather than one. paired with the fact that the highest leading entities are located within the same department, the likelihood of PI is greatly enhanced.

Effective collaborative leadership is exerted by the environment office as the highest leading entity. Particularly in the different networks, collaborative processes are adequately managed as to ensure plausible decisions accepted by all members. According to (Sustainability coordinator, personal conversation, May 26 2020; Adaptation coordinator, personal conversation, June 3 2020) the relationship and communication among actors in networks is cooperative and collaborative which suggests the existence of effective collaborative leadership.

Policy structures and procedures

Administrative capacity is a key element for PI and lies for both policies within the same department; the department of environment. This promotes the successful coordination and implementation of the policies and moreover functions as a guiding entity in coordinating the further integration of both policies. The environment department upholds the coordinating and administrating function as the leading management authority for both policies and is charge for all tasks and projects concerning environment and sustainability policies (Sustainability coordinator, personal conversation, May 26 2020; Adaptation coordinator, personal conversation, June 3 2020). Within the environment department, the environment office is the primarily responsible entity for implementing and handling adaptation processes, however it includes important other offices such as the health or urban planning office (Adaptation coordinator, personal communication, June 3 2020). Opposed to the sustainability sector, only one person is responsible for adaptation topics. Indeed, this limits the capacity of efficiently and accurately processing adaptation topics. Yet, despite this limitation, the circumstance of having a position exclusively focussing on adaptation topics is a rather rudimentary asset for climate adaptation (Adaptation coordinator, personal conversation, June 3 2020). In the case of sustainability, the environment department brings together actors and networks, coordinates them and monitors the processes. The actual implementation of the individual topics however lies within the different other departments and offices (Sustainability coordinator Nuremberg, personal communication, May 26 2020). This constitutes a distinct difference for both policies as sustainability issues are incorporated into all of the almost 50 municipal departments (Sustainability coordinator, personal conversation, May 26 2020). Given this circumstance, a multitude of municipal actors are responsible for implementing sustainability measures which implies high staff capacities and financial resources to finance the process.

A crucial component of PI are constituent, compatible or coordinated procedures and rules of decision making in the competent administrative bodies (Briassoulis, 2004, p. 23). The procedures and rules of decision making to be found for both policies resemble each other in various ways. Several offices and external actors participate in decision making processes with a coordinating entity, the environment department, supervising the process. The environment department is in charge of uniting important actors and leading the process. Decision making mainly takes places in municipal networks in which responsible persons from important offices as well as external actors and experts are united. In such networks, the voice of each member is taken seriously which attributes to a fair and equal process as joint decision making. The processes seeks to be as consensus oriented as possible and put joint decision making first in order to achieve an outcome that is approved by all participants included (Stadt Nürnberg & Umweltamt, 2014).

Policy Instruments and Policy Output

According to Briassoulis (2004) instruments that are compatible, non-conflicting and mutually reinforcing are one factor leading to successful PI. Instruments found in sustainability and adaptation

policies can be categorized as non-conflicting and reinforcing each other. Adaptation policies apply funding and subsidy programs such as the promotion of private green roofing and photovoltaics to foster climate adaptation (Adaptation coordinator, personal communication, June 3 2020). The subsidy program "Initiative green" explicitly focusses on funding adaptation measures such as façade and roof greening with up to EUR 5000 per individual measure or the removal of concrete and asphalt surfaces (Stadt Nürnberg, 2019). Another instrument is the strict consideration of climate adaptation measures in future urban projects and procedures (Stadt Nürnberg & Umweltamt, 2014). Policy documents such as the urban climate report, the master plan for open spaces or the integrated urban development concept serve as foundations for adaptation planning as they all take up adaptation as a component and are thus considered as instruments (Adaptation coordinator, personal conversation, June 3 2020). The latest sustainability report lists a multitude of concrete instruments concerning all factettes of sustainability. One that is closely related to adaptation is the implementation of the adaptation policy *climate roadmap*. Further, adaptation as a stand-alone instrument for sustainability is listed; to be more precise it says "Adaptation in construction and planning projects in urban climatologically critical areas will be promoted" (Stadt Nürnberg & Referat für Umwelt und Gesundheit, 2018, p. 144). Such examples point out how sustainability instruments are reinforcing adaptation instruments. Furthermore, the present indicator and monitoring system can be considered as political instruments to enforce problem definitions and processes. Next to this, the administration is setting good examples as to encourage private actors to get involved in sustainability. This is being done by regularly publishing sustainability reports that present all sustainability targets and measures as well as disclosing actual achievements on behalf of the administration (Stadt Nürnberg & Referat für Umwelt und Gesundheit, 2018). It can be said that instruments of both policies reinforce each other as to foster the implementation of the desired outcomes. Adaptation measures subsidised by financing programs such as unsealing concrete surfaces or the plantation of trees can even enhance sustainability goals. Setting good examples that serve as motivation and orientation for individuals and private and public institutions can be linked usefully with the promotion of roof greening and photovoltaic. Consequently, the instruments are non-conflicting and complementary and facilitate the likelihood of PI.

Due to its comprehensive monitoring system the outputs of sustainability policies in Nuremberg are easily traceable. The 4th sustainability report summarises the results of the city's endeavours over the last years and comes to the conclusion that the majority of targets are well on track of being reached but also highlights existing gaps and obstacles (Referat für Umwelt und Gesundheit, n.d.). The city speaks of a success on its way to a more sustainable future as implemented measures targeting poverty, sustainable production and consumption, education, energy transition, mobility or climate action show positive effects (Referat für Umwelt und Gesundheit, n.d.). Since no monitoring and indicator system has been developed for adaptation measures so far, the assessment of its success proves to be more difficult. The coordinator for adaptation classifies achievements for adaptation as successful, not least due to the comparably early start of adaptation measures but also due to the expansion of support programmes and the steadily increasing attention (Adaptation coordinator,

personal conversation, June 3 2020). Further, requirements as the consideration of adaptation concerns in all urban project and procedures indicate steps in the right direction. Consequently, both policies show positive results which could possibly be further improved by PI.

Overview of PI

The following table offers a brief overview about the achievements of PI in Nuremberg based on the previous analysis. The evaluation of requirements for PI stretches from ++ (fully met), + (met), - (barely met) to -- (not met at all) and 0 (no data available).

Table 3: Overview of PI in Nuremberg

| Component of PI | Indicators | Analysis of PI |
|-------------------|--|----------------|
| Elements of | Scope of policy | + |
| Policy | | |
| | | |
| | Perception and aspects of the problem situation | ++ |
| | | |
| | Spatial and temporal systems of reference | ++ |
| | Cross-scale integration | |
| Goals and | Goals and objectives | + |
| objectives | Measurable, indicator-based targets and timetables | |
| Policy actors and | Internal actors | ++ |
| networks | | |
| | External actors | ++ |
| | Actor networks | ++ |
| | | |
| | Relationship among actors (Face-to-face dialogue) | ++ |
| | Formal and informal interaction | ++ |
| Facilitated | Political commitment and leadership for PI | + |
| Leadership | | |
| | Determination and Number of leaders | ++ |
| | Effective collaborative leadership | ++ |
| Policy structures | Administrative capacity | + |
| & procedures | | |
| | Procedures and rules of decision-making in competent | ++ |
| | administrative bodies | |

| | Joint decision making and joint responsibilities | ++ |
|-------------------------|--|----|
| Policy instruments & | Types of instruments | ++ |
| Policy Output | Actual Outcome of Policy | ++ |

4.2 Adaptation and sustainability in Bonn

Opposed to Nuremberg, Bonn's commitment for adaptation and sustainability is not based on a long tradition of both, but rather found in its great variety in policies. Next to an extensive and comprehensive strategy alighted to the SDGs, the city regularly publishes sustainability reports, set up a sustainability network with several actors from public, private and civic institutions, participated in the pilot project Global sustainable community in North-Rhine Westphalia and has been rewarded several times for its engagement in the field of sustainability (Bundesstadt Bonn, 2020h). Adaptation measures are mainly focusing on improving the urban climate situation. For climate related issues, the city implemented a control centre in 2011 that implements and coordinates adaptation measures with actors from business, science and civil society (Bundesstadt Bonn, 2019). Exceptional for Bonn is its outstanding civil engagement for both topics that pushes policy and decision making further. More detailed information about Bonn's climate adaptation and sustainability policies can be found in the following.

4.2.1 Adaptation policies

Bonn has ambitious targets when it comes to climate mitigation and adaptation. Originally, climate related topics focussed on mitigation activities only which can be traced back to the 1990s where the long history of mitigation endeavours in Bonn was born (Bundesstadt Bonn, 2020e). However, it was not until 2011 that adaptation as an equal topic was integrated into the duties of the city. Further, in 2011 the control centre for climate protection has been set up as to facilitate the process of adaptation and mitigation measures in the city. Up to date, one person is in charge for the coordination of adaptation measures, yet due to the increasing recognition and importance of the issue, further positions are planned (Adaptation coordinator Bonn, personal communication, May 29 2020). The main intention of setting up the control centre was to establish a coordination unit for the integrated climate protection concept. The concept was developed in 2013 and entails progressive measures for mitigation and adaptation (Greiving & Fleischhauer, 2013). It consists of two components, the first and longer part contains climate mitigation targets and measures while the second part focusses on adaptation to climate change (Greiving & Fleischhauer, 2013, p. 2). A major breakthrough for climate action has been a comprehensive catalogue with measures as an answer to the application made by

citizens to call out the climate emergency in the city (Bundesstadt Bonn, 2020e). The current document encompasses 150 measures in six different actions fields one of which is climate adaptation (Amt für Umwelt-, Verbraucherschutz und Lokale Agenda, 2020).

4.2.2 Sustainability policies

As early as Spring 2016 Bonn signed the model resolution *2030 Agenda for sustainable development: shaping sustainability at the local level* of the German Association of Cities and Towns (Bonn, 2020). By signing the resolution, Bonn commits itself to several goals carried out locally and globally likewise, such as to acknowledge the shared responsibility between global north and south for achieving justice and sustainable development. Another national commitment is to call upon the federal government and the states to increase the sovereignty of cities and municipalities as to enhance their influence and efficiency in implementing sustainable measures (Deutscher Städtetag,n.d.). In order to meaningfully connect the SDGs to the life of its citizens, Bonn adopted its first sustainability strategy in early 2019. The development of the strategy was embedded in the participation in the project Global sustainable municipality North-Rhine Westphalia. Various actors from politics, civil society, science and business were included in the development on the city in a periodically manner to inform citizens about the process. This is being done since 2002 in form of a sustainability report that records 55 indicators in four categories such as well-being, social justice, environmental quality and resource efficiency (Oberbürgermeister der Bundesstadt Bonn et al., 2020).

4.2.3 Policy Integration among adaptation and sustainability policies in Bonn

In the following, the degree of PI among adaptation and sustainability policies in Bonn will be analysed. Foundation to this analysis are the analysis of the aforementioned documents as well as an interview with experts for both policy fields working for the city. For further information about adaptation policies, Bonn's climate adaptation coordinator has been interviewed. The coordinator of local sustainability strategy was interviewed as to gain a more detailed insight into the city's sustainability policies.

Elements of Policy

Despite the increasing visibility of adaptation and the implementation thereof into several other sectors, so far only a few policy documents with concrete targets and measures have been developed. The integrated climate concept lists only a few adaptation measures and the climate emergency measure program lists adaptation as one action field and refers to the concept for further objectives (Amt für Umwelt, 2020). Due to the longer history of sustainability as a topic and the city's strong commitment towards it, the scope of Bonn's sustainability policies is comparatively broad. The difference in scope can be illustrated by the facts that the city maintains a long tradition of regularly publishing sustainability reports which inform all interested parties about the sustainability process in

the city and additionally published a comprehensive sustainability strategy that collects and merges various actions regarding sustainability carried out in the city (Sustainability coordinator Bonn, personal communication, June 4 2020). The strategy encompasses six main action fields with each of these field being supplemented by a thematic guideline. These guidelines are representing the principles and values of the municipality and provide long term guidance for sustainable development. Further, each guideline entails strategic and operative objectives. In order to successfully achieve the set goals, concrete measures are formulated (Bonn, 2018). This detailed and comprehensive approach shows the commitment of the city on one hand and greatly contributes to the effective and successful implementation and monitoring of the process. Opposed to this, adaptation policies are currently relatively general with a predominant focus on urban planning and heat measures (Adaptation coordinator, personal communication, May 29 2020). Due to this difference it can be concluded that the requirement of having a common scope is not fully met, yet well on track.

The perceived problem situation of both policies resembles each other in the way that both see the preservation of green spaces and urban tree population as threatened. According to the sustainability coordinator (2020), further mobility and (affordable) housing can be mentioned as problematic for sustainability. As in many other German cities, adaptation problems arise mainly from the increasing burden of urban heat and heavy rain (Adaptation coordinator, personal communication, May 29 2020). These aspects of problems are non-conflicting if not indeed complementary, e.g. the need for a climate sensitive and adaptive urban development goes hand in hand with targeting the problem of the creation of (affordable) housing. The problematic of urban heat and heavy rain further complies with the need to preserve green spaces and urban tree population.

Next the temporal and spatial system of reference of Bonn's adaptation and sustainability policies will be examined. The temporal system of reference for adaptation policies is twofold. The overarching time horizon for measures is the year 2035 in which Bonn is sought to become climate neutral. Yet, in principal most of the smaller measures have a shorter time scale and should be implemented within the next five years (Adaptation coordinator, personal communication, May 29 2020). However, so far not each measure is provided with an individual and concrete timescale. The adaptation coordinator (2020) states that the next step concerning this matter is to establish an overall plan in which the exact temporal system of reference for each measure is defined. The temporal system of reference for sustainability policies is represented by the strategic and operative goals presented in the sustainability strategy. The strategic goals are orientated towards the SDGs from the UN framework and hence have a long-term character and a timeframe till 2030. Opposed to this, the operative goals are functioning as short term goals to be implemented within the next 3-5 years (Sustainability coordinator, personal communication, June 4 2020). Consequently, both policies foresee similar short and long-term goals reaching from three years till the year 2035. Also, the spatial system of reference of both policies is similar as it concerns the city itself and its citizens. All measures have a local focus, yet some sustainability targets have a global orientation such as anchoring awareness of global responsibility (Bonn, 2018).

Cross-scale integration of local and global issues is mentioned only once in the sustainability strategy in the action field Global responsibility and one world. The strategy aims at raising awareness among the citizens about their global responsibility and urges them to act according to this (Bonn, 2018). The other measures and targets are mainly focussing on the city itself yet given their orientation on the global SDGs indicates a certain indirect cross-scale integration of further global issues. Adaptation policies on the other hand specifically focus on local issues. However, since the overarching topic of adaptation is climate change, the topic is exceptionally global. Although the impacts of climate change have very local consequences, the origin of the problem is global in the first place. Consequently, crossscale integration can be found to a limited extent in sustainability policies and in an indirect way in adaptation policies.

Goals and Objectives

Similar as in Nuremberg and Freiburg, adaptation measures seek to reduce the exposure of citizens to the impacts of climate change. However, the climate action programme differs slightly from the policies of the other city as it was set up in the context of the climate emergency declaration and lists predominantly technical measures. The underlining objective, however, is to target societal problems such as health problems triggered by heat, floods or air pollution or to safeguard property. The sustainability strategy pursues the objective of sustainable development in Bonn in the context of the Agenda 2030 which encompasses societal, economic and ecological components likewise. The more profound analysis of goals and objectives of adaptation policies shows that a multitude of measures and targets is already existing, however, they are not neatly and succinctly put down in one document, which hinders obtaining a full overview of all measures in place (Adaptation coordinator, personal communication, May 29 2020). As already mentioned previously, the goals of adaptation efforts in Bonn are broadly focusing on two main subjects heat and urban planning (Greiving & Fleischhauer, 2013). The mission statement refers to the continuous development of Bonn as a climate-sensitive city and the reduction of vulnerability as main adaptation targets. In order to reach this, the mission statement contains administrative, energy-, housing- and mobility-related and overarching measures (Bonn, 2019). Looking at the goals and objectives of the sustainability strategy, the wide range of covered topics becomes apparent: mobility, climate and energy, natural resources and environment, work and economy, social participation and gender and global responsibility and one world. Each action field contains several sub targets and measures. For this analysis especially all sustainability targets focusing on adaptation are of interest. One of those is ensuring sustainable integrated urban development with its sub targets to ensure climate-adapted inner development and post-compaction with high-quality greening concepts. Here a clear connection can be drawn to the focus of the adaptation policies on urban development and heat assessments. Another sustainability target is to improve quality of life through well-developed blue-green infrastructure and biodiversity, which resembles the adaptation target of supporting greening measures and blue infrastructure. Moreover, the sustainability target to reduce health impacts from noise and air pollution has a similar focus as the adaptation policies aim to reduce the vulnerability and develop Bonn towards a climate-sensitive

city (Amt für Umwelt, 2020; Bonn, 2018). Further, both policies encompass mobility related measures such as promoting low-emission mobility or attractive, environmentally friendly public transport (Bundesstadt Bonn, 2018, 2019). The similarity and compatibility of both policies is accordingly high. Moreover, as the sustainability strategy is more detailed and concrete it can take a complementary feature for the adaptation strategy.

Analysing measurable, indicator-based targets and timetables proves that adaptation policies are lagging behind sustainability policies. The city has been working for a long time with a very differentiated set of indicators that is specifically geared to the local level of Bonn. Those indicators are supplementing each topic of the sustainability report and contribute to an effective monitoring and measuring of the achieved outcomes (Oberbürgermeister Bonn et al., 2020). For adaptation policies this circumstance differs: So far, no policy lists measurable, indicator-based targets and timetables, which hinders the accurate monitoring thereof. Since a monitoring system has been developed for mitigation efforts, the lack of quantifiable measures and indicators for adaptation can be explained by the rather young age of the topic and the missing resources to establish such structures (Amt für Umwelt, 2020). As only sustainability policies employ indicator-based targets and timetables, this component of PI cannot be considered as fulfilled and can potentially hinder the integration of both policies.

Policy Actors and Networks

The next component is a crucial one for this research as the influence of policy actors and networks are thought to be an important feature of successful PI. In the adaptation field, internal actors from a multitude of city departments such as the office for the environment, health department, climate protection office, city planning office and many others are involved, while the environment office holds the coordinating role (Adaptation coordinator, personal conversation, May 29 2020). Some offices are implementing adaptation issues independently of the environment office, such as the civil engineering office, the office for urban greenery and the urban planning office. The latter is being consulted by the environment office on climate adaptation topics regarding urban development. The involvement of internal actors for sustainability policies is broad as well. Here internal actors from all six administrative departments are participating in the policy process, whereby the expertise for the implementation of the specific targets and measures lies within the competence of the individual offices.

Representatives from all departments, i.e. the departmental coordinators, representatives from key offices and also from municipal companies and institutions, are connected in a permanent steering group for sustainability. The international office in cooperation with the environment office are in charge of coordinating the process (Sustainability coordinator, personal conversation, June 4 2020). This makes the environment office a key actor for both policy fields. Within the realm of adaptation two networks are active; first, the control centre and the climate protection advisory board. The control centre is a group consisting of actors of the environment office who coordinate the city's climate protection and adaptation activities both internally and externally (Bonn, 2020). The advisory

board is led by the control centre and foresees the "participation of politicians and representatives of social groups" (Bonn, 2020, own translation), therefore includes experts from science, economy, church and civil society. Members of this group accompanied the creation of the integrated climate concept and advise politicians and the administration itself on climate mitigation and adaptation. A further group is to be created in the future to better coordinate adaptation and mitigation measures internally. The steering group will have the task of implementing the action programme that was drawn up in the context of the climate emergency declaration and will consist of members from a large number of offices. Also, offices that on a first glance have nothing to do with climate will be part of this group such as human resources or the finance department (Adaptation coordinator, personal communication, May 29 2020). While networks for sustainability encompass internal actors from climate related sectors, this is not the case vice versa. Networks operating in the field of adaptation do not yet include internal actors working on sustainability policies. A similarity of both network types is the involvement of external actors from public, private and civic background. It can be concluded that both policy networks intersect with each other as actors involved in adaptation are part of sustainability networks. Inversely, this is not necessarily the case as adaptation networks include only a limited number of internal actors into their work.

Given Bonn's strong citizens' movement with countless initiatives, civil society represents a great part of external actors in both policies. According to Bonn's adaptation coordinator (2020), these movements were sometimes able to move more in politics than the objective statements from the administration. Similar as in the case of adaptation policies, for sustainability too civil society functions as a strong pusher and initiator for change, sometimes even more than the administration itself (Sustainability coordinator, personal communication, June 4 2020). However, the active involvement of society in adaptation is not only due to its own engagement, but also foreseen by the council's decision to include the public into the implementation of climate measures. Next to this, cooperation with different universities are frequently conducted as well as private offices and bureaus which function as external experts. Similar are the external actors in the field of sustainability. Representatives from science, politics, economy and civil society were involved in the development of the strategy on one side and are further accompanying the current process on the other. The wide range of common internal and external actors involved in both policy processes constitutes an advantage for PI (Briassoulis, 2004).

Internal and external actors engage predominantly in face-to-face dialogues as was confirmed by the adaptation coordinator (2020). Also, among the actors and networks of the sustainability process the communication was predominantly face-to-face in frequent meetings. One representative of each department coordinates the process and guides the communication between the own department and the others as to make sure that the requests and ideas are incorporated in the discussion and results. As communication is mostly direct, the relationship among actors can be assumed to be collaborative. This can be supported by their engagement in several groups and networks with the

same goals. In both policy fields actors from internal and external backgrounds are united in groups that are fighting for the same goals.

The interaction among actor networks is categorised in being of formal and informal nature. The advisory board for adaptation is a formal group with set rules of procedure, an elected chairperson and appointed roles. Regularly scheduled meetings each quartal allow for formal interaction, serve to discuss topics jointly and enable each member to have an equal voice (Adaptation coordinator, personal conversation, May 29 2020). In the case of sustainability, frequent meetings are hold within the steering and working group which are of formal nature. Here external actors from science, economy, politics and civil society engaged jointly in the development of the sustainability strategy. Regular formal meetings enabled cooperative interaction and decision making among its members (Sustainability coordinator, personal conversation, June 4 2020). An example for informal cooperation and interaction among different networks are ad-hoc or spontaneous meetings between internal adaptation networks and the local Fridays for Future (FFF) group. Members of FFF irregularly participate in Council meetings and demand certain results. The council is not obliged to respond to these demands, however since both parties are fighting for a common goal, collaboration is aspired (Adaptation coordinator Bonn, personal communication, May 29 2020).

Facilitated Leadership

Facilitated Leadership is the next component to be analysed. Briassoulis (2004) mentions the "existence of a formal policy framework for PI" (p. 22) as a possible way to prove political leadership and commitment for PI. In the case of adaptation and sustainability policies in Bonn such a concrete example as formal policy framework could not be found. Political commitment for PI can be seen for both policies due to the variety of introduced topics and integrated actors. The mission statement for climate adaptation and mitigation describes both as a substantial component of sustainable development and by this draws a clear connection between both policy fields. Consequently, the mission statement is seen as an integral part of the city's sustainability strategy (Bonn, 2019). This situation is the same for sustainability policies: Given the inherent cross-linkages of sustainability that lead to close cooperation with other policy fields, the integration of different policies is already given. Particularly adaptation is often mentioned in the sustainability strategy as a crucial component to support sustainability (Bonn, 2020b). This lays the foundation for PI among both topics.

When it comes to the determination of leaders, responsibility for both policies is not only concentrated in one organisational unit, but distributed among various offices (Adaptation coordinator, personal communication, May 29 2020; Sustainability coordinator Bonn, personal communication, June 4 2020). This implies the existence of multiple leaders which in turn enhances the likelihood for PI (Ansell & Gash, 2007). Despite the environment office and control centre holding the coordinating role for adaptation efforts, some offices are implementing adaptation issues independently. Those are the civil engineering office responsible for measures concerning water, the office for urban greenery responsible for green spaces in the city and the city planning office is in charge of the entire urban

development (Adaptation coordinator, personal communication, May 29 2020). The steering group which is yet to be established will be the leading entity for climate related issues once it is in place. However, in the course of the establishment of the control centre for adaptation, the position of an employee who exclusively works on adaptation has been established. The adaptation coordinator is currently the only employee exclusively working on adaptation issues and responsible for managing and coordinating the process (Adaptation coordinator, personal communication, May 29 2020). Opposed to this, leadership for sustainability can be defined more explicitly. Here, the international office in cooperation with the environment office are in charge of leading the process and are responsible for coordination and monitoring, yet all six departments are responsible for implementing their sustainability targets and measures (Sustainability coordinator, 2020). Ansell and Gash (2007) state that successful collaboration often relies on multiple actors leading the policy process. The analysis reveals that in both policies, multiple actors hold a leading role in the policy process which enhances successful collaboration among actors and stakeholders (Ansell & Gash, 2007).

Effective collaborative leadership is proven by the successful collaboration among actors in various internal networks. As such internal working groups are always led by one administrative entity, mostly the environment office, their responsibility is to empower each office and their representatives to arrive at widely acceptable decisions that foster not only the process but the trust and collaboration among actors likewise.

Policy structures and procedures

Administrative capacity is a component of Policy structures and procedures and can be described as a central unit which is in charge of supervision, coordinating or implementing processes for PI. As already mentioned above, so far, no single unit entrusted with supervision or monitoring is in place, but responsibility is rather split among different offices. However, the existence of an adaptation manager compensates for this partly as the manager holds a coordinating function. Consequently, no administrative capacity in the sense of Briassoulis for PI can be determined within the realm of adaptation. In the context of sustainability, the international office in cooperation with environment office holds the coordinating, monitoring and supervising role for sustainability processes and since this process is indeed of cross-sectoral nature, an administrative capacity of both departments for PI can be assumed.

In the following the procedures and rules of decision making of the competent administrative bodies of adaptation and sustainability sectors are analysed. Both hold the right to set formal agendas: for adaptation, this is done in the advisory group; for sustainability, the steering group is in charge of setting formal agendas. Yet final decisions are being made by responsible persons in politics. The climate protection advisory board as a formal entity ensures participation of different departments as well as offices and consequently other policy sectors. Further, it is allowed to set formal agendas and hence could be seen as a competent administrative body for procedures and rule of in decision making. However, the board lacks the ability to monitor and coordinate the whole process of adaptation let alone of PI. Here, the steering group that is yet to be established could be filling in this gap. It can be concluded that procedures and rules of decision-making in competent administrative bodies of both policies are consistent, compatible and coordinated.

As already outlined above, external and internal actors are working collaboratively on policy formulation and implementation as to enhance the impact of the outcomes. The advisory board for adaptation also gives equal rights to both internal and external actors and thus ensures joint-decision making and joint-responsibilities (Bonn, 2020). Moreover, both include a variety of departments and thus incorporate actors from other policy sectors. Both, having the capacity to set formal agendas and comprising various internal and external actors, can be seen as a solid foundation for developing PI proposals. In sustainability processes, decision-making or voting on specific issues is carried out jointly in both steering and working groups. Each member has an equal voice and the right to intervene. For adaptation, such a steering group is yet to be developed.

Policy instruments and Policy Output

Last but not least policy instruments and policy output are going to be examined in the following. Both policies plan to or already did implement funding and subsidy programs. In the wake of the declaration of the climate emergency, several funding programs emerged. One adaptation program targets the greening of buildings and unsealing of concreted surfaces. Opposed to new buildings, no regulation possibilities for existing buildings to implement such measures are at the city's disposal. The planned support program foresees subsidies of EUR 110,000 with the possibility to further increase the payments depending on the demand on behalf of the public (Bonn, 2020d). Fundings within the realm of sustainability policies cover a great variety of topics such as subsidising private installations of photovoltaic and solar energy systems with EUR 2,680 million and EUR 1 million respectively (Bonn, 2020). With these programmes the city tries to exert its influence on new buildings through financial incentives. Further, municipal utilities are object to the funding programs as to facilitate Bonn's goal of becoming climate neutral by 2035. For this EUR 120,000 will be provided (Bonn, 2020). Moreover, maps like the heavy rain hazard map, the climate analysis map or the planning reference maps can be seen as instruments for adaptation policies. Since the topic of sustainability intersects with each other, department concepts and strategies of these departments are regarded as instruments for sustainability policies. A total of 19 concepts and more than 45 projects could be found that are of relevance for sustainability of which one is the adaptation concept and the project for more cooperation in the field of climate protection and adaptation (Stadt Bonn, 2020). Instruments of both policies thus resemble each other and even facilitate each other's implementation.

Due to the lack of monitoring and indicators, the actual outcome or policy output is hard to determine. According to the adaptation coordinator (2020), significant progress has been made in the last years and months since adaptation gained increasing recognition, however no quantitative measurable numbers and indicators are existing to give concrete numbers or results to prove this. For sustainability, information about the process made in the past years is easy to obtain given its comprehensive sustainability report. The city lists achievements and challenges aligned to each goal and comes to the overall conclusion that the city is well on track. Important for PI is that policy outputs of both policies are non-conflicting and mutually enhancing at its best. Despite the circumstance that progress cannot be measured in quantitative terms, it can be measured in qualitative that is perceived terms. Since the goals of both policies are non-conflicting their positive outcomes can be considered as non-conflicting either. Yet, as this can only be assumed and derived from personal evaluations of the adaptation manager, no exhaustive statement can be made about this.

Overview of PI

The following table offers a brief overview about the achievements of PI in Bonn based on the previous analysis. The evaluation of requirements for PI stretches from ++ (fully met), + (met), - (barely met) to -- (not met at all) and 0 (no data available).

| Component of PI | Indicators | Requirement for PI |
|-------------------|---|--------------------|
| Elements of | Scope of policy | _ |
| Policy | Perception and aspects of the problem situation | ++ |
| | | |
| | Spatial and temporal systems of reference | ++ |
| | Cross-scale integration | + |
| Goals and | Goals and objectives | + |
| objectives | Measurable, indicator-based targets and | |
| | timetables | |
| Policy actors and | Internal actors | + + |
| networks | | |
| | External actors | ++ |
| | Actor networks | +/- |
| | Relationship among actors (Face-to-face dialogue) | ++ |
| | Formal and informal interaction | + + |
| Facilitated | Political commitment and leadership for PI | ++ |
| Leadership | | |
| | Determination and number of leaders | ++ |
| | Effective collaborative leadership | ++ |

Table 4: Overview of PI in Bonn

| Policy structures | Administrative capacity | + |
|-------------------|--|-----|
| & procedures | | |
| | Procedures and rules of decision-making in | + + |
| | competent administrative bodies | |
| | Joint decision making and joint responsibilities | + + |
| Policy | Types of instruments | ++ |
| instruments & | | |
| Policy Output | Actual Outcome of Policy | +/- |

4.3 Adaptation and sustainability in Freiburg

With its several comprehensive adaptation and sustainability policies, Freiburg proves to be highly committed to strengthen the cities sustainability and resilience and enhance the quality of life even further (Stabstelle Nachhaltigkeitsmanagement, 2018). An overview about climate adaptation and sustainability policies in Freiburg and an overview of their integration is provided in the following.

4.3.1 Adaptation policy

In 2007 Freiburg started implementing the topic of climate adaptation into its climate policies, even prior to the previously discussed cities. Four years later, the adaptation working group was established by the environmental protection office. The working group was commissioned with the development of an action plan which was later on supplemented and converted into an adaptation strategy exclusively focussing on implementing adaptation measures. This strategy in turn guides and fosters the implementation process of the responsible and involved municipal departments (Stadt Freiburg, 2020c). To counter the increasing urban temperatures, the environmental protection agency further developed an adaptation concept solely aiming at reducing the exposure to heat stress. This process was closely accompanied by the horticultural and civil engineering office (berchtoldkrass space&options, 2019). Moreover, the city recently created the position of a climate adaptation manager in March 2020 (Adaptation manager, personal conversation, June 12 2020).

In order to obtain a comprehensive overview about adaptation policies in Freiburg, the city's sustainability manager was interviewed to supplement the information gathered from the preceding document analysis.

4.3.2 Sustainability policy

Only one year earlier, the city started to engage effectively with the issue of sustainability by compiling the very first sustainability goals for the city based on the Aalborg Commitment. Those targets have been revised in irregular intervals with major changes in 2017 when the city's own sustainability goals were aligned to the SDGs and then adopted as the foundation for all political actions within the municipality. The implementation of the goals is monitored and summarised in biennial intervals in sustainability reports. The urgency and seriousness of the topic is demonstrated by the slogan "Sustainability is a matter for the boss" that guides the cities actions and implies that the highest authorities of the city take the topic seriously and engage with it (Website).

The sustainability manager of Freiburg has been interviewed as to supplement the missing information from policy document analysis.

4.3.3 Policy Integration among adaptation and sustainability policies in Freiburg

Elements of Policy

The first indicator of elements of policy that is going to be analysed is **scope of policy**. Both policy sectors dispose of comprehensive strategies and concepts for their targeted issue and cover a wide range of topics. While most of the adaptation measures can be found in numerous action plans, exclusively the topic heat was given special attention due to its substantiated negative impacts on the city (berchtoldkrass space&options, 2019). A total of 37 measures concerning heat are gathered in the adaptation concept which is based on a prior climate modelling that was conducted to determine the exact location and degree of urban heat exposure in Freiburg. As measures are thought to be combined, an impact analysis was carried out to exemplify the effect that can be achieved on behalf of the selected measures. The status of implementation is observed regularly and beyond that an indicator system will be developed as to successfully monitor the impacts of the measures on the city (Adaptation manager, personal communication, June 12 2020; Philipps et al., 2016). The decision and policy making process for adaptation objectives and targets is carried out with the involvement of almost all departments and offices. This process is coordinated by the recently employed adaptation manager (Adaptation manager, personal conversation, June 12 2020).

The scope of sustainability policies in Freiburg is, given its variety of topics, comparably broader. Here, it is important to mention the naturally wide range of topics encompassed compared to adaptation which is rather limited. At the heart of sustainability policies lie the 60 sustainability goals which are in line with the SDGs. Those provide the basis for all decisions made in the entire city on behalf of administration and politics (Stabstelle, 2017). Next to this, regularly published sustainability reports summarise achievements and processes of endeavours in each action field and inform about the current status of implementation. Due to its comprehensive extent, all departments are included into

the process with two responsible persons managing the entire process (Sustainability manager, personal conversation, June 10 2020).

A difference in scope arises from the non-existence of an indicator system for adaptation measures. However, the sustainability report includes two adaptation measures, hence, indicators for those measures are existing. Those are the planting of trees and the area of green spaces are given (Stabstelle, 2018). Yet, as an indicator system for adaptation is to be developed and other defining factors resemble each other, it can be concluded that both policies are well on track of developing resembling scopes.

Looking at the perception and aspects of the problem situation in Freiburg from a more fundamental level, it becomes visible that climate change is the driving force behind the majority of problems. Targeting this very issue as well as grievances in society can be considered as the key focus. On a rather detailed level, as could be observed in previous case studies too, the main problem targeted by adaptation policies is urban heat followed by heavy rain (Adaptation manager, personal conversation, June 12 2020). The city responds to this challenge in an effective and serious manner through developing an separate adaptation concept exclusively focusing on urban heat stress (berchtoldkrass space&options, 2019). Heavy rain is an essential element of other adaptation policies published (Umweltschutzamt, 2018). Compared to this, the challenges for sustainability are somewhat broader defined: affordable living or mobility but also climate change is mentioned as causing conflicts (Stabstelle, 2018). Based on this analysis, the perceived problem situation of both policy fields can be considered common.

Spatial system of reference of both policies resembles each other while temporal systems take slightly different approaches. Starting off with the former, the similarity shows itself in the fact that both policies target the city area of Freiburg leaving outer parts of the city and the surrounding region unconsidered (berchtoldkrass space&options, 2019; Stabstelle, 2018). The adaptation concept further indicated 13 hot spot areas within the city and offers concrete local measures for these spots, while the sustainability goals aim at covering city-wide actions (berchtoldkrass space&options, 2019; Stabstelle, 2018).

Turning to temporal systems, adaptation policies have no temporal determination as they foresee the immediate and successive implementation of the measures, yet define no endpoint at which they have to be achieved (Adaptation manager, personal conversation, June 12 2020). Compared to this, sustainability goals have a rather long-term focus until 2030 as specified in the Agenda 2030. However, few targets set out shorter temporal determinations (Sustainability manager, personal conversation, June 10 2020). The temporal systems of reference of both policies can be described as compatible despite their differences as both foresee instant implementation and only differ in their time horizon which is not necessarily causing trouble.

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Cross-scale integration, that is the integration of local and global issues, is raised in one sustainability goal that foresees that "by 2030 the interactions between users in the city and producers in the regional surroundings or in global regions of origin are made visible" (Stabstelle, 2018, p. 18, own translation). Cross-scale integration in adaptation policies, however, could not be found. This requirement, thus, can be considered as not met.

Goals and objectives

Starting with overarching goals at the more fundamental level, it becomes apparent that both policies aspire to make the city of Freiburg more sustainable and climate and citizen friendly. The majority of goals are thriving for a higher quality of life for all people while ensuring a safe and healthy environment. Thus, tackling climate change and social are the overarching goals of both policies. This is further proven by the incorporation of adaptation as a sustainability goal (Stabstelle, 2018). With a more detailed look on specific goals listed in policy documents, the similarity remains existent. Both policies share a number of common and complementary goals. Logically, sustainability policies target as broader number of issues, while adaptation targets more specific goals. Such goals are concerning urban green and open spaces, preservation of natural common goods and biodiversity, mobility and infrastructure. Further, focus is put on urban and building structures as well as energy efficiency and consumption (Stabstelle, 2018; Umweltschutzamt, 2018). Goals targeted by only sustainability policies are of rather societal nature and encompass social equity and justice, education, culture and sports or public participation (Stabstelle, 2018). The equal alignment of both policies in terms of their objectives enhances the likelihood for PI significantly.

Successful monitoring requires the existence of indicator-based targets. The targets of sustainability policies are formulated in a measurable manner and based on two different kind of indicators. First, core indicators that measure the achievement of objectives and office specific indicators, and second corresponding measures that contribute to the achievement of objectives (Stabstelle, 2017). Each sustainability objective is backed up by indicators enabling to measure the concrete contribution of the agency to the achievement of sustainability goals (Sustainability manager, personal conversation, June 10 2020). This enables a detailed and precise monitoring of actions for sustainability based on which further recommendation and adjustments can be made.

Looking at adaptation policies, it becomes apparent that no indicators are listed in any adaptation policy documents. Furthermore, so far no monitoring system for the city itself has been established, however it is planned to be developed in the medium term (Adaptation manager, personal conversation, June 12 2020). For this, the city of Freiburg participated in the research project *Establishment of a regionally specific monitoring of climate impacts and adaptation measures in the Freiburg model area* conducted by Albert-Ludwigs-University Freiburg, which serves as a suitable foundation for the further development of indicators (Philipps et al., 2016). Moreover, as already mentioned, adaption is anchored in sustainability policy with an own set of indicators for adaptation measures.

Policy actors and networks

Both policies include a wide array of internal actors from various departments. Striking is the inclusion of almost all municipal departments into the field of adaptation. This results from the perception of adaptation as an inherently cross-sectoral topic that touches all areas of the administration (Adaptation manager, personal conversation, June 12 2020). Indeed, the same circumstance applies for sustainability policies, as all offices are included into the process (Sustainability manager, personal conversation, June 10 2020). Given the involvement of a great majority of actors from common departments and offices, indicates shared values and goals among them which promotes the sustainable and resilient future of Freiburg.

Additionally, both policy fields engage with various external actors such as numerous cooperation partners from business, science, welfare services, independent agencies and institutions (Stabstelle, 2018). Especially the incorporation of civic actors is a key element for both policies. Freiburg's citizens are exceptionally committed: more than one third of Freiburg's civil society is involved in more than 2,000 volunteer projects (Stabstelle, 2018) The role of representatives from external institutions in policy processes are two-fold: as experts they support the content-related process and accompany the process of policy-making and implementation or consult interns on specific issues. As citizen their motivation results from the desire to informal themselves about adaptation and sustainability related processes in their city (Adaptation manager, personal conversation, June 10 2020). Both types of involvement of externals is exceptionally well established for both policy fields.

The broadly diverse actors are also reflected in the various networks existing for both policies. The sustainability board is a key element for the sustainability process and unites 40 representatives from science, business, politics and civil society with the goal to advise the municipal council and administration on the implementation of the sustainability goals (Stabstelle, 2018). For closer cooperation concerning adaptation related topics, a working group was established in 2011 and unites members from policy and administration to foster the climate adaptation process within the city. Here, representatives from several responsible offices are jointly working for adaptation (Adaptation manager, personal conversation, June 12 2020). A similar internal working group also exist for sustainability with the task of managing the policy discourse, connecting members and supporting the work of the sustainability board. Compared to the working group adaptation, members from all municipal offices are participants of this group (Sustainability manager, personal conversation, June 10 2020).

Having a similar operating working group for each topic enhances the process of PI as the working and cooperating structures resemble each other. However, internal networks are not coordinated by design despite their similar focus. Furthermore, Freiburg claims to have an outstanding citizens movement and participation particularly in form of citizens networks. While civic networks for adaptation are still in its infancies, involvement of such networks targeting sustainability are well

known (Adaptation manager, personal conversation, June 12 2020; Sustainability manager, personal conversation, June 10 2020).

Communication among actors is a key element to discover mutual gains. The diversity of actors in both policy fields requires a great amount of communication to coordinate policy processes. Despite no precise statements about the actual way of communicating within the working group for adaptation, it can be assumed that the majority of communication is in form of direct dialogues and discussions in meetings. This assumption is based on the information gathered for the two priorly analysed cities. Next to meetings with the entire group, bilateral or multilateral face-to-face-dialogues are held within individual departments (Adaptation manager, personal conversation, June 12 2020). Besides this, particularly interaction among internal and external actors often is of indirect nature, that is, calls and mailing due to greater distances. For sustainability processes most of the communication takes place in the several working groups in form of direct dialogues and discussions. To enhance communication with externals selected target group-specific communication measures are developed and implemented to motivate and convince citizens, institutions and companies. For this a variety of ways to communicate are foreseen. While face-to-face dialogues too are the most common way of communication among internal actors, communication with externals often takes different formats (Stadt Freiburg, 2020d). The predominantly direct communication suggests a positive relationship among different actors. Moreover, as explained above, external actors are involved into policy processes when additional knowledge is required or given their personal interest (Adaptation manager, personal conversation, June 12 2020). The former strengthens the importance of externals as their expertise is clearly recognised and valued. The latter underlines the willingness of the administration to inform external actors about their process. According to the municipal representatives for adaptation and sustainability, the engagement on behalf of citizens is greatly acknowledged and valued by the city. The openness about such policies in turn is appreciated by cities as can be indicated by their interest to engage in such processes. The cooperation among both has proved to be successful in the past considering the collaboratively developed adaptation concept on heat and several sustainability goals (berchtoldkrass space&options, 2019; Stabstelle, 2018).

Facilitated Leadership

The comprehensive commitment of the city of Freiburg to sustainable development and adaptation is demonstrates by the professional commitment of the municipal offices and departments with numerous projects and measures (Stadt Freiburg, 2020a). An important key element of political commitment and leadership for PI is the recognition of both topics as cross-sectoral and strongly interrelating with other policy fields. Both policies prove their commitment by including all municipal offices into the process of policy planning and implementing as to strengthen the effectiveness of the outcomes and results (Adaptation manager, personal conversation, June 12 2020; Sustainability manager, personal conversation, June 10 2020).

The determination of leaders for adaptation is unambiguous: since 2020 the city employs an adaptation manager, who is exclusively working on adaptation measures. The position evolved from a two-fold reason. First, due to the increasing importance of the topic and second, due to the need to centralise policy processes in one entity instead of decentralising them into various offices. The adaptation manager is in charge to coordinate all adaptation related topics across the administration to ensure a well organised and effective implementation of measures (Sustainability manager, personal conversation, June 10 2020). For sustainability processes responsibility is hold by an entire unit rather than one person. The aim of the sustainability management unit is to integrate the city's sustainability goals into the actions of the administration, politics and society and to monitor them (Stadt Freiburg, 2020a). The actual content implementation, however, falls within the responsibility of the individual offices. According to the sustainability manager (2020), leaders for sustainability are the director of the environmental protection agency as this position hold the most power in administration on one side and the members of the sustainability board on the other. The latter is constituted of one representative of each city departments (Sustainability manager, personal conversation, June 10 2020). Two important features can be concluded here: first, the determination of leader recognised differently in both policy fields which consequently leads to varying number of recognised leaders.

What is important to leadership after all, is an "adequate management of collaborative process" (Ansell & Gash, 2007, p. 554) as much as ensuring decisions and results that are "acceptable to all" (Ansell & Gash, 2007, p. 554). Effective collaborative leadership is proven by the successful management of collaborative processes and the ability to ensure collaboration that brings credible and convincing decisions. Adequate management of collaborative processes are especially ensured through the establishment of a management position for adaptation policies. Both policy fields have at least one person in charge for the management of the process and the collaborative among included actors (Adaptation manager, personal conversation, June 12 2020). In the field of sustainability policy these tasks are divided within the sustainability management unit (Sustainability manager, personal conversation, June 10 2020). The very role of this manager is to ensure the acceptable and satisfactory collaboration among actors with the desire to enhance policy outcomes. Their success in effectively leading these collaborations is shown in first, the good communication and relationship among actors and the outcomes of such processes. Both policy sectors take the collaboration with other sectors serious and like this enable a fair and just discourse.

Policy structures and procedures

As sustainability is seen as the guiding principle of every political action in Freiburg, extensive financial and personnel capacities are invested into this policy field (Stadt Freiburg i. Br., 2019). The staff unit for sustainability subordinated to the mayor's office employs about 250 employees with the aim of managing and coordination the city-wide sustainability process (Stadt Freiburg, 2020a). Within this unit, two main representatives lead the working group on sustainability and are responsible for communication with citizens and other external actors (Sustainability manager, personal conversation, June 10 2020). The annual budget of EUR 66 million is comparatively small compared to other departments, however as sustainability is an all-encompassing topic, financial resources of other departments are used for sustainability topics as well. (Stadt Freiburg, 2019).

For adaptation, the staff capacities are significantly smaller compared to sustainability. While the majority of staff working in the environment office are working on climate mitigation topics, the establishment of an adaptation manager has had a determined character to foster this component of climate policy (Adaptation manager, personal conversation, June 12 2020). In financial terms large amounts of money are spent on climate related topics. For the integrated climate concept, which also entails adaptation measures of almost EUR 5.750 million were spent while department II, which is responsible for the environment, was allocated the largest share of funds with round about EUR 305 million (Stadt Freiburg, 2019, p. 201). It can therefore be concluded that administrative capacity exists for both policy fields with varying extent regarding financial and staff capacities. Both policies employ at least one person responsible for management, including various other actors and defined their targets and measures in strategies and concepts.

In order to ensure coordinated procedures and rules of decision making, both cities dispose of competent internal networks that are authorised to set formal agendas, steer policy processes and include internal and external institutions and actors. In the working group adaptation, representatives from several affected offices are jointly working towards on adaptation issues coordinated by the adaptation manager (Adaptation manager, personal conversation, June 12 2020). Also the sustainability council aims to achieve more result-oriented cooperation and enable all actors to have a saying in the decision-making process (Stadt Freiburg, 2020a). Such factors constitute a valuable basis for developing PI proposals. Moreover, for this, joint decision making, and joint responsibilities must be existing too. Joint responsibility follows from joint decision making, that is, practised in networks for adaptation and sustainability. By bringing all actors to the table and including them in the process a joint feeling of responsibility is established.

Policy instruments and policy output

The sustainability process in Freiburg is strongly supported by a large number of policy instruments available to politics and administration. A comprehensive set of indicators is used as a powerful instrument to measure the process and development achieved, and in turn enables for effective reporting thereof. The sustainability report as an information, communication and control instrument allows for documentation of the development of the sustainability process and constitutes a basis for further improvement of implementation measures for the administration (Stabstelle, 2018). The reporting further allows to gain an overview of the budget spent on the different measures by each office and thus offers the possibility to use available resources in a goal-oriented manner. The city aims to constantly developed the reporting system as to effectively link financial and sustainability reporting across the administration to arrive at a consistent, city-wide sustainability reporting. For this, Freiburg was the first city to implement an own reporting framework (Stadt Freiburg, 2020e). Moreover, the city offers funding possibilities for three thematic areas: 1. optimal insulation of the building envelope,
2. efficient and renewable heating and ventilation, and 3. renewable power generation through photovoltaics. All subsidy programs fund a maximum of EUR 25,000 per applicant (Stadt Freiburg, 2020b).

The climate adaptation concept for heat can be seen as an instrument for the offices commissioned with urban and land use planning of the municipal administration (berchtoldkrass space&options, 2019). Further, funding programs are planned to be set up. Compared to sustainability policies no own reporting system has been set up yet, however the sustainability report includes information on few adaptation targets (Stabstelle, 2018). The joint reporting of both topics comprised in one document is a strong indicator for the successful integration of both policy areas.

Policy outcomes are an important feature to measure the effects policies have in reality. The sustainability report portrays in a two year cycle the development of Freiburg towards a more sustainable city. For this, the document evaluates implementation of the objectives on the basis of indicators developed specifically for this purpose. Based on this, it points out further options of actions to gradually evolve towards a more sustainable future (Stabstelle, 2018). As the report summarises a total of 23 targets, a brief overview about the general state of the art will be given. Generally speaking it can be said that the city is well on track regarding sustainable development (Sustainability manager, personal conversation, June 10 2020). This is also apparent in the facts and figures for each goal presented in the sustainability report; for the majority of goals a positive development could be recorded. Positive developments were reported, for example, for the employment of foreigners, women and citizens in general, CO₂ emissions per capita (-30 % compared to 1992) or the share of bicycle traffic - in fact, the latter exceed the set goal of 30% share of cycle traffic (Stabstelle, 2018). Other targets remained stable, such as the number of children (15,4 %) and elderly people (7%) affected by poverty or the area for conservation of biological diversity in the city (286 ha) (Stabstelle, 2018). Few developments show negative trends and can thus need further dedication and improvement, e.g. the percentage of the population receiving social benefits slightly increased (9 % to 9,3%) (Stabstelle, 2018).

As no individual monitoring and reporting system for adaptation measures exists, the result for adaptation listed in the sustainability report are evaluated. The trend shown for this policy field is comparable to sustainability. Despite a steady increase in population, the share of settlement and transport areas remains constant with 31,9% (Stabstelle, 2018). Hence, the goal of effective land use is successfully pursued. Furthermore, positive developments for the share of urban green areas and trees planted are to be expected (Stabstelle, 2018). The adaptation manager supports the claim that adaptation policies achieve positive outputs (Adaptation manager, personal communication , June 12 2020). The overall positive development of both policy fields indicates that both sustainability and adaptation policy are well on track. No conflicts among the outcomes of both policies could be found, however, it is important to emphasise that reporting of outcomes is only available for a small amount of adaptation policies. A final conclusion can thus not yet be drawn.

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Overview of PI

The following table offers a brief overview about the achievements of PI in Freiburg based on the previous analysis. The evaluation of requirements for PI stretches from ++ (fully met), + (met), - (barely met) to -- (not met at all) and 0 (no data available).

| Component of PI | Indicators | Analysis of PI |
|---------------------------------------|--|----------------|
| Elements of Policy | Scope of policy | + |
| | Perception and aspects of the problem situation | ++ |
| | Spatial and temporal systems of reference | ++ |
| | Cross-scale integration | |
| Goals and | Goals and objectives | ++ |
| objectives | Measurable, indicator-based targets and timetables | |
| Policy actors and networks | Internal actors | ++ |
| | External actors | + |
| | Relationship among actors (face-to-face dialogue) | + |
| | Actor networks | + |
| | Formal and informal interaction | ++ |
| Facilitated Leadership | Political commitment and leadership for PI | ++ |
| | Determination and number of leaders | ++ |
| | Effective collaborative leadership | ++ |
| Policy structures & | Administrative capacity | + |
| | Procedures and rules of decision-making in competent | ++ |
| | administrative bodies | |
| | Joint decision making and joint responsibilities | ++ |
| Policy instruments & Policy Output | Types of instruments | ++ |
| | Actual Outcome of Policy | + |

Table 5: Overview of PI in Freiburg

5 Discussion

After having analysed all three cities thoroughly with regards to their sustainability and adaptation policies and the potential degree of policy integration (PI) among them, this chapter seeks to provide a comparative analysis of the case studies and thereby consolidate and summarise on the main findings of this research. Moreover, the expectations set out in Chapter 2 will be reflected on.

In order to provide a clear, comprehensive and comparable summary of the results, the following table offers an overview about the achievements of PI in Nuremberg, Bonn and Freiburg based on the previous analysis. It has to be noted that the individual indicators of each component are condensed to one overarching result per component as to give a representative overview. Specifically, the evaluation of requirements for PI stretches from ++ (fully met), + (met), – (barely met) to – – (not met at all) and 0 (no data available).

| Components of PI | Nuremberg | Bonn | Freiburg |
|---------------------------------------|-----------|------|----------|
| Elements of Policy | + | + | + |
| Goals and objectives | — | _ | +/_ |
| Policy actors and networks | ++ | ++ | + |
| Facilitated Leadership | ++ | ++ | ++ |
| Policy structures & procedures | ++ | ++ | ++ |
| Policy instruments & Policy Output | ++ | + | + |

Table 6: Summary of PI

Based on the preceding analysis (chapter 4) and as seen in table 6, a predominately positive assessment of the degree of PI can be concluded for all three cities. The urgency for a comprehensive and integrated approach regarding climate adaptation and sustainability seems to be understood and acted upon by all cities. The analysis confirmed that, with one exception, all requirements for PI set out in the operationalisation (chapter 2.6) are met.

In this regard, the first expectations outlined prior to the analysis (see end of section 2.4.1) is addressed, which stated that "the more indicators of PI are satisfied, the higher the likelihood of two policies to be integrated". First of all, the analysis disclosed that the majority of both policies from the individual cities incorporate the other topic considerably. This is particularly apparent for sustainability policies; as outlined throughout the analysis (chapter 4), sustainability polices already indicate their

commitment and interest in facilitating integration with other policies. This is especially true with adaptation policies, as intersection among both policies can be found. This interrelation is due to their cooperation and collaboration with a great number of actors and networks and the incorporation of various topics, among them adaptation. Inversely, adaptation policies barely include sustainability as a stand-alone topic in their policies, which can be traced back to the fact that all three adaptation policies predominantly focus on heat as their main topic. As a consequence, they exclude several other issues sustainability is dealing with. Nevertheless, the consistent commitment for PI in the majority of policies and the fact that all components are satisfied strongly that this first expectation can be confirmed.

Then, addressing more directly the implications of the analysis in chapter 4 in terms of answering the sub-questions posed in chapter 1.2, we begin with the first sub-question: "Using the experiences of three German municipalities as a case study, what is the state of integration among adaptation and sustainability policies on the local level?". Taking the three case studies as examples, the degree of PI between climate adaptation and sustainability policies on the local level?". Taking the three case studies as examples, the degree of PI between climate adaptation and sustainability policies on the local level can indeed be considered as very high. This information derived from the analysis which revealed that with one exception all requirements for PI are met. Both policies resemble each other on various ways such as having similar targets, approaches or actors. Moreover, the political commitment for PI is given in all cities and decisive for the overall high degree of PI.

What is striking, is that the cities obtained merely common results for the individual components. It can be assumed that this is due to the high similarity among the three case studies and their institutional and economic circumstances. Further possible explanations for this are given below in section 6.1, where the limitations of this research are elaborated on. Noteworthy are the overall very positive results for the components policy actors and leadership as those constitute the core of this research. The only component that could not sufficiently be satisfied is goals and objectives. Here it is important to add, that the indicator *measurable and indicator-based goals and targets* was not met by any of the three analysed adaptation policies. It can be suggested that the field of adaptation is not yet prepared to fulfil this requirement. Thus, the lack of indicators can be justified by the fact that adaptation as a topic made it comparably later to the political agenda of each city.

Subsequently as part of the second sub-question, the influence of actors and networks and the collaboration among them is examined. This sub-question reads: "What influence do actors and networks have and how does their collaboration influence the process of PI in municipalities?". The influence of actors on PI is significant as their relationship, commitment and responsibility is determining for successful or failing integration. It could be proven, that common actors enhance the likelihood of two policies being integrated. Further, as scope, policy structure and instruments resemble each other, cooperative and collaborative relationships among actors prove to be the determining reason for both policies to get further integrated. Collaboration among actors showed to be crucial in order to detect common grounds and mutual gains, setting and maintaining clear ground rules and building trust. Moreover, barriers seem to be broken down and miscommunication could be

counteracted. Those factors are favoured by leaders. Important for successful actor collaboration is that all policy fields dispose of at least one person responsible for coordinating and managing the process. Moreover, the results of the analysis reveal the existence of common internal and external actors that share values and goals and are tightly connected through a collaborative relationship. This is derived from the predominantly direct communication in the form of face-to-face dialogues, that suggests a positive relationship among different actors. Further, the linkage between the type of communication between actors and their commitment to the process is analysed. The expectation tested here is that direct communication, preferably in the form of face-to-face dialogue, favours actor relationships and the feeling of joint responsibility, which ultimately leads to mutual trust and respect among actors. Indeed, face-to-face dialogues are predominant components of communication in each city. In addition to this, relationships are assessed as cooperative, moreover joint responsibility is established. Consequently, it is argued that this expectation can be confirmed. The existence of multiple leaders in the role as facilitators helps to further improve their relationship by setting clear rules for communication, empowering all actors and facilitate dialogues. Like this, trust for the process among actors is further enhances and mutual gains can be explored collectively.

Linked to the second sub-question, a further expectation was that the existence of policy actors that share the same background indicates that policy goals are similar at its best. This expectation can be confirmed as policy actors as well as policy goals are assessed as being common and complementary. For this, the specific tables at the end of each individual analysis (4.1.3 & 4.2.3 & 4.3.3) have to be taken into account, as they further differentiate between fundamental goals and indicator-based goals, while the upper table 6 summarised both and thus arrives at a comprised result for the component goals and objectives.

Now, the third sub-question: "What influence do actors and networks have and how does their collaboration influence the process of PI in cities?" will be answered. Lessons learnt for advanced policy integration for other municipalities with similar background are derived from the findings. The first recommendation provided for other municipalities is not hugely novel but of critical importance, and hence must be underlined: the more indicators of PI are satisfied the higher the likelihood of two or more policies to be integrated. Thus, cities should strive to take different aspects into account to allow for PI. As this research sought to prove, actors are an exceptionally important factor as they facilitate or hamper the process depending on their collaboration. Preferable direct communication modes should be chosen to break down barriers and implement a feeling of mutual trust and commitment for the process. Having one or multiple actors in the role of a facilitated leader further supports this process as coordination and effectiveness of communication and decision procedures are enhanced.

6 Conclusion

This thesis sought to analyse the degree of integration of sustainability and climate adaptation policies on the local level on behalf of three selected German cities. A special focus has been placed on actors in this process and collaborations among them. In order to do so, two relevant theories Policy integration and Collaborative governance have been combined as they complement each other and build a solid framework to answer the guiding research questions.

Since all sub-questions have been answered within the previous sections (chapter 5), this section now ultimately gives an answer to the study's main research question: "To what degree are climate adaptation and sustainability policies on the local level integrated and how is this process influenced by actor collaboration?".

Referring to the former part of the question "To what degree are climate adaptation and sustainability policies on the local level integrated", the analysis of PI in Nuremberg, Bonn and Freiburg by means of the developed conceptual framework and multiple indicators reveals that the degree of PI among climate adaptation and sustainability fields is indeed high. Almost all relevant requirements have been met, with one exception, namely *goals and objectives* or to be more precise its indicator *measurable and indicator-based targets and timetables*. The adaptation policy field of each city was not yet prepared to fulfil this requirement; however, most sustainability strategies indeed covered some particular adaptation targets. Despite this, all requirements are met, therefore a high degree of PI can be trace to the great involvement of actors and their successful collaboration.

Finally, the latter part of the research question is being answered, namely "how is this process influenced by actor collaboration?". The influence of actors on PI is significant and determining for successful or failing integration. Common actors as well as collaborative relationships among them significantly enhance the likelihood of two policies being integrated. Especially direct communication among actors contributes towards discovering common grounds and mutual gains and building trust. Collaborative relationship among actors' further favours joint feelings of responsibility and joint decision making which in turn is beneficial for PI. Consequently, it can be concluded that direct communication among actors fosters collaborative relationships which in turn favour PI.

6.1 Limitations

Here, a reflection upon the research's limitations including a critical consideration on the data collection technique as well as the over-all generalisability of findings is given. Although the selected research method turned out to be practically and methodologically appropriate in answering the study's research question, some limitations have to be considered.

First of all, as the literature review conduced prior to this study revealed, only a limited amount of literature aims at investigating PI of adaptation and sustainability policies on the local level. Literature that integrate the focus on actor collaboration into this topic turned out to be even scarcer. Therefore, this study contributed to this lack in a novel way, yet this also entailed and lead to some methodological doubts as part of this research. Specifically, it had not been practically tested and approved, whether the applied framework will actually deliver credible results. In this regard, as the next paragraph states, the findings have been beneficial to answer the research question, they are limited in their generalisability.

Another potential limitation of this research is that the findings are grounded on a relatively small sample size of three German cities that have both extensive climate adaptation and sustainability policies at their dispose. This factor was important to enable this research due to limitation in scope and time. Consequently, the results are particularly positive as the chosen case studies proved to be outstanding in both policies field in the national context. Moreover, looking at the criteria for case selection set out in the methodology part (section 3.4) (similarities in population size, political and administrative processes, economic and institutional circumstances and in adaptation and sustainability efforts) the selected cities are particularly well developed. Indeed, finding cities that comply with all those requirements was not an easy task. Therefore, it can be said that the generalisability of the findings is rather low as the results are applicable to only a small number of cities.

A third limitation is that having interviewed only one responsible person for each policy field of each city limits the amount of gathered data. Despite carefully choosing the most appropriate personnel in the administration for this research, some of the respondents we only able to answer certain questions to a restricted degree. For example, the respondent for adaptation in Freiburg only took up her work as the adaptation manager three months prior to the interview and therefore was not able to answer all questions satisfyingly as the process was rather novel to herself. Moreover, the respondents all are working in the city administration and thus were mainly able to convey information about internal processes. However, as external actors are part of the analysis too, direct information from external actors would have been worthwhile. Given the restricted circumstances due to the current Covid – 19 pandemic, finding interview respondents turned out to be more complicated as previously assumed when this research was planned. Fortunately, all interview partners were able and willing to conduct online interviews which enabled the researcher to obtain primary data sources. This circumstance, however, limited the chances of finding further fitting experts.

6.2 Further recommendations

Based on the limitations outlined in the previous section, a number of recommendations for further research are provided.

Regarding the limited amount of research devoted to the field of PI between climate adaptation and sustainability policies in cities with a focus on actor collaboration, studies contributing to closing these fundamental gaps are thought to be of particular worth. Filling these gaps will lead to an increase of frameworks to successfully measure PI on one side and further promote the integration of collaborative governance into this process. Ultimately, public administrations will benefit from this as well as the success of climate adaptation and sustainability processes in cities.

Moreover, as the findings are thought to be applicable to only a limited number of cities, it would be beneficial to apply the framework to cities with a higher generalisability in order to create result that are transferrable to a broader set of cities. Investigating the degree of PI in cities with limited administrative and financial capacities could serve as interesting examples in order to determine the correlation between administrative and financial capacities and PI. Moreover, it might be valuable to analyse PI in cities that not yet have fully developed one or either of the policies to obtain information about how the process of PI can be facilitated from the very beginning on.

Lastly, more detailed and diverse insight and information especially for actor collaboration can be obtained by conducting interviews with multiple internal and external actors in different roles for each policy field. Interviewing external actors from universities, NGO's, private organisations or civic networks sheds light on the PI process from another angle and like this can enhance the findings.

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