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Evaluating e-Participation

Frameworks, Practice, Evidence

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Georg Aichholzer, Vienna;
Herbert Kubicek, Bremen;
and Lourdes Torres, Saragossa

Acronyms and Abbreviations

ABC	Attitude, behavior, and choice
CAHDE	Ad hoc Committee on e-Democracy of the Council of Europe
CH_4	Methane
CIRCE	Research Centre for Energy Resources and Consumption
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalents
CoM	Covenant of Mayors
CRed	Community Carbon Reduction Program
DFG	Deutsche Forschungsgemeinschaft
DG	Directorate General
DVD	Digital versatile disc
e-SQ	Electronic service quality
ECRP	European Collaborative Research Projects
EF	Emission factor
eGEP	eGovernment Economics Project
EIPA	European Institute of Public Administration
EPSA	European Public Sector Award
ESF	European Science Foundation
EST	Energy Saving Trust
EU	European Union
EVM	Expected value model
FAQ	Frequently asked questions
FWF	Austrian Science Fund
GHG	Greenhouse gas
GIS	Geographic information system
HCI	Human–computer interaction
I = PAT	Equation in environmental science (Human Impact on the environment equals the product of Population, Affluence, and Technology)
ICLEI	International Council for Local Environmental Initiatives
ICT	Information and communications technology
IFEU	Institute for Energy and Environmental Research in Heidelberg
IPCC	Intergovernmental Panel on Climate Change

IT	Information technology
kWh	Kilowatt-hour
LCCN	Low Carbon Communities Network
LED	Light-emitting diode
LFU	Least frequently used
MRT	Media richness theory
MZES	Mannheim Centre for European Social Research
N_2O	Dinitrogen monoxide
NGO	Nongovernmental organization
NOA	Needs, opportunities, and abilities model
NPM	New Public Management
OC	Online consultation
OECD	Organisation for Economic Co-operation and Development
OGD	Open Government Data
PB	Participatory budgeting
PTT	Post, telephone, and telegraph companies
QCA	Qualitative computerized analysis
RCT	Rational choice theory
RFI	Radiative forcing index
RSS	Rich Site Summary
SD	Standard deviation
SES	Socio-economic status (model)
SMS	Short Message Service
SPD	Social Democratic Party of Germany
TAM	Technology Acceptance Model
UBA	German Federal Environment Agency
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
UNIZAR	University of Saragossa
UNPSA	United Nations Public Service Award
UNPSD	United Nations Public Service Day
URL	Uniform Resource Locator
WWF	World Wide Fund for Nature
WWV	World Wide Views

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Chapter 1
Introduction

Georg Aichholzer, Herbert Kubicek and Lourdes Torres

Abstract This book presents the results of a 3-year international research cooperation on concepts and methods to improve the evaluation of e-participation in the area of sustainable development and climate protection.

1.1 How It Began

In November 2007, the European Science Foundation (ESF) invited scholars from all over Europe to a research conference entitled "Electronic Democracy—Achievements and Challenges" held in a former monastery in Vadstena, Sweden. Under the moderation of Herbert Kubicek about 40 researchers, well known seniors and young PhD students, tried for 3 days to identify the theoretical and methodological challenges for the future research agenda in different subareas of e-democracy, for example, e-consultation, e-petitioning, e-movements, e-voting, and more. They agreed that the biggest challenge in all of these fields is the evaluation of the deployment, use, and impact of the new electronic tools in their respective context.[1]

The biggest barrier to valid assessment is the lack of comparability in existing research, which is mostly case oriented, providing a set of highly heterogeneous cases. There is a need for international and interdisciplinary comparative empirical

[1] See the conference report by Herbert Kubicek at http://www.ifib.de/publikationsdateien/ESF_e-democracy_Report_2008.pdf and the press release by the ESF www.esf.org/hosting-experts/scientific-review-groups/social-sciences-soc/news/ext-news-singleview/article/edemocracy-research-requires-all-inclusive-approach-esf-conference-told-397.html. Accessed July 27, 2015.

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research. As the effects of electronic tools are highly dependent on their context, it is necessary to compare similar tools in a similar context in order to detect success factors. Success can only be assessed and success factors can only be identified by comparing a number of cases with the same kind of participation on the same subject and by the same target group of participants.

The ESF offers the format of European Cooperation Research Projects (ECRP) for this kind of research under a two-step review process and with particular support for the cooperation between research teams from at least three different countries. It was during the conference that four researchers from Austria, Denmark, Germany, and the UK sat down together and started a discussion on what such a research cooperation might look like. We agreed that we were most interested in evaluating government-initiated processes of citizen consultation and collaboration. From previous research on this kind of participation, we knew that a salient issue and personal concern are the most important success factors for reaching a large number of participants. As this discussion coincided with the preparation of the UN Climate Change Conference in Copenhagen, we agreed that climate protection is an appropriate subject of individual concern and, at the same time, of European significance. In addition, the subject of fighting climate change has a methodological advantage because it allows the comparison of the impact of participation in a quantitative way via the measurement of the CO_2 reduction achieved[2].

We also felt that the four of us only covered the northwest of Europe and that we should get a partner from Southern Europe on board. We invited the research team at the University of Saragossa, Spain, to join us and they accepted. The group of six senior researchers, Georg Aichholzer (AT), Jens Hoff (DK), Herbert Kubicek (DE), Ann Macintosh (UK), and Lourdes Torres and Vicente Pina (ES) not only represented different countries but also different disciplines, and thereby permitted a comprehensive and interdisciplinary concept of evaluation. We met several times in order to elaborate a coordinated research plan for an ECRP, which was submitted to the ESF in April 2008. The official title is "Comparative Assessment of E-Participation in the Context of Sustainable Development and Climate Change." For outside communication we chose "e2democracy," meaning "electronic environmental democracy."

1.2 The Set Up

In order to assess the impact of electronic tools a quasi-experimental design seemed necessary, in which one group of citizens participated by traditional means (face-to-face, telephone, and mail) and a second group via the Internet. There should be more than only one project of this kind in each participating country. We agreed to find three local communities of different sizes in each of the participating countries. For the acquisition of cooperating local communities, the signatories of the Aalborg

[2] In this book we use the terms carbon dioxide (CO_2) and carbon dioxide equivalents (CO_{2e}) interchangeably.

Commitments[3] were considered to be the most promising, as they had committed themselves to having their citizens participate in the efforts of CO_2 reduction and to providing a regular monitoring. However, several of the signatories did not welcome the offer of a free evaluation of their activities and a complementary contribution to their monitoring, and it took some time for letters of intent to be included in an application for funding.

The joint application successfully passed the review process by the ESF, but an additional review by the national research funding organizations is necessary for the funding of each team. While the Austrian, German, and Spanish agencies; the Austrian Science Fund (Der Wissenschaftsfonds—FWF); The Deutsche Forschungsgemeinschaft—DFG; and the Ministry of Science and Innovation (Ministerio de Ciencia e Innovación) in Spain approved the funding, the Danish and the British agencies did not. Therefore, the remaining three teams had to take over the tasks assigned to the two excluded teams.

When the national research teams were established and the local communities which had provided letters of intent were informed, some were not willing or able to provide the necessary personal support for carrying out the project. In Germany, in particular, it turned out that the three cities which had signed the Aalborg Commitments and letters of intent to participate in the project had not conducted any kind of citizen participation in their initiatives against climate change, or any systematic monitoring including private households. Consequently, they were not able to raise the resources for setting up participation processes with their existing budgets or were afraid that they would not succeed in recruiting the desired number of 400 panelists. So, the search for participating communities had to start all over again. In Spain, the cities of Saragossa and Pamplona immediately upheld their commitment to the project. The third local administration which had signed a letter of intent, the Provincial Government of Biscay, was more interested in issues of water supply rather than CO_2 reduction when planning the details. The research team was willing to follow this priority but the results would not have been comparable. In Austria, an active involvement materialized for two of the contacts which had signed letters of intent to participate in the e2democracy (e2d) project. In the case of Bregenz, the definite agreement came about immediately, and in the case of Styria three regions had been considered for participation by the Regional Development Agency Styria[4] (southeastern Styria, Schladming, and Mariazeller Land); the decision was finally made in favor of the latter within a rather short time span. Negotiations with our original third candidate, the city of Vienna, extended over several weeks, starting with the Local Agenda 21 Office which finally found it would be more appropriate the project be hosted by the city's Climate Protection Coordination Office. After several meetings of scoping the fit with the Coordination Office's strategies and activities it finally became clear that they preferred to pursue alternative formats of citizen participation and advice in energy efficiency as opposed to joining the e2d project. Initial attempts to continue the search for interested alternative candidate

[3] See http://www.sustainablecities.eu/aalborg-process/commitments. Accessed July, 28, 2015

[4] See http://www.landentwicklung-steiermark.at/. Accessed July, 28, 2015

cities were finally stopped before too many resources were absorbed and delays incurred in view of lengthy negotiation processes already experienced.

So, finally the cooperation of seven local communities had been won. Three local communities joined the project in Germany (Bremen, Bremerhaven, and Wennigsen), while two could be won in Austria (Bregenz and Mariazeller Land), and another two in Spain (Pamplona and Saragossa). The two Spanish cities are the only signatories of the Aalborg Commitments in this sample.

1.3 The Basic Research Design

In each local community a cooperation agreement had to be achieved, including a commitment to CO_2 reduction between the administration, local businesses, and panels of citizens, as well as an additional consultation project on a subject in this area. The local administration was to take responsibility for the recruitment of citizens and business partners and for organizing and moderating the collaboration and consultation processes. The national research teams provided the electronic tools and user support and conducted the evaluations through surveys, interviews with local organizers, and observations.

As measures of CO_2 reduction include heating and electricity, they are season dependent. In order to assess any improvement, at least a 2-year period of measurement is necessary. Therefore, the field study was scheduled for 24 months. However, it was not possible to start with all the panels in the three countries at the same time. The first panel started in Bremen, Germany in December 2009, and the last one, because of delays in acquisition, in March 2011 in Wennigsen.

1.4 Data Collection and Analysis

Each research team took responsibility for different aspects of the evaluation and the respective research instruments.

The German team was responsible for the CO_2 calculator, which transforms energy consumption and other areas of consumption into CO_2 emissions. While it was appropriate to use the same calculator in Austria and Germany, it turned out not to be the case for Spain. Because of differences in the national energy mix and emission factors, the Spanish team elaborated their own CO_2 calculator based on the Austro-German one.

The Austrian team took responsibility for three rounds of surveys of participants of citizen panels, the German team for the participants in the consultation processes and the Spanish team for two rounds of interviews with local organizers and government managers involved in citizen collaboration. All the teams made proposals about the instruments proposed by the others, which were discussed and finally agreed upon in cooperation. Proposals for questionnaires and interview guides were submitted in English, discussed and finally agreed upon in cooperation meetings

and then translated into the respective national language. For comparative analysis, the data collected in each country had to be integrated into a common database. Each team collected and coded data, which was to be analyzed by another team. It is no surprise that the consolidation, particularly of the CO_2 data, raised a lot of questions which had to be clarified between the collecting and the analyzing teams. The biggest practical problem was that comparative data analysis could only be started after the last panel had delivered its last measurement. Thus, some inconsistencies of the data from different panels became apparent when drafting the chapters of this book and clearing these inconsistencies led to delays in finishing the respective chapters.

1.5 The Chapters

Due to how the responsibilities were distributed among the three teams for different aspects of the research design and the evaluation, this book is organized by authored chapters. Each chapter has gone through an internal review by the partner teams and an additional external peer review.

Chapter 2 starts with a state of the art report on the evaluation of e-participation. Herbert Kubicek and Georg Aichholzer summarize the expected benefits of citizen participation by traditional means as well as electronic tools, introduce a distinction between information, consultation, and collaboration, present different approaches to evaluation, introduce the generic Input–Activities–Output–Outcome–Impact model as the conceptual framework for the evaluation exercises in the e2d project and adapt it for the evaluation of consultation processes. The chapter ends with the basic hypothesis underlying the whole project and this book, which is called a two-fold relativity theory. Thereby, we mean that it is not appropriate to evaluate different kinds of participation processes with the same success criteria and measurement tools, but rather one has to take into account the differences between information provision, consultation, collaboration, petitions, and other forms, and develop tailored evaluation concepts and measurement tools. Even for a single kind of participation, there should be no universal evaluation, but a multi-perspective approach, taking into account that, for example, organizers and participants have different expectations and apply different success criteria when assessing the same process.

(e-)Participation in local climate governance is a key subject of several chapters in this book. For this reason, *Chap. 3* by Georg Aichholzer introduces the development of public participation in climate governance and the theoretical background of various approaches of public engagement with climate change, energy conservation, and transition to a low-carbon society. A special focus is made here on behavior change interventions and rationales behind the participation format of the local climate initiatives studied in the e2d field study. The ongoing discourse on the role and limitations of behavior change in policy approaches is also touched upon (cf. Kurz et al. 2015).

Chapter 4 by Basilio Acerete, Ana Yetano, and Sonia Royo analyzes the websites of the environment departments of European local government signatories of

the Aalborg+10 Commitments. It evaluates a first category of e-participation, that is, electronic access to information. The aim is to establish the extent to which the signatories make use of the Internet to promote e-participation and environmentally friendly behaviors among their citizens. The results of this chapter show that the developments in e-participation are higher in areas that only give information than in areas of interactive communication. This chapter shows that the Internet, as a tool to revitalize the public sphere, is still limited to countries with higher levels of transparency and a culture of citizen engagement.

In *Chap. 5,* Herbert Kubicek applies the basic model for evaluating consultation processes which has been introduced in Chap. 2 to six different consultation processes and presents the respective research tools. Following the general idea of a twofold relativity theory of evaluating (e-)participation, as outlined in Chap. 2, three pairs of similar cases are subject to evaluation from different views, caught with different instruments:

- For comparing two one-stage consultation processes, which have been carried out online only in Pamplona and Saragossa, Spain, a template is applied for assessing success criteria and success factors by external observers, in these cases the research team, which based their evaluation partly on data collected from managers and partly on their own observations.
- Data collected by questionnaires for assessing aims and expectations of organizers at the beginning and their assessment at the end of the consultation are compared for two consultations on political documents in Vienna and Bremen.
- Finally, two consultations on local development and planning in Bremerhaven and Wennigsen, Germany, are compared, which have been carried out in two phases: one for idea collection and one for priority building. Participants were asked about their expectations at the beginning of the process as well as their assessments of the process and its results at the end.

The final section of this chapter provides some methodological conclusions on the research instruments. An interesting finding in this respect is that the judgment of managers and participants varies with the point in time it is made, that is, before, during, or after the consultation process.

In *Chap. 6,* Georg Aichholzer and Stefan Strauß introduce the special form of participation which is the focus of this research; it is generally labeled as cooperation, collaboration, or coproduction. The essence of such relationships between public agencies and citizens is to collaborate in policy-making and implementing policy decisions on shared goals. Prominent collaborative (e-)participation models are participatory budgeting, citizen assemblies, citizen panels, community councils, round tables, and similar procedures especially in domains such as spatial planning and local governance. Electronic communication and an expanding repertoire of Internet-based applications play an essential role in facilitating collaborative participation.

Chapter 7 by Georg Aichholzer, Doris Allhutter, Herbert Kubicek, and Stefan Strauß presents the approach and the empirical setting for the evaluation of a collaborative type of (e-)participation in local climate governance. The focus of the

quasi-experimental field study is on assessing outcome and impacts. Common core elements of a set of similar participation processes characterized by a combination of individual and collective activities are explained and their potential effects and impacts are outlined. Checks for possible alternative explanations of impacts and potential biases caused by Hawthorne effects are addressed as well.

In *Chap. 8,* Ralf Cimander, Ana Yetano, and Sonia Royo review the criteria used to select the most appropriate CO_2 calculator for the e2d project and explain the criteria applied to adjust the calculator for continuous measurement with various feedback functions. The chapter goes into the details of the different categories of CO_2 measurement analyzed during the 2-year period and also describes the actual functioning of the calculator, how participants interacted with it and the feedback provided to them. Finally, some challenges, such as lack of data about emission factors, interpolation, validation, and comparability, are also discussed.

The integrative framework tailored to a longitudinal evaluation of the citizen–government collaboration on local climate targets (see Chap. 2 and 7) distinguishes between process, output, outcome, and impacts. *Chapter 9* by Georg Aichholzer, Doris Allhutter, and Stefan Strauß analyzes the relationship between process outputs, that is, the supply side of the e-participation processes such as the quantity and quality of devices and products offered to citizens for information, communication, and engagement, and the process outcomes, that is, the immediate effects of the output such as the number and activities of participants and their contributions. The chapter's first part outlines the evaluation framework, specifies the inputs and activities that provided the basic setup for seven local (e-)participation processes, and describes their output. The second part presents the outcome of the citizen–government collaboration studied.

Chapter 10 by Georg Aichholzer, Dieter Feierabend, and Doris Allhutter is the first of three chapters on the impacts of collaborative (e-)participation exercises studied in the e2d project. The contribution investigates attitudinal and behavioral impacts of (e-)participation in the citizen panels collaborating with local governments in joint efforts to reduce CO_2 emissions. Attitudinal changes turned out to be greater than behavioral changes, which can partly be explained by the difficulties of changing social practices (e.g., nutritional habits) and local context conditions (e.g., transport options) as argued, for example, by Shove (2010). An investigation of the causal mechanisms and mediating factors suggests moderate "gentle nudge" type effects (cf. Thaler and Sunstein 2008) from CO_2 footprint monitoring among panelists. A number of community-related factors, such as social learning and reported removal of personal barriers through community support clearly showed a positive relationship to behavior change and underline the importance of community-based initiatives (Heiskanen et al. 2010).

In *Chap. 11,* Ralf Cimander presents the results of the analysis on the ecological impact at individual level of the seven citizen panels in the local climate initiatives. The criterion used is the number of panelists who improved their own CO_2 balance by at least 2 % p.a. during up to 2 years of monitoring. A conceptual frame of reference developed by Wilber (2000) serves to explain different models and theories

of individual action and behavior, and to compare results among the seven citizen panels which are explained against the background of relevant context factors.

Chapter 12 by Ralf Cimander, Sonia Royo, and Ana Yetano analyzes whether the cooperation of citizens as participants of citizen panels has had a positive ecological impact at a collective level, by contributing to the achievement of a 2% annual reduction in the CO_2 emissions in their city or region. The authors suggest that a combination of different methodological approaches is the best option to assess the ecological impact at this level. Depending on the kind of calculation, some panels met the reduction targets completely, others only partially and one failed. It is an interesting finding that learning results are obtained after 1 year and that longer participation beyond this period does not seem to yield further savings but serves to prevent relapse.

In *Chapter 13,* Ralf Cimander analyzes the extent of dropout in the seven citizen panels during the monitoring processes in order to understand the reasons why panelists stopped their participation and/or did not enter their data. The author identifies mainly two kinds of dropout: one group of participants who only registered themselves and withdrew before entering any data for the CO_2 monitoring process and one who dropped out during one of the actual monitoring periods. Explanations for both types of dropout are sought with reference to local context factors.

Chapter 14 by Vicente Pina and Lourdes Torres evaluates the effectiveness of citizen participation from the organizers' point of view. It analyzes the experience of local managers in Germany, Austria, and Spain and their expectations about citizen participation in local government programs through an empirical survey focused on citizen participation in climate change programs. It seeks to compare the opinion of these managers, experts in climate change initiatives, about the impact of e-participation. This research contributes to better understand the opinion of managers about the success and failure factors of citizen participation in environmental programs.

In *Chap. 15,* Herbert Kubicek examines the consultation and collaboration processes described in the previous chapters with a special focus on the communication channels and tries to answer the question, what difference the "e" made, that is, whether there are any differences in satisfaction and/or impact between participants who communicated face-to-face and those who used the Internet. After a short review of the relevant literature on media choice and effects, the assessment of participants and of organizers of the six consultation processes with regard to costs, effort, outreach, and effects of the two modes of communication is presented. Furthermore, perceptions and observations on the effects of both modes are compared for one consultation case in Bremen where online and offline modes were offered in parallel. Finally, the impact of the online and offline panels is compared with regard to the CO_2 emissions, the accuracy of the consumption data delivered by the participants and the dropout rates of the respective panels.

Chapter 16 by Herbert Kubicek and Georg Aichholzer concludes the volume. It provides a summary of major results and lessons from the empirical evaluation of examples of three different types of (e-)participation processes: access to e-information, e-consultation processes, and collaborative forms of e-participation. The outlook addresses the methodological contribution as well as the policy field-specific

contribution of the results (the extent to which collaborative forms of citizen participation can enhance climate protection) and points to important qualifications under which the participation format studied in local climate initiatives can lead to positive impacts.

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Chapter 2
Closing the Evaluation Gap in e-Participation Research and Practice

Herbert Kubicek and Georg Aichholzer

Abstract This chapter points out the upswing of citizen participation, the emergence of a broad range of participation forms, and the high expectations of the potentials of e-participation. Against this background, a twofold evaluation gap is identified: a lack of acknowledged success criteria and indicators and a lack of empirical studies analyzing, differentiating, and comparing ecologies of e-participation instead of undertaking isolated case studies. The second part reviews major types of evaluation criteria and different conceptual frameworks for evaluating e-participation processes. It concludes with a twofold "relativity theory" of evaluation and proposes an adapted Input–Activities–Output–Outcome–Impact model for the comparative evaluation of e-participation through a quasi-experimental field study design.

2.1 Expected Benefits of Citizen Participation

Since the 1970s, there has been a tendency to complement political decision-making and administrative decision processes in the framework of the structures of representative democracy by procedures of citizen participation. This can be seen by statutory hearing procedures for land use planning and urban development, legal provisions for petitions and referenda as well as a broad variety of informal participation procedures on different themes, especially at the local administrative level, such as urban development, citizen budgets, overall visions for urban development, and environmental protection.

International organizations, such as the Organization for Economic Cooperation and Development (OECD) and the Council of Europe, strongly encourage national

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and local governments to increase the degree of citizen participation (OECD 2001a, b, 2003; Congress of Local and Regional Authorities 2000, 2008a, b; Council of Europe 2001, 2009)[1]. In particular, in the context of environmental policy there was the Aarhus Convention, launched by the United Nations Economic Commission for Europe (UNECE 1998), starting local agenda processes in many countries, followed since 2003 by directives by the European Union (EU) demanding citizen participation in environmental planning processes which have been transferred to national law.[2] Since 2004, more than 700 cities and towns have signed the Aalborg Commitments, obliging themselves to initiate local climate protection programs with citizen participation and regular assessment.[3]

In a critical appraisal, Innes and Booher (2004) summarize five reasons or objectives for the participation of citizens, in particular, in urban planning processes, which also apply to participation in environmental and climate protection policies:

1. Through participation, decision-makers can find out what the public's preferences are and consider them in their decisions.
2. Decisions can be improved by incorporating citizens' local knowledge.
3. Public participation can advance fairness and justice.
4. Public participation helps getting legitimacy for public decisions.
5. Participation is offered by planners and public officials because the law requires it (p. 422).

Moreover, some expect that participation will help to overcome the widely stated disengagement with politics and the loss of trust in political institutions (a.o. Pratchett et al. 2005). Others emphasize the building of democratic competence or social capital on the side of the participating citizens by their participatory experience (Irvin and Stansbury 2004), which could be called social learning as well. In political science, public participation is regarded not only as a means to specific political goals, but as a goal and a value in itself or, by integrating some elements of direct democracy, as a complement to the dominating forms of representative democracy.[4]

In most cases, the legal requirements for citizen participation demand the active involvement of public interest organizations by sending documents for consultation, while with regard to individual citizens, governments comply by allowing planning documents to be viewed in government offices or by general invitation to public hearings. In recent years, formal channels for petitions and procedures to start referenda have been established in a few EU member states as well (Riehm et al. 2013).

The actual acceptance by citizens of such participation offers often falls short of expectations because participation requires time and other resources. Especially in connection with urban development and land use planning, the participation

[1] In 2009, the Committee of Ministers of the Council of Europe adopted the recommendations of the Ad hoc Committee on e-democracy (CAHDE), including guidelines and principles as well as an accompanying document on practical tools, to which two of the editors of this book made their contributions. http://www.coe.int/t/dgap/democracy/activities/ggis/cahde/default_EN.asp. Accessed 27 July 2015

[2] See http://ec.europa.eu/environment/aarhus/legislation.htm. Accessed 27 July 2015

[3] See http://www.sustainablecities.eu/aalborg-process/. Accessed 27 July 2015

[4] Proponents of direct democracy most often refer to the theory of deliberative discourse and the public sphere by Jürgen Habermas (1996; summary by Chambers 2003).

obligations regulated by law or politics are not always fully supported by administrators and planners. Trained planners perceive it as a disregard of their professionalism and qualifications if the plans they laboriously produced can be rejected by citizens who have no special qualifications. And they argue that, in many participation procedures, it is not always the interests of the most concerned that become accepted but often the interests of the best organized. Also, sometimes the politicians in charge do not back the participation offers of their administrations because they fear for their acknowledged legitimacy (cf. Pratchett et al. 2005; Creasy et al. 2007).

On the other hand, citizens tend to refrain from engaging in statutory formal participation procedures mainly because it is not clear what will happen with their contributions and because trust in political bodies is lacking. According to so-called ladders of participation (Arnstein 1971; Wiedemann and Femers 1993), many procedures offered do not qualify for true participation but are restricted to the lower levels of the ladder, that is, informing citizens. Moreover, Innes and Booher (2004) emphasize that the communication situations, for example, in a public hearing, are such that qualitative improvements are rarely brought forward and that often reduced arguments are aggressively stated. Finally, the participating citizens quarrel, and administrators and politicians cannot reconcile the different arguments.

These experiences with formal participation requirements lead to experiments with more open, informal, and long-term participation procedures, such as focus groups, panels, planning cells, round tables, etc., where planners and the persons concerned work on problem analyses and solutions for longer periods of time. This so-called deliberative participation, according to Coleman and Goetze (2001), is a method of encouraging citizens to discuss and weigh up competing options, aiming towards preference formation instead of preference assertion. The OECD calls this kind of participation "cooperative participation" or partnership (OECD 2001a). In such settings, it has been observed that the prejudices of planners and citizens can be revised and that a constructive attitude develops. This positive learning success was especially strong in processes where the participating persons knew that they did not only have to deal with criticism of the administration's plans, but that the citizens also had to contribute, as is the case with measures against climate change (Creasy et al. 2007).

2.2 A Broad Range of Forms of Participation

Meanwhile, there is a broad spectrum of different forms of citizen participation, and there are different approaches to classifying this broad range of methods and devices. The OECD (OECD 2001a, pp. 15–16) uses a classification with three main forms of citizen participation:

- Information
- Consultation/communication
- Active participation/cooperation

For each of the main categories, a variety of methods and instruments is available (see Table 2.1).

Table 2.1 Devices for citizen participation (Kubicek 2010, p. 175)

Information	Consultation	Cooperation
Written official plans with maps	Surveys and polls	Neighborhood planning office
Leaflets	Complaint forms	Development trusts (i.e., by independent organizations)
Booklets	Appeal services	Round tables
Visualization	Citizens' expertise	Focus groups
Games	Ideas competition	Workshops
Newsletters	Award schemes	Neighborhood committees
Oral lectures/presentations	Simulation	Consensus conferences
Road shows	Face-to-face/door-to-door	Advocacy planning
Hotline	Community planning forums	Mediation procedures
Site visits	Citizens' request sessions	
Street stalls	Invitation of nongovernmental organizations (NGOs) to council meetings	
	Complaint hotlines	
	Action planning events	
	Experimentation	

Cooperation can take place in different ways and with different degrees of engagement. The International Association for Public Participation distinguishes five kinds of participation, with an increasing level of public impact, including three different forms of cooperation (IAP2 2007). The distinction between involvement and collaboration points to different degrees of engagement in terms of the time spent and the length of the process (see Table 2.2).

These different forms of participation are offered by governmental agencies or political bodies, and citizens may accept these invitations and participate in order to articulate their needs, provide their knowledge, and exercise some influence on plans or decisions, mostly within a predefined set of subjects and channels of communication. But there are other forms of participation where citizens or nongovernmental organizations (NGOs) try to initiate such processes by themselves and put the subjects of their concern on the political agenda. Complementary to the provision of public information by government agencies is the provision of information by NGOs, including the independent monitoring of government activities. Citizens may articulate and communicate their concerns and appeals, for example, by sending letters, collecting signatures, organizing, or taking part in demonstrations, etc. On a larger scale, this may take the form of campaigns, and in a more formalized and more influential way, there is the possibility of petitions and referenda.

In Fig. 2.1, bottom–up and top–down initiated forms of citizen participation are arranged according to the direction of initiation and the degree of commitment.

In the following parts, our discussion on evaluating e-participation will concentrate exclusively on top–down initiated forms, or e-participation understood as "taking part in public affairs in a particular phase of the institutional policy process" (van Dijk 2012, p. 12).

Table 2.2 Different forms of citizen participation (IAP2 2007)

Increasing level of public impact →					
	Inform	Consult	Involve	Collaborate	Empower
Public participation goal	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities, and/or solutions	To obtain public feedback on analysis, alternatives, and/or decisions	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution	To place final decision-making in the hands of the public
Promise to the public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible	We will implement what you decide
Example techniques	Fact sheets Web sites Open houses	Public comment Focus groups Surveys Public meetings	Workshops Deliberative polling	Citizen advisory committees Consensus-building Participatory decision-making	Citizen juries Ballots Delegated decision

2.3 High Hopes for e-Participation

The participation landscape has become especially variegated over the more recent past as an impressive list of information and communications technology (ICT)-supported forms of engagement in policy-making has evolved. Some of them transform previous models from the real world into the digital world, while others provide more or less new forms of political engagement (Oser et al. 2012). This diversification also applies to the subset of institutional participation on which this book focuses. There are several distinct approaches to structuring and classifying

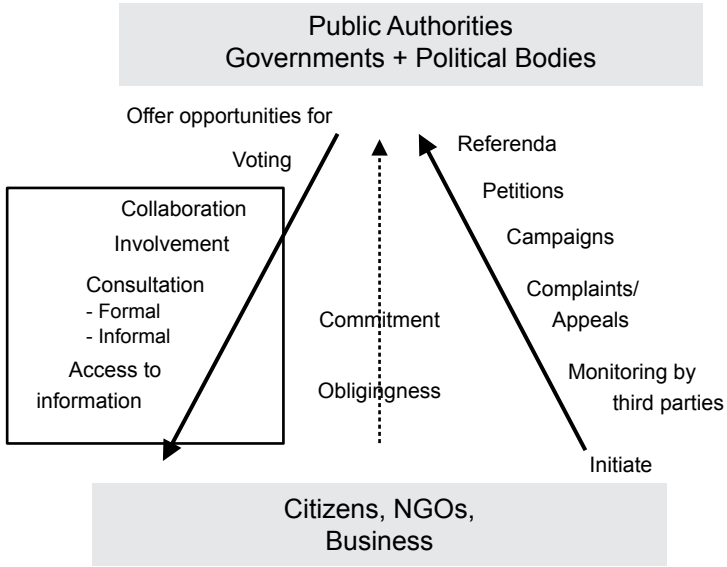

Fig. 2.1 Two directions of participation (illustration by H. Kubicek)

this landscape. On the lines of the OECD classification, Macintosh (2004) has suggested distinguishing between the different roles of ICTs: *"e-enabling"* denotes the function of ICTs to provide access to relevant and useful information, *"e-engaging"* evokes the idea that a wider audience can be consulted and involved in deliberative processes via networked technologies, and *"e-empowering"* is understood to support the active participation of citizens in policy-making and influencing the political agenda. In contrast to mere information and consultation type activities, the latter type of e-participation covers both formal and informal collaborative processes of civic engagement. Porwol et al. (2013) have compared 12 different models of e-participation, underlining the variety of perspectives.

Table 2.3 provides an overview of the methods and tools of the three main categories of e-participation and the corresponding stages of the policy-making process. The dynamics of technological innovation, experimentation and communication culture, as exemplified by the upswing of social media, make it necessary to continuously amend this participation matrix and existing toolboxes with new forms (see e.g., Macintosh et al. 2005; IAP2, 2006).

Along with the diffusion of the Internet as an information and communication medium in everyday life, hopes were raised that the new media might help to overcome the barriers to citizen participation experienced so far, because electronic communication—compared to citizen meetings or access to records in administrative agencies—is much easier and more flexible as regards place and time; on the side of the administration, it is also much easier to carry out surveys online instead of sending paper questionnaires by postal services.

Typical of these expectations is the following list in a publication of the OECD (Macintosh 2003, p. 33):

Table 2.3 E-engagement matrix (Macintosh 2003, p. 98)

Stage in policy-making cycle	Information	Consultation	Participation
Agenda setting	Search engines, e-mail alerts for new policy issues, translation support for ethnic languages, style checkers to remove jargon	Online surveys and opinion polls, discussion forums, monitoring e-mails, bulletin boards, and FAQs	E-petitions, e-referenda, e-communities
Analysis	Translation support for ethnic languages, style checkers to remove jargon	Evidence-managed facilities, expert profiling to assist government to know who the experts are	Electronic citizen juries, e-communities
Formulation	Advanced style checking to help interpret technical and legal terms	Discussion forums, online citizen juries, e-community tools	E-petitions and e-referenda to amend policy
Implementation	Natural language style checkers, e-mail newsletters	Discussion forums, online citizen juries, e-community tools	E-mail distribution lists for target groups.
Monitoring	Online feedback	Online surveys and opinion polls, discussion forums, monitoring emails, bulletin boards, and FAQs	E-petitions, e-referenda

FAQs frequently asked questions

> (…) the objective of technology-enabled information dissemination, consultation and participation is to improve the policy-making process through a range of devices designed to enable:
>
> - Reaching and engaging with a wider audience through a range of consultation and participation technologies adapted to cater for the diverse technical and communicative skills of citizens thereby enabling broader participation.
> - Providing relevant information in a format that is both more accessible and more understandable to the target audience to enable more informed participation.
> - Enabling more in-depth consultation and supporting deliberative debate online.
> - Facilitating the analysis of contributions to support policy-makers and to improve policy.
> - Providing relevant and appropriate feedback to citizens to ensure openness and transparency in the policy-making process.
> - Monitoring and evaluating the process to ensure continuous improvement.

In economic terms, e-participation, that is, participation based on information technology and in particular the Internet, is supposed to overcome the dilemma of legitimacy versus effectiveness (Dahl 1994) by reducing the marginal cost of additional participants (Andersen et al. 2007).

Moreover, recognizing decreasing voter turnout and increasing mistrust in political parties and bodies, politicians hope that they can regain trust and engagement by offering online dialogue and online participation. In particular, there is widespread hope that the interest of young people in politics can be raised if online communication channels are offered.

Similarly, the Internet allows for more effective and cheaper methods of citizen-initiated participation such as monitoring political bodies, publishing documents,

organizing online campaigns and online petitions. However, sometimes this potential is seriously overestimated; at least there is often no corresponding empirical evidence.

In political science research, there is rivalry between a "mobilizing" and a "reinforcement" hypothesis with regard to the number and the sociodemographic characteristics of online activists (Oser et al. 2012): Do the new online facilities draw previously less active citizens into the political process (Gibson and Cantijoch 2013) or do the main social factors of political engagement prevail in the digital world as well, and are online tools "weapons of the strong" (Schlozman et al. 2010)? On an international level, the debate about the Arab Spring is a good example of technology being overestimated. In 2011, the mass media attributed the success of the civil uprisings, that is, the largely peaceful revolution in Egypt, Tunisia, and with violence in Libya, to the Internet and text messages and videos via mobile phones. But Morozov in his book *The Net Delusion: How Not to Liberate the World*' criticized this attribution to technology (Morozov 2011). We would also argue that only the publication of amateur videos by the big TV-channels has created worldwide attention and pressure and, therefore, the retreat of the ruling leaders. In other words, the Internet is not the final decisive factor for the success of a movement, but rather success depends on several situational factors and the interplay of different communication channels (mix of media). And there is another lesson to be learned from these cases: By now everybody can see that the desired impacts have not been achieved. Therefore, one should take a longer perspective beyond the immediate short-term changes before making judgements about the success or failure of political movements.

It is interesting to note that all these expectations on the contribution of technology to the advance of democracy have been raised for decades. Very similar effects were listed almost 20 years ago with regard to "teledemocracy," defined as electronic dialog via two-way cable-television or computer networks (called mailboxes at that time).

Before the rise of the Internet, Scott London (1995, pp. 2–3) put together the following list of principal arguments in favor of electronically mediated political talk:

- Interactive telecommunications can foster increased civic participation in the democratic process.
- Telecommunications can link citizens together across the boundaries of time and space. It can also involve citizens who may ordinarily have no opportunity to participate.
- A direct link between citizens and government ensures the accountability of representatives.
- Electronic media can function as a mass feedback system, providing legislators with instant public opinion on issues.
- Many new electronic media provide unmediated communication allowing citizens to be in touch with each other and their leaders without such traditional gatekeepers as newspaper editors, mail carriers, and television moderators.
- The new media can facilitate direct public participation in governance through plebiscitary mechanisms or direct communication between citizens and policymakers.
- New technologies can process vast amounts of information almost instantaneously.
- Electronic communication can guarantee equal access to information to large numbers of citizens.
- Electronic networks are excellent vehicles for political agenda setting and planning.

- Teledemocracy enhances political competence by involving large numbers of people more directly in the process of public discussion.
- New technologies provide innovative ways of informing and educating the electorate on key public issues.
- Telecommunications can strengthen ties of communication among and between individuals and groups.
- New technologies provide improved access to government information and services.

Following US President Barack Obama, new initiatives have been started under the headline of Open Government in many European countries and the EU (Office of the President 2009; Ministerial Declaration on eGovernment 2009; European Commission 2010). The vision is that Open Government can be achieved by political leadership through building on the three pillars of transparency, participation and cooperation, based on Open Government data, generated for and from integrated network-based public services (see Fig. 2.2).

In line with this broader understanding of (e-)participation, Millard et al., in their review of the state of the art of e-participation in Europe, highlight the following opportunities in the application of ICT to participation (2009, p. 7):

> In the context of decision-making initiated by government "ICT can exploit the vast reserves of data the public sector has available" … and could include "involving constituents through political representatives or directly through processes of information, consultation, active participation and elections".
> Regarding empowerment from the bottom "ICT can help to leverage the voices and expertise of huge numbers of individuals and groups, setting their own agendas and developing their own policies in new forms of 'crowdsourcing', mass collaboration and mass creativity. This can also result in short-term single issue politics, and sometimes in instant street politics and forms of mob-rule, but can potentially also build to more permanent countervailing power bases possibly at odds with governments".
> "Transparency and openness can be supported by ICT through freedom of information and consultation, to reveal the purposes, processes and outcomes of government, also through real-time tracking and tracing. This will help place responsibility, reduce corruption and make decisions more responsive, although legitimate privacy and the space for risk taking should be safeguarded".

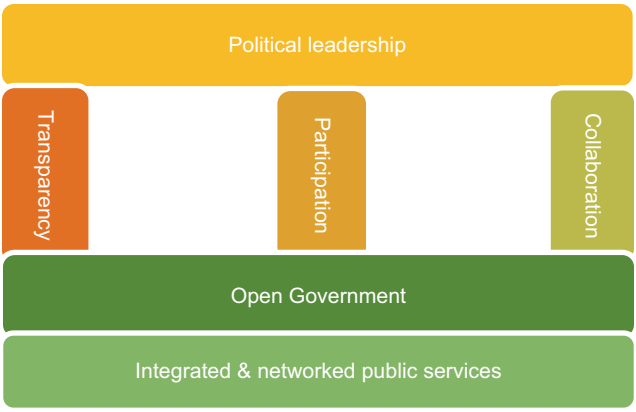

Fig. 2.2 Participation as part of Open Government (internal document of the European Commission; authors' translation from German)

But these are opportunities that are not always realized. For example, in Germany, governments and in particular national ministries and the chancellery have been heavily criticized by big magazines for spending money on expensive online consultation platforms, with either low participation rates or questionable results:

- "Online Konsultationen sind kein demokratischer Selbstläufer" (Online consultations are no democratic self-seller). Spiegel Online, 26 Nov. 2010. http://www.spiegel.de/netzwelt/netzpolitik/oeffentlicher-web-dialog-online-konsultationen-sind-kein-demokratischer-selbstlaeufer-a-731118.html. Accessed 27 July 2015.
- S. Becker: "Teure Websites—Regierung scheitert am Bürgerdialog" (Expensive websites—Government fails on citizens dialog). Spiegel Online, 2 Sept. 2011. http://www.spiegel.de/netzwelt/netzpolitik/teure-websites-regierung-scheitert-am-buergerdialog-a-783532.html. Accessed 27 July 2015.
- F. Beck and L. Novy: "Bürgerbeteiligung ist mehr als eine Webseite" (Citizen participation is more than a website). Zeit Online, 29 Feb. 2012. http://www.zeit.de/politik/deutschland/2012-02/partizipation-demokratie. Accessed 27 July 2015.
- "Experten sehen Chancen der Online-Demokratie nüchtern" (Experts assess the chances for online democracy with reservation). Heise Online, 20 March 2012. http://www.heise.de/newsticker/meldung/Experten-sehen-Chancen-der-Online-Demokratie-nuechtern-1475287.html. Accessed 27 July 2015.
- P. Beuth: "Bürgerbeteiligung im Netz mit fragwürdigen Ergebnissen" (Citizen participation on the net with questionable results). Zeit online, 13 April 2012. http://www.zeit.de/digital/internet/2012-04/dialog-fuer-deutschland-ergebnis-manipulation. Accessed 27 July 2015.

So, what are the relevant criteria for evaluating participation offers? The number of participants, the number of new ideas, new insights for whom, or is the impact of the process more important than the output? And what is the specific contribution of e-participation tools?

Between 1998 and 2008, the European Commission funded more than 35 e-participation research projects with a total budget of over 120 million € (Tambouris et al. 2008). As a supporting action, the MOMENTUM project has been set up in order to evaluate these (research) projects (Bicking et al. 2011). The most tangible results assessed were the websites, in most cases created as pilot projects in several member states. In quantitative terms, figures have been collected about the size of the target groups, the number of people reached, the number of visits to the websites, and the number of active participations, for example, posts or votes. According to the authors, the most striking results of this analysis are the great differences between these levels of engagement for most of the projects. For example, one project contacted about 1000 people, only 260 registered, 110 visited the website, but there were only 25 posts. In other projects, there was a better relation between the people addressed and the visits, but in all cases, the relation between the visits and the posts was even worse, for example, 232 out of 35,600, 2371 out of 21,909, or 273 out of 74,681 (Bicking et al. 2011, p. 4). With the data collected on the four benchmark areas, it was not possible to explain these gaps between passive and

active participation, calling for more comprehensive and differentiated frameworks for and methods of evaluation (see Millard et al. 2009; Tambouris et al. 2012).

Some observers see a solution to the attention and passivity problems in the so-called social media, and a transfer of the active behavior of millions of mostly young people, acting in these networks on everyday affairs and for entertainment, to political issues (e.g., Sæbø et al. 2009). But also, in this respect, there are warnings, to reject the "cheery techno-optimism, that avoids seeing social media in their social context" (Dahlgren 2012, p. 5). Overall, empirical evidence of the effects of social media on political participation and democratic practice is not yet conclusive and more research is needed to clarify its impacts (Auškalnienė 2012, p. 114, Gibson and Cantijoch 2013).

2.4 A Twofold Evaluation Gap

There is neither conceptual agreement on success criteria and indicators nor any valid empirical studies assessing the expected effects in a number of comparable cases. Research on the use and the effects of e-participation is still far from being able to provide empirical evidence for success factors. This is the conclusion of a review of the state of the art of research on e-participation within The Democracy Network (DEMO-net),[5] a Network of Excellence, established under the 6th Framework Programme of the EU (Macintosh and Coleman 2006; Aichholzer and Westholm 2009) and a research conference convened by the European Science Foundation (Kubicek 2007), among others.

In its recommendations for citizen participation, the OECD repeatedly emphasized the importance of systematic evaluation. But in 2005 in its volume *Evaluating Public Participation in Policy-Making*, it had to state that an evaluation gap exists:

> As noted in the 2001 OECD report, Citizens as Partners: Information, Consultation and Public Participation in Policy Making, there is a striking imbalance between the amount of time, money and energy that governments in OECD countries invest in engaging citizens and civil society in public decision making and the amount of attention they pay to evaluating the effectiveness and impact of such efforts. That a significant 'evaluation gap' exists is hardly surprising. If public engagement in policy making is a recent phenomenon and evaluation is itself a relatively young discipline, then it may safely be said that the evaluation of public participation is still very much in its infancy. (OECD 2005, pp. 10–11)

So far, Pratchett et al. (2009) have undertaken one of the most comprehensive attempts of comparative evaluation of e-participation. They characterize the evidence base of e-participation research as follows:

> While there is extensive academic literature on this topic, the case based evidence is actually quite limited. Much of the literature focuses on exploring particular normative accounts of deliberative or representative forms of democracy, tends to be highly descriptive in relation to its handling of particular cases and is 'boosterist' in relation to e-democracy's potential more generally. Moreover, there are only a limited number of examples of the Internet being used for policy deliberation, and these are often experimental in nature. ….

[5] See http://www.demo-net.org/. Accessed 27 July 2015

> The biggest problem with the literature, however, is that much of it is not concerned directly with seeking to understand or evaluate the impact of devices on empowerment. Research on e-Forums, in particular, focuses on the more direct questions of the type and quality of the deliberation taking place, and the effect of such features as moderation of discussion. There are only a limited number of cases where the wider issues of community empowerment can be identified. (Pratchett et al. 2009, p. 75)

Closing the evaluation gap concerning citizen participation in general poses severe conceptual and methodological challenges for assessing the effects and impact of e-participation projects and tools in particular. Assessment regarding usability and convenience and/or usefulness and effectiveness may start with the technical tools and other communication devices. However, the effectiveness of online tools is not determined by their technical functionality and usability but rather much more by the context in which they are deployed. The same tools are employed in different, more or less formalized participation procedures with different rules and regulations. These procedures are embedded in different institutional contexts, that is, policy fields with different sets of stakeholders, power distributions, legal provisions, cultural traditions, etc. (see Fig. 2.3). In most cases, e-participation research focuses on the technical tools and takes into consideration only some of the context-related aspects. However, a full-scale evaluation has to ascertain the procedural and institutional context in which these tools are more or less embedded because the effects of these tools depend on this context as well and cannot be separated.

If comparisons are carried out at all, most often they compare similar tools in different contexts (see also Aichholzer and Westholm 2009). Based on such compari-

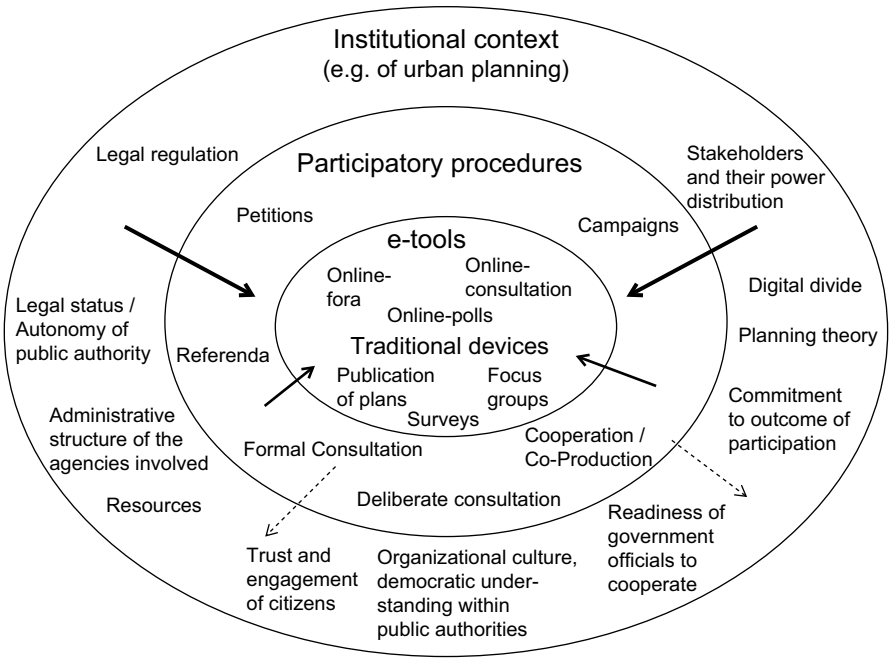

Fig. 2.3 E-participation tools in their contexts (Kubicek 2010, p. 171)

sons, one cannot tell whether different effects depend on the differences between the tools and/or the context. Rowe and Frewer (2004) have criticized the disregard or negligence of the context as the biggest deficit of existing evaluation studies of traditional participation procedures and formats. This disregard poses an even bigger problem for the comparison of e-tools as parts of such participation procedures (see Millard et al. 2009).

Medaglia (2011), in his review of 123 articles on e-participation, identifies an "underlying technological determinism":

> While contributions often formally highlight the dangers of technological determinism, and call for a deeper, more sophisticated view on contextual factors, affecting eParticipation processes, the large majority of studies that could do so have instead focused solely on technological determinants. (p. 106)

It would be more appropriate to compare different tools in the same context in order to ascertain which tools serve the purpose of a participation process best. But, so far, there are almost no studies that start from a specific policy context or domain, look at the established participatory procedures therein, and analyze the extent and kind of e-tools employed to support these processes. If they do, they find that e-tools have been employed in very few cases so far and/or often play a minor role compared to the traditional methods of communication within the same procedure (Aichholzer and Westholm 2009; Kubicek 2010).

This finding refers to a further complicating factor: There is almost no participation process which is based on e-tools only, substituting the traditional ways and means of information and communication completely. Rather, almost all serious participation processes apply e-tools in addition to the traditional ways of formal or informal participations, that is, they employ a media-mix (Kubicek et al. 2009), a multichannel or multimedia approach (Aichholzer and Westholm 2009), also called "blended participation" (Kubicek and Westholm 2010). The main reason is that there is still a mismatch between the sociodemographic structure of the population and that of the Internet users. Therefore, the results of online processes are not representative of the population as a whole and do not provide the desired legitimacy of decisions or policies. E-tools not only offer new chances but also build new barriers at the same time.

So, there is a twofold evaluation gap with regard to e-participation: There are no established and valid methods, either for evaluating the overall effects and impacts of multichannel participation processes or for assessing the partial effects of e-tools within such a process.

2.5 Evaluation Criteria for e-Participation

Evaluation can be defined as "the structured process of establishing the success or otherwise of an exercise against pre-set criteria" (Frewer and Rowe 2005, p. 94). The criteria should be chosen with regard to the purpose of the exercise and the evaluation. The methods applied vary with regard to validity and reliability.

2.5.1 Policy-Oriented Evaluation

Evaluation of (e-)participation projects and processes has been taking place for many years in the form of competitions, awards and benchmarks, among others, by well-respected organizations such as the United Nations, the European Commission, the Telecities association and others. They apply a wide range of success criteria and mainly rely on expert judgments based on submitted descriptions.

Competitions and Awards
Since 2003 the United Nations Public Service Award (UNPSA)[6] has been launched annually, with changing categories, by the United Nations Division for Public Administration and Development Management. Government agencies which have introduced particular innovations are eligible for this award. They have to be nominated by other government agencies.

In 2011 and 2012, awards were given in five categories. One was called "Fostering participation in policy-making decisions through innovative mechanisms" (e.g., utilizing ICT, participatory budgeting, participatory/social auditing and monitoring, and others). For this category, according to the submission guidelines, five evaluation criteria were applied:[7]

- Promotes responsiveness
- Promotes participation through new institutional mechanisms
- Facilitates e-participation
- Transforms administration
- Introduces a new concept

From 2003 to 2009, the European Commission launched the biannual European eGovernment Award with varying categories. The main objectives were to identify and select good practices of eGovernment, to highlight the benefits of ICT to society and to stimulate innovation and shared learning by identifying and promoting good practices. In 2007, one of the five categories was "Participation and transparency" and in 2009 "Empowering citizens."[8] On the basis of these objectives, the evaluation of submissions in 2007 applied five categories of differentially weighted criteria (each subdivided as exemplified for category 1):

1. Evidence of impact (30 points)
   - Provision of quantitative and qualitative evidence of impact or results, that is, the efficient use of *I = PAT* and/or eGovernment Economics Project (eGEP) methodologies will be awarded; other ways of describing impact are allowed, if convincing.
   - Recognition (EU, national, regional, local) by users.

[6] See http://www.un.org/en/events/publicserviceday/award.shtml. Accessed 27 July 2015

[7] See http://www.unpan.org/DPADM/UNPSDayAwards/UNPublicServiceAwards/tabid/1095/language/en-US/Default.aspx. Accessed 27 July 2015

[8] See http://www.epractice.eu/files/download/Awards2007SubmissionGuidanceNotes_en.pdf. Accessed 29 May 2014

   - Take into account the size/impact ratio, awarding impact score in relation to what share of the total relevant population is reached.
   - Do the results justify the resources spent?
   - Is the impact sustainable or is it a one-off phenomenon?

2. Evidence of/potential for sharing good practice (20 points)
3. Understanding of multichannel aspects (20 points)
4. Innovation and management efficiency (20 points)
5. Overall impression/communication capacity (10 points)

Since 2007, the European Institute for Public Administration (EIPA) has launched the biannual European Public Sector Award (EPSA) with changing categories. In 2009, one of the four categories was Citizen Involvement.[9] Evaluation criteria for all categories, according to the call, were innovation, public concern, significance/relevance, impact, learning capacity and transferability. In particular, with regard to the category "Citizen Involvement" the criteria were:

- Involvement and satisfaction of citizens, civil society, administrators, and politicians in the process/system
- Balance between process efficiency and governmental effectiveness
- Costs versus benefits of new approaches vis-à-vis traditional methods/processes

Benchmarks

Slightly different from award programs are benchmarks as they try to apply some kind of rating to projects or nations according to predefined criteria. Most famous is the e-participation index compiled by the United Nations within the frame of the UN E-Government Surveys. Since 2003, the UN Department of Economics and Social Affairs has periodically conducted e-government surveys and reviewed websites of the governments of all member states, most recently in 2012 (UN 2012). The benchmark is based on a listing of 21 offerings in the categories e-information, e-consultation, and e-decision-making, and the index shows the degree to which the websites are providing these features.

However, the results are quite surprising for each survey and even more so with regard to the changes from 2010 to 2012. For example, Spain was ranked third in 2010 and did not feature among the top 20 in 2012, but, for instance, the Russian Federation did, although only ranked 86th in the period before. In 2012, Spain was ranked 33rd and Austria 42nd, clearly behind Bahrain, Saudi Arabia, and Mongolia. The three countries at the top were The Netherlands, the Republic of Korea, and Kazakhstan.

Such inconsistencies raise doubts about the reliability of the method of measurement. Unfortunately, the model for calculating the e-participation index in detail is not disclosed. The authors admit that there is a problem in identifying and including all relevant websites in larger countries, but they do not reflect on what an inspection of websites can tell about e-participation and where the limits are. Website inspection may be an appropriate method to assess the degree of information provision but not for consultation.

[9] See http://www.epsa2011.eu/en/content/show/&tid=92. Accessed 27 July 2015

2.5.2 Academic Evaluation Approaches

Scientific studies are more sophisticated in this respect. Table 2.4 shows some examples of recommended or applied evaluation criteria for citizen consultation.

Rowe and Frewer (2004) have undertaken the most comprehensive review to date. They analyzed more than 30 evaluation studies of participation in different contexts and countries and found that all of them apply some process-related criteria, but only half of them apply some outcome-related criteria also (p. 540).

In a further review of existing evaluation research, Abelson and Gauvin (2006) argue that process evaluation is much easier as it relates to a process with a starting point, a definable set of places and actors, and for which an end point can be defined. While outcome-related evaluations are desirable in any case, because they are used to assess whether a project or program has achieved its objectives or produced the intended effects, it is much more difficult to achieve valid results as there is no obvious definition of an end point, and effects may occur at places and with people who were not part of the process.

As e-participation can be subsumed as a specific format under the more general concept of democratic innovations (Smith 2009), the criteria developed for evaluating these are also equally relevant. Geissel (2012) suggests a framework for assessing the impacts of participatory innovations on the quality of democracy, focusing on four dimensions and corresponding criteria (p. 170):

- Input-legitimacy (inclusive equal participation; perceived legitimacy)
- Democratic process (deliberative quality)
- Effectiveness (identification of collective goals; achievement of collective goals)
- Civic education (improvement of knowledge; improvement of civic skills)

Table 2.4 Examples of criteria in academic evaluations of (e-)participation

Rowe and Frewer (2000)	RTPI (2007)	Pratchett et al. (2009)
Acceptance criteria	*Consultation standards*	*Outcome factors* (criteria for evaluating "empowerment success")
Representativeness	Integrity	Impact on participants (skills, personal efficacy)
Independence	Visibility	Impact on communities (social capital, collective efficacy)
Early involvement	Accessibility	Impact on decision-making
Influence	Confidentiality and transparency	
Transparency	Disclosure	
	Fair interpretation	
Process criteria	Publication	
Resource accessibility		
Task definition		
Structured decision-making		
Cost effectiveness		

Recent approaches to evaluating e-participation in a scholarly fashion have applied some of these and additional criteria in combination with a quantitative methodology:

A project of the Mannheim Centre for European Social Research (MZES)/University of Mannheim in Germany provided the empirical basis for a broad examination of online consultations (OCs), a major category of e-participation, employing a quantitative approach. Quittkat (2011) used two large databases established during the "DemoCiv" project: one with basic data on 554 OCs conducted by individual Directorates General (DGs) of the European Commission between 2000 and 2007 and a second database for a deepened study of participation patterns, containing the data of all institutional and organizational participants of consultations carried out by DG Employment, Social Affairs and Equal Opportunities and DG Health and Consumers. The evaluation criteria were chosen in accordance with the European Commission's declared aims of civil society participation via OC, that is, to improve the quality of decisions and the democratic quality of European decision-making. The key criteria comprised openness, transparency, and inclusiveness. They were operationalized via the following variables:

- Specification of target groups (open, selective, or closed OC)
- Format of the online consultation (non-standardized, semi-standardized, standardized)
- Record of reporting (accessibility of individual contributions, assessment criteria used, accessibility of evaluation report, traceability of consideration in decision-making).

In order to "juxtapose formal openness with factual inclusiveness of OC," an integral part of the approach was "to analyze whether participation patterns are skewed towards specific groups" (Quittkat 2011, p. 664). OC format, the time period over which contributions were accepted, and the issues treated were considered to be the basic determinants for OC participation rates and patterns. Further aspects analyzed were the representation of specific actor groups, interest positions, and various aspects of territorial representation. Such a quantitative approach has its advantages, especially in its potential to explore and reveal the bigger picture of e-participation processes, that is, the larger patterns and trends in the practice of e-participation, its functions and its impacts, including a focus on comparative analyses. The analysis of 554 OCs organized by the European Commission not only showed an increase in the use of this instrument and unequal usage by the different DGs but also revealed some critical issues. Most noticeable are a shift towards standardized OC entailing a trade-off between format and participation (more open formats tended to bring higher quality input but lower numbers of participants), an unbalanced representation of interests in favor of business groups, and a high degree of nontransparency concerning incoming contributions and their further processing. Besides the OC format, the study identifies two other factors having special influence on participation rates and patterns: the issue treated and the time period allowed for contributions.

Quantitative recording and analysis of participation activities plays a key role in many e-participation platforms. It may include counting participant numbers as the success criteria, but it goes beyond what is known as web analytics, that is, the

collection and analysis of data on the behavior of website visitors through server- and client-based information from log files, tags etc. Märker and Wehner (2013) identified a more fundamental function inherent in many forms of online citizen participation, a kind of "Internet-based reform of the conditions of political participation" which amount to a "calculation of the citizens' will" (p. 276). Using the example of participatory budgeting, they show how this is brought about by the special possibilities of statistical recording and analyzing relevant online activities. It includes providing elements such as numerically coded suggestion lists, rankings of suggestions made, graphically animated analyses of relevant participation activities, summaries and overviews as well as gathering sociodemographic user profiles. With this circular integration of participation activities and statistical logging and analysis, Märker and Wehner argue that the conditions for participation become geared not only towards the possibilities of measuring the online activities, but also towards the selection of the criteria and factors for success. Moreover, the postulated change of function is of special relevance for a comparison between the online and offline formats of participation.

2.6 Different Conceptual Frameworks for Evaluating e-Participation Projects

To date, there are only a few frameworks for evaluating e-participation in its institutional and wider context.

2.6.1 The Three-Layer Framework

Macintosh and Whyte (2008), in line with the three levels distinguished in Fig. 2.3 above, propose a three-layer framework for evaluating e-participation with three levels of criteria or views. Among other applications, it has been used within the frame of the British Local Democracy National Project.[10] This approach was slightly modified and adopted in the recommendations submitted by the DEMO-net project (Lippa et al. 2008) and the CAHDE of the Council of Europe mentioned previously.[11] Table 2.5 shows the different wordings for the three layers and the subdimensions proposed for or applied in evaluation exercises.

The *socio-technical* or *tool perspective* considers the extent to which the deployed tools directly affect the outcomes, that is, help to achieve the objectives of an e-participation project. Hence, the evaluation looks at the public take-up and usage and the usefulness and acceptability of the tools with respect to users and processes.

The *project* or *initiative perspective* looks in detail at the specific aims of e-participation projects and initiatives and the extent to which they meet their objectives.

[10] See http://www.e-democracy.org/uk/. Accessed 27 July 2015

[11] A more elaborated version is contained in Aichholzer and Westholm (2009).

Table 2.5 Variations of the three-layer approach to the evaluation of e-participation

Local democracy national project	DEMO-net	CAHDE
Tool quality criteria	*Socio-technical perspective*	*Tool quality criteria*
Social acceptability (trust and security, relevance and legitimacy)	*Social acceptability* (trust and security, relevance, and legitimacy)	*Social acceptability* (trust and security, relevance, and legitimacy)
Usefulness (accessibility, appeal, content clarity, responsiveness)	*Usefulness* (accessibility, appeal and usage, content clarity, interaction, responsiveness, good practice)	*Usefulness* (accessibility, appeal, content clarity, responsiveness)
Usability (navigation and organization, efficiency and flexibility, error recovery)	*Usability* (navigation and organization, efficiency and flexibility, error recovery)	*Usability* (navigation and organization, efficiency and flexibility, error recovery)
Key dimensions of e-democracy initiative	*Project perspective*	*Key dimensions of e-democracy initiative*
Type of engagement	*Engaging with a wider audience* (outreach, inclusiveness, community development)	*Type of engagement* (information, consultation, active participation)
Stage in decision-making	*Obtaining better-informed opinions* (information, learning)	*Stage in decision-making*
Actors	*Scope of deliberation* (extent of interaction, extent of rationality)	*Actors involved*
Technologies used	*Effectiveness* (cost and time)	*Rules of engagement*
Rules of engagement	*Feedback* (content and quality, participants satisfaction with feedback)	*Duration and sustainability*
Duration and sustainability	*Process quality* (areas of enhancement, gap analysis, harmonization of work practices	*Accessibility*
Accessibility	*Sustainability* (level of stakeholder support)	*Resources and promotion*
Resources and promotion		*Evaluation and outcomes*
Evaluation and outcomes		*Critical success factors* (to be agreed on before starting the initiative)
Critical success factors		*Gender aspects*
		Understanding of democratic principles, actors' images of democracy
Criteria for enhancing democracy	*Democratic perspective*	*Quality of democracy*
Representation	*Representation* (fit with legal framework, integration with "offline" participation)	*Institutional order* of a social system in terms of freedom and equality

Table 2.5 (continued)

Local democracy national project	DEMO-net	CAHDE
Engagement	*Engagement* (information provided on rules, knowledge, participation numbers and level of involvement, social capital building, etc.)	*Inclusive citizenship* (including voting rights of minorities)
Transparency	*Transparency* (publication of interim and final results, on how decisions were negotiated, public discussion of final results)	*Contestation and alteration* of governing political parties
Conflict and consensus	*Conflict and consensus* (identification of "pros" and "cons," moderation)	*Transparency* of political decision-making and public control
Political equity	*Political equality* (pluralism, i.e., number of relevant target groups in relation to participants, openness, i.e., identification of barriers to active citizenship)	*Existence of a well-established and active public sphere*
Community control	*Community control* (participant satisfaction, impact on decision-making process, i.e., level of administrative integration, accountability, documentation of results, policy outcome, impact in different stages of decision-making	Quality of governance Quality of public participation

DEMO-net The Democracy Network, *CAHDE* Ad hoc Committee on e-democracy

This perspective implies an assessment of the outcomes of projects against the articulated objectives. Here the priorities, interpretations, and expectations of different stakeholders and the specific aims of different initiatives may vary.

The *democratic perspective* considers the overarching principles and values of democracy and looks at the democratic criteria that the e-participation initiatives are addressing. But democracy is a contested concept and, therefore, does not qualify as a universal reference point for measurements across levels of government and across nations. While consensus on evaluation criteria can be reached within national assessments and perhaps even within the EU, the differences in the CAHDE concept reflect the difficulties within the much broader and more heterogeneous membership of the Council of Europe, including, for example, Russia and the Ukraine.

The three-layer approach covers almost any aspect that has been mentioned in the literature as relevant or interesting in order to assess and evaluate (e-)participation projects. Although indicators and methods are also recommended for collecting data on these aspects, practical evaluation exercises look only at a small portion of these criteria.

In the British Local e-Democracy project, the authors were able to use only very few of the proposed criteria and could only resort to expert interviews, and a survey was not undertaken on citizens engaged nor on those who did not participate. Although the program had several million pounds of funding, there were no funds for a representative survey, including also those who did not participate (Macintosh and Whyte 2006). Thus, for example, the impact on democracy could not be evaluated in a representative way.

In a joined general reflection, two DEMO-net members point to a theory-practice tension and discuss several challenges posed by the framework (Aichholzer and Westholm 2009). As a classification framework, the proposed three layers or perspectives at first glance seem to correspond to views of different stakeholders. The authors admit that the three views are overlapping. In particular the "project view" has no common point of reference. This view is extremely heterogeneous with regard to the units of analysis and units of data collection. It includes requirements of the whole participation process, such as "inclusiveness," and of certain events within the process(es), such as "scope of deliberation," while "effectiveness" refers to the achievement of the objectives of the whole exercise, which may include democracy-related aspects as well as the effects and impacts on the respective policy domains and on the people who were not even involved in the exercise. However, a main point of critique is that an actor or stakeholder-oriented approach is suggested while there is no distinction between what actors can do and the effects they achieve.

2.6.2 The Generic Input–Activities–Output–Outcome–Impact Model

In a state-of-the-art report on e-participation for the European Commission, submitted by the Danish Technological Institute, Leeds University, and the University of Macedonia, Millard et al. (2009) introduce three levels of analysis which make such a distinction (see also Smith et al. 2011; Tambouris et al. 2012): They distinguish:

> Base Level: Operational outputs. These are the outputs that the project should generate through the construction of eParticipation tools and methods.
> Middle Level: Outcomes (specific objectives). These are the benefits of the project for stakeholders, for example more effective decision-making, more fulfilling participation, etc., resulting from the successful use of the eParticipation tools and methods made available.
> Top Level: Impacts (general objectives). These are the overall goals of a project and are expressed in terms of its ultimate impacts. These will not normally be expressed as eParticipation objectives, but rather as societal objectives/public values to which successful eParticipation should contribute.

For each level, examples are given for technical and organizational components and the views of different stakeholders such as project owners and intended users (Millard et al. 2009, pp. 7–9).

This distinction is borrowed from the almost classical model of program or project evaluation developed within the OECD and which may be called the generic

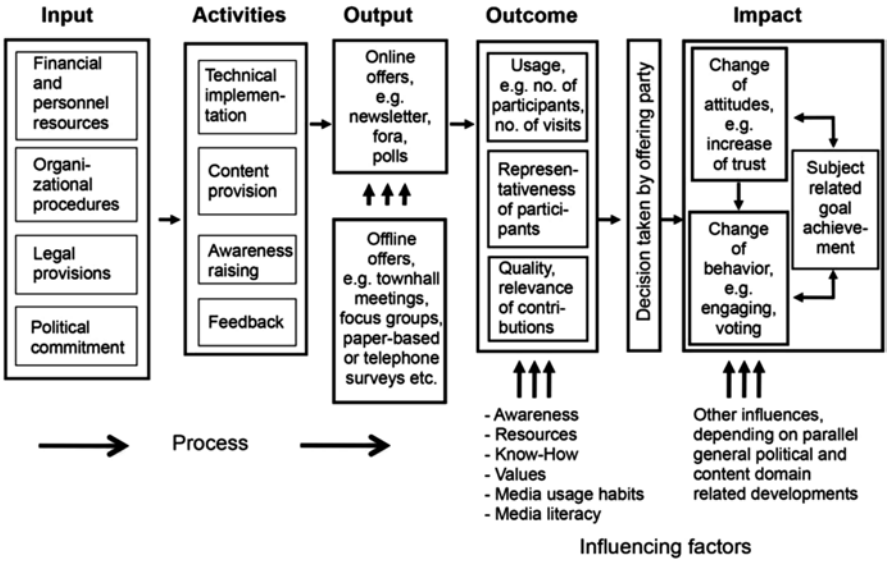

Fig. 2.4 The Input–Activities–Output–Outcome–Impact model applied to e-consultation

Input–Activities–Output–Outcome–Impact Model.[12] In its Glossary of Terms the following definitions are given (OECD 2002):

> *Activity* = Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilized to produce specific output (related term: development intervention). …
> *Inputs* = The financial, human, and material resources used for the development intervention. …
> *Outputs* = The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes. …
> *Outcome* = The likely or achieved short-term and medium-term effects of an intervention's output. …
> *Impacts* = Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

Figure 2.4 shows an adaptation of the generic model applied to the evaluation of e-participation projects and even more so of consultation-type participation with the following components (Kubicek 2010):

[12] This model has been developed for assessing environmental projects within the UN Environmental Programme and offers the possibility of looking at the relation of inputs to different kinds of results (output, outcome, and impact). The earliest source is probably the *Performance Monitoring Indicators Handbook* by the World Bank (Mosse and Sontheimer, 1996). For small differences in definitions by the European Commission see http://ec.europa.eu/europeaid/evaluation/methodology/glossary/glo_en.htm. Accessed July 27, 2015.

- *Input*, besides financial and human resources in the context of formal or informal citizen consultations, includes the immaterial preconditions on which the specific activities can and have to build upon, in particular, legal provisions and organizational, administrative procedures as well as the political commitment of relevant political bodies and government leaders with regard to the consultation process and the handling of results. The more binding the commitment to check or even adopt proposals which meet certain predefined criteria, the higher the involvement of the target groups.
- *Activities*, which are necessary to conduct an effective consultation, not only include the provision of appropriate technical tools and content but also some kind of awareness raising and feedback (meta-communication).
- *Output* of a consultation project or intervention is the different offerings of information provision and communication—online and offline, for example, online forums, newsletters, and/or polls as well as town hall meetings, focus groups, paper based or telephone surveys, etc., that is, the supply side of the process in terms of quantity and quality, with regard to the appropriateness for different target groups, including usability and accessibility.
- *Outcome* covers the demand-side components, such as the number and activities of the participants, the composition of the participant group compared to the target population, and the characteristics of the contributions made.
- *Impacts* can be the desired changes of attitudes, for example, building trust in political institutions, the changes in behavior, for example, increased future engagement, or changes in the issue, for example, "better" decisions. Beyond such an instrumental view of participation processes, the desired impact may also be social learning, the building of social capital or participatory/democratic competence.

Millard et al. (2009) point to the fact that in proceeding from output to impact, the stakeholders have less influence on the results because the influence of external factors on achievements increases. While the transformation of input into output is largely under the control of the organizers of e-participation projects, their chance of controlling the transformation of outcome into impact is rather small (Millard et al. 2009, pp. 7–8; Tambouris et al. 2012, p. 322). Therefore, the model in Fig. 2.4 considers factors influencing the outcome, for example, awareness, resources, or the media usage habits of the target groups of consultation offers as well as factors influencing the long-term impacts within the specific domain of the consultation subject.

2.6.3 Evidence-Based Success Criteria and Success Factors

Despite their methodological weaknesses, existing evaluations of (e-)participation processes show that their effect often does not meet the expected outcome, but there are some projects which do. Therefore, there is a need to identify those factors and conditions which contribute to success or failure. As there are no comprehensive

and valid empirical assessments, so far the discussion about success factors has been based on premature generalizations from a few cases and is highly speculative. For a more valid assessment, a large number of cases have to be analyzed.

Pratchett et al. delivered such a study in 2009. In a project for the British Department for Communities and Local Government, six researchers, from the Local Government Research Unit at De Montfort University and from the Centre for Citizenship and Democracy of the University of Southampton, collected and analyzed about 100 participation projects. Their report "Empowering communities to influence local decision-making—A systematic review of evidence" is the only study so far which identifies success factors for different kinds of participation based on empirical evidence. The view on community empowerment covers six kinds of participation (Pratchett et al., 2009, pp. 10–11):

- Electronic participation includes e-forums and e-petitions.
- Participatory budgeting includes deliberate participation or voting on local budgets.
- Petitions are a mechanism for citizens and groups to raise issues of concern.
- Redress is a mechanism for citizens to register complaints, have them investigated, and receive feedback and response.
- Citizen governance covers the role of citizens on boards or forums with decision-making authority about public services and policy.
- Asset transfer is a mechanism for community management and/or ownership of assets by citizens.

For each type of empowerment, about 20 well-documented cases from all over the world have been collected and analyzed with regard to predefined success criteria and success factors. Referring to the White Paper "Communities in control: Real people, real power" (Department for Communities and Local Government 2008), Pratchett et al. (2009) distinguish three key criteria defining empowerment success:

- Effect on participants involved in the process: the extent to which participants have developed networking skills, confidence, political efficacy, etc.
- Effect on communities, that is, whether the mechanism has led to improvements in a community's level of political efficacy, social capital, cohesiveness, etc.
- Effect on decision-making, that is, whether communities have gained more power and can exercise more influence on local decision-making (pp. 11–12; 208).

Besides these criteria for success, the study identifies certain influencing factors, that is, "factors that are likely to drive or inhibit empowerment in different circumstances" (p. 12). They include:

- Design of mechanism/intervention
  - Open to all
  - Support mechanisms
  - Links to formal political decision-making (…)
- Context of mechanism/intervention
  - Low resource base

- Ethnic diversity
- Political "buy-in"
- Bureaucratic "buy-in"
- Highly salient issue (pp. 12 and 209)?

In order to ascertain which of these generic success factors contribute to the achievement of the different success criteria, a methodology called "Boolean truth tables" has been employed. For each case of each type of empowerment, available documents have been inspected for whether the predefined success criteria and success factors were present (1) or not (0).

For example, for the category of e-participation, in the narrow meaning of e-forums, cases have been coded with regard to six success factors and three success criteria (see Table 2.6).

In a second step for each success criterion coded positively, the success factors also present in the respective case were identified. As the success factors are labeled with capital letters (A–F), the relevant success factors for each success criterion are marked by a sequence of these letters, for example, BCF; factors not present are sometimes mentioned by lowercase letters, for example, BcDEF.

Based on this coding, a qualitative computerized analysis (QCA) was undertaken, which, for e-participation, showed the following results:

Factors influencing individual skills and efficacy include moderation of forums, clear statements of how the inputs will be used by the decision-makers and a subject issue of widespread concern for six cases (BCF). For another five cases, the use made by the decision-makers may be unclear, but the forum is hosted by an official body or elected politician.

Factors that drive the empowerment of the community are, again, moderation, a clear statement of the use made by the decision-makers and a subject issue of widespread concern in the majority of cases.

For the impact on decision-making, there is no clear pattern of relevant influencing factors.

The most interesting result of the analysis, over the six different types of empowerment or participation, is that, in most of the cases, there was some kind of impact at the individual participant level, but only for the cases of participatory budgeting and citizen governance were there effects at the community level and on decision-making in a larger number of cases.

2.7 An Adapted Model for the Evaluation of Consultation Processes

The most important contribution to participation research by the study of Pratchett et al. (2009) is the distinction between success criteria and success factors, which is missing in all previous concepts mentioned in this chapter. This distinction can be applied to the generic Input–Activities–Output–Outcome–Impact model (Fig. 2.4). Output, outcome, and impact can be regarded as different kinds of success criteria. Input and activities cover different kinds of success factors.

Table 2.6 Excerpt of "Boolean truth table" (Pratchett et al. 2009, p. 77)

			Influencing factors						Outcome factors		
			A	B	C	D	E	F			
Case	Descriptor	Short name	Government sponsored	Moderation	Links to decision-making	Political "buy-in"	Bureaucratic "buy-in"	Salient issue	Impact on participants	Impact on community	Impact on decision-making
1	Downing street policy forum	No 10 forum	1	1	0	–	–	1	1	0	0
5	Minnesota E-democracy	Minnesota	0	1	0	0	0	1	1	1	0
6	City planning game Tampere	Tampere	1	0	1	–	1	1	0	0	1
7	New housing Esslingen	Esslingen	1	1	1	0	0	1	1	0	0
8	Paris 3rd airport forum	Paris	1	1	1	0	1	1	1	0	0

Boolean "truth table": All cases coded against all factors—e-participation (– no data available for this factor)

However, the particular success criteria and success factors defined by Pratchett et al. (2009) only partially match with the majority of evaluation criteria proposed in the literature. Due to the empowerment perspective, the criteria are selected completely from the perspective of communities and their members and not from the perspective of (local) government or political bodies which initiate a participation process and make offerings in order to achieve certain effects, for example, new ideas, acceptance of plans, or regaining trust.

Criteria and methods of evaluation vary according to the purpose of the evaluation procedure. If the purpose is to learn lessons for improving the design of participation processes in order to make them more successful (formative evaluation), the criteria must be defined in the perspective of the different parties involved.

Considering the range of different kinds of participation, one can assume that organizers and participants pursue different purposes, for example, with consultations and petitions.

Against this background, Kubicek et al. (2011) have modified the approach of Pratchett et al. (2009) and adapted it to informal consultation processes. For a comparative evaluation of 12 well-documented cases, seven success criteria have been defined, which not only relate to the objectives pursued by the organizers of the consultation processes and include the gaining of relevant information (e.g., new ideas) or an increase in the acceptance of the proposed measures, the outreach and inclusivity of the process, but also the view of participants, for example, development of new skills, influence on decision-making, satisfaction with the process and the results as well as the advancement of democracy and the efficiency of the process.

To ascertain under which conditions these different success criteria have been reached, ten success factors were defined:

1. Clearly defined objectives
2. Presence of the decision-makers
3. Mobilization of target groups
4. Transparency of the consultation process and its results
5. Administrative “buy-in”
6. Commitment of decision-makers
7. Target group-specific provisions
8. Sufficient resources
9. Salient issue
10. Professionalization

The detailed results of the matching of success factors and success criteria will be presented in Chap. 5, dealing with the consultation processes undertaken within the e2democracy project. However, two important results shall already be mentioned here:

There is one success factor which was most significant for all seven success criteria: a salient issue, that is, an issue of high concern for members of the target group. This confirms the finding of Pratchett et al. (2009): Most people do not participate for the sake of participation but only if they feel concerned by the issue of a participation process.

For all the other success criteria, different success factors have a different relevance. A little surprising was that frequently mentioned success factors like transparency and commitment do not rank highly for most of the success criteria.

The selection of success criteria and success factors by Kubicek et al. (2011) have particularly been defined and operationalized for informal consultation processes. The criteria themselves can also be applied to other government-initiated forms of participation, for example, the provision of public information, formal consultation and cooperation/collaboration projects, but they have to be operationalized by adapted empirical indicators.

2.8 A Twofold "Relativity Theory" of Evaluation

It has already been argued that different kinds of participation, that is, provision of information, consultation, cooperation, petitions, etc. require different sets of evaluation criteria. This is achievable by adapting the generic Input-Activity-Output-Outcome-Impact model. In addition, the analysis by Kubicek et al. (2011) shows that even for the category of consultations, there are various objectives, which also require different evaluation criteria.

In particular, there are cases where, in an early phase of decision-making, planners and decision-makers want to collect the ideas of and proposals by the people, either of those immediately concerned and/or with specific knowledge. But there are other cases as well, where decision-makers would like to gain an impression of the acceptance of planned measures or on priorities between different options. Such a distinction is relevant with regard to appropriate success criteria. For the collection of ideas, the quality of the contribution and not the number of participants is the most important, while for a priority picture, the number of participants and the extent of inclusion are crucial. In addition, such a differentiation is also relevant for the concrete design of an e-consultation, for example, with regard to registration requirements, which are not necessary for the collection of ideas but may be for voting on alternative options.

Evaluation has been defined as "the structured process of establishing the success or otherwise of an exercise against pre-set criteria" (Frewer and Rowe 2005, p. 94). The frameworks presented in this chapter claim more or less that the criteria they propose do correspond with different kinds of stakeholders. But, so far, there is no explicit stakeholder differentiation in the evaluations of e-consultations. If evaluation is carried out ex post and is based on documents, such a differentiated analysis depends on the data available. But within a formative evaluation where primary data are collected, there is a chance to identify the success criteria of different groups of stakeholders and groups involved. Success may then be defined in relation to the success criteria defined by different groups of actors.

At least five different roles can be observed in participation processes:

- Decision-makers
- Organizers

- Users/participants
- Target groups/people concerned
- The general public

Taking an actor-related approach, it may well be that one group considers a consultation to be successful while another group, according to its criteria, is less satisfied.

There is not always a difference between organizers and decision-makers, but in some cases, the administration organizes a consultation, while a political body makes the final decision and, in most of the bottom–up processes, an NGO organizes a campaign in order to influence a decision taken by government or a political body.

The distinction between users, target groups, and the general public is relevant with regard to often held expectations of the organizers; in particular, impacts on the broader public, such as regaining trust, encouraging political engagement, etc. and in order to find out why members of the target group did not participate.

If an evaluation is carried out only after the consultation has finished, it may well be that actors have changed their minds during the process or do not want to admit a failure. Therefore, a more valid evaluation could be achieved by a before-and-after assessment of the expectations and views of different actors. Decision-makers, organizers, users, and members of target groups can be asked about their objectives and expectations at the start of a participation process, their activities during the process can be observed and/or surveyed, and at the end of the process, the achievements can be assessed in light of the original expectations and objectives. These expectations may relate to output, outcome, and impacts. For instance, decision-makers and organizers can be asked at the start about the expected output, the number of expected participants and contributions, and the impact these might have. At the end, they can be requested to assess the actual output, outcome, and impact as well as the input into the consultation. Similarly, users can be asked about their expectations and the extent to which they were met. Within a short-term consultation, this will only be possible in an ex post assessment. If there is a longer consultation or cooperation process, a before-and-after survey is possible.

As a summary of these considerations, we do not recommend striving any longer for a general evaluation framework for e-participation. Instead, we argue for a twofold "relativity theory" of e-participation evaluation, claiming that different evaluation criteria and methods have to be chosen in relation to the kind of participation procedure (e.g., consultation or cooperation) and, for each kind of procedure, relative to different groups of actors.

2.9 Towards a Quasi-experimental Design for Evaluating e-Participation

Neither the methodology for identifying success factors nor the "relativity theory" outlined in the previous section allows for an assessment of the effects assigned to electronic forms of participation, as for example quoted in Sect. 2.3.

- Is it possible to reach and involve more participants by making online offerings?
- Does online communication lower the quality of the representativeness of the votes?
- Can organizers assess the acceptance of proposals more easily in a face-to-face assembly than via an e-forum?

These and similar questions cannot be answered by an ex post analysis of participation processes because the cases differ in respect of subject, target group, institutional context, and many other aspects. Therefore, differing effects cannot be assigned to different modes and channels of communication (Aichholzer and Westholm 2009). However, a field experiment approach seems predestined to permit the controlling for the influence of the "e."

In order to identify any effects at all, a quasi-experimental design should take place under the most favorable conditions for the participation procedure. If no effects can be identified under favorable conditions, it is less likely that there are effects under less favorable conditions.

To ensure the adequate measurability of impact criteria, the participation process should last longer and keep a larger number of participating citizens engaged. This is most likely if:

- The objective of the participation procedure is shared by the offering and the participating stakeholders.
- It is an issue of great concern for organizers and citizens.
- The process is made transparent.
- There is sufficient meta-communication/public relations.
- There are sufficient personnel resources to moderate the process.
- There are resources for regular data collection for the assessment.

Traditional online consultation in urban planning, land use, city renewal, etc. does not meet these requirements. But local climate change policy programs might. According to a study of the Green Mountain Institute (2005), there is high consensus that in order to fight climate change and to reduce carbon emissions, contributions by cities and governments, industry, and consumers are equally necessary. By investment in energy saving in public buildings as well as office buildings and private homes, energy-saving bulbs, selection of means of transport and many others, each party can make its own contribution and not just put demands on others.

In many local communities, there already exist alliances moderated by local political leaders including administrators, business representatives and NGOs, for example, local Agenda 21 roundtables. As mentioned above, with the Aalborg process, more than 700 mayors have committed themselves to initiate local climate change programs with citizen participation and regular assessment. The commitments refer to ten holistic themes and related policy fields such as energy consumption, waste management, mobility and public transport, and others. These policy domains include measurable objectives allowing for impact assessment of specific programs, in particular measuring CO_2 emissions. And there are online tools that can be used to measure goal achievement, in particular so-called ecological footprint

calculators,[13] or, as a part of these, carbon calculators. By putting a series of easy-to-answer questions, they calculate an index value which can be used as a yardstick for measuring carbon reduction due to changes in behavior or other measures. Of course, self-reporting has limited validity and therefore has to be checked by comparisons with the electricity bills or, where available, with data from smart metering devices which produce and collect data on electricity consumption continuously.

These conditions seem to be a favorable context for a comparative quasi-experimental design for the evaluation of e-participation which permit expectations on relevant empirical evidence and greater clarity of the present challenges of (e-)participation practice. The elaboration of project-specific success and impact criteria as well as corresponding indicators can partly draw on existing systematic assessments in relevant subject fields. For instance, Brooks et al. (2013) offer such a framework to evaluate the success in terms of attitudinal, behavioral, ecological, and economic outcomes for community-based projects in the area of sustainable development. Gelders et al. (2010) provide further components which are of specific relevance for collaborative participation contexts.

2.10 Conclusions

Up to now, the proliferation of different forms of public participation and the high expectations of the potentials of e-participation have not been matched by sufficiently systematic examination. The review of existing evaluation approaches has revealed a twofold evaluation gap: a lack of advanced instruments for systematic evaluation and a lack of comprehensive empirical evaluation practice. A coherent evaluation framework based on an "Input–Activities–Output–Outcome–Impact model" including appropriate provisions for success criteria and success factors appears to be a promising starting point. However, we have argued that instead of striving for a general evaluation framework as the final solution, evaluation criteria and methods need to be tailored to the specific kind of (e-)participation procedure and to different groups of actors involved. We suggest a comparative evaluation approach based on a tailored evaluation framework and a quasi-experimental design as the most appropriate setting for an empirical examination to control for differential effects of electronic and traditional participation. In the e2democracy project, this evaluation approach has been applied for a comprehensive comparative evaluation of collaborative (e-)participation processes in the implementation of local climate targets as well as for consultation-focused forms of (e-)participation exercises.

[13] See http://www.footprintnetwork.org (accessed 27 July 2015) and Chap. 8 for details.

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Chapter 3
Citizen Participation in Climate Governance

Georg Aichholzer

Abstract Major parts of this book are devoted to the evaluation of (e-)participation through a quasi-experimental field study of a set of exercises in the area of local climate governance. For this reason, the chapter outlines the development of public participation in climate governance and provides an overview of theoretical frameworks and assumptions linking citizen engagement and change processes at the individual and societal level. A special focus is on behavior change interventions and rationales behind the participation format of the local climate initiatives studied in the e2democracy field study.

3.1 Introduction

The policy field of climate governance suits as a test bed for the empirical evaluation of (e-)participation for at least two reasons: *Firstly*, climate change as one of the largest environmental problems ever faced by mankind seems an issue salient enough to attract public attention and interest in participating in countermeasures; *secondly*, this subject field provides tangible and quantitative criteria for measuring impacts, which are ultimately represented by the extent of reduction in greenhouse gas emissions achieved at a certain level.[1]

Existing scientific evidence suggests that only timely and substantial reductions of global greenhouse gas emissions can prevent the worst consequences of climate change. Achieving the climate goals represents an enormous governance challenge involving all levels—global, supranational (European Union (EU)), national, regional, and local. A major milestone was the 1992 United Nations Framework

[1] Carbon dioxide emissions from fossil fuel burning represent a major part of the primary greenhouse gases (GHGs), causing global warming. In the context of this book, we use the terms GHG, carbon dioxide equivalents (CO_{2e}), and carbon dioxide (CO_2) interchangeably.

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Convention on Climate Change (UNFCCC) in Rio, which marks the start of interstate climate governance at a global level (cf. Bulkeley and Newell 2009). Increasingly decentralized and networked governance processes have gained importance for the implementation of climate change mitigation strategies. The emergence of transnational public and public–private actor networks, especially on the municipal level, went hand in hand with calls for community engagement and citizen participation. The concept of "environmental democracy" with its roots in the Rio Declaration of 1992 and the Aarhus Convention of 1998 (UNECE 1998) have reinforced the role of public engagement in climate protection.

It is widely agreed that an effective response to the tremendous challenge of climate change can only be found in a profound change to more sustainable forms of production and consumption, of living and working. A wide range of public policies of different types has evolved, from price-based instruments (e.g., emission trading) to command and control regulation (e.g., technology standards), technology support policies, and information and voluntary approaches (cf. OECD et al. 2015). The local level is of growing importance, and its most widespread mitigation strategy is improving energy efficiency (Pohlmann 2011). Individuals are challenged to contribute to the transition to a low-carbon society both as citizens and as consumers. Concepts such as "sustainable citizenship" (cf. Micheletti and Stolle 2012) and "sustainable consumption" (cf. Defila et al. 2012) describe major tenets of the required reorientation. Key issues are the need for a change to pro-climate behaviors and lifestyles as well as the associated wider social change.

In the following sections of the chapter, we will first outline the development of citizen participation in environmental issues and the concept of "environmental democracy." The subsequent section provides an overview of the different types of public engagement with energy conservation and climate change, followed by a brief review of different theoretical approaches underlying strategies that aim to reduce greenhouse gas emissions. A special focus here is on behavior change interventions and rationales behind the participation format of the local climate initiatives studied in the e2democracy project (see Chaps. 7–16). The final section draws some conclusions on the role of (e-)participation of citizens in combating climate change.

3.2 The Evolution of Public Engagement in Sustainable Development

The foundations for citizen participation in environmental issues were laid in the 1990s. Since then, various forms of public participation have entered the stage of environmental governance.

3.2.1 Environmental Democracy

A major result of the UN Conference on Environment and Development (UNCED), held at Rio de Janeiro in June 1992, was the "Rio Declaration." The document stipulates in its Principle 10 that "environmental issues are best handled with the participation of all concerned citizens, at the relevant level" and prepared the ground for what later became labeled as "environmental democracy" (cf. Beyerlin 2015, 336 ff.). In the USA, the idea of environmental democracy has been closely linked with Right to Know programs, enabling the public to participate in environmental decision-making. After years of negotiations within the framework of United Nations Economic Commission for Europe (UNECE), the legally nonbinding declaration was finally successfully transformed into a legally binding instrument. It is embodied in the "Aarhus Convention" launched by the UNECE (1998). Adopted in 1998, it came into effect on October 30, 2001. The convention has the character of a global framework for strengthening citizens' environmental rights, mainly by establishing standards for public participation made up of three basic principles: "access to information," "participation in decision-making," and "access to justice" in environmental matters (cf. Beyerlin 2015, p. 337). These three pillars have also constituted the promotion of environmental democracy by targeted programs and policies of the EU.[2]

The European Commission signed the Aarhus Convention in 2003. Subsequently, it launched a directive on public access to environmental information as well as a directive on public participation with respect to environmental plans and programs.[3] Both directives were transferred into national law in EU member states. In addition, the idea of citizen participation in environmental issues was disseminated by various other activities. The OECD and the Council of Europe as international organizations strongly encouraged national and local governments to increase the degree of citizen participation (see Chap. 2). The Aarhus Convention also stimulated Local Agenda 21 processes, the implementation of the UN's action plan on sustainable development at local level, in many countries.

In addition to the advancement of environmental democracy on the political level, the concept has been further elaborated on a theoretical level. One of the theoretically most elaborated versions understands itself as both normative and explanatory, defining environmental democracy as "a participatory and ecologically rational form of collective decision-making: it prioritizes judgements based on long-term generalizable interests, facilitated by communicative political procedures and a radicalization of existing liberal rights" (Mason 1999, p. 1).

[2] See http://ec.europa.eu/environment/aarhus/index.htm. Accessed July 23, 2015.

[3] See http://ec.europa.eu/environment/aarhus/legislation.htm. Accessed July 23, 2015.

3.2.2 The Aalborg Commitments

The "Aalborg Process for Local Sustainability" was a further milestone in the promotion of citizen participation in sustainable development issues.[4] It started with the First European Conference on Sustainable Cities and Towns held at Aalborg (Denmark), in 1994, where the "Charter of European Cities and Towns Towards Sustainability" (the "Aalborg Charter") was adopted. A group of ten networks of cities and towns with an active interest in sustainable development (such as Eurocities and ICLEI—International Council for Local Environmental Initiatives) has also joined this urban environment sustainability initiative. It prepared the ground for a variety of similar schemes and movements, such as the Covenant of Mayors, Green Capital Award, EU Reference Framework for Sustainable Cities, and other transnational municipal networks.

As a follow-up to the "Aalborg Charter," in 2004, the "Aalborg Commitments"[5] were adopted, sponsored by the European Commission to provide support in implementing European strategies and policies for sustainable development. More than 700 cities and towns have voluntarily agreed as signatories to produce a review of their city within 12 months; to set individual environmental targets in consultation with stakeholders, within 24 months; and to monitor progress target achievement and deliver regular reports to their citizens. Commitments extend to ten specified fields of action on environmental protection and citizen participation (e.g., governance, responsible consumption, and better mobility). How to put the commitments into practice is left to the signatories.

3.3 Types of Public Engagement with Energy and Climate Issues

The targets of the European Union's 2030 framework for climate and energy policies are ambitious: reducing greenhouse gas emissions by at least 40 %, increasing the share of renewable energy to at least 27 %, and increasing energy efficiency by at least 27 % below 1990 levels by 2030.[6] Achieving such a far-reaching transformation in energy provision and consumption requires not only supply-side and infrastructural measures but also the cooperation of consumers and private households.[7] Pro-environmental actions in households are crucial for progressing towards

[4] See http://www.sustainablecities.eu/aalborg-process/. Accessed July 23, 2015.

[5] See http://www.sustainablecities.eu/aalborg-process/commitments. Accessed July 23, 2015.

[6] See http://ec.europa.eu/clima/policies/2030/index_en.htm. Accessed July 23, 2015.

[7] In 2013, households accounted for 26.8 %, transport 31.6 %, and industry 25.1 % of the end use of energy in the EU−28. Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/Consumption_of_energy#End-users.

sustainable consumption (cf. Scott et al. 2015). However, communicating the need for changes in behavior to combat climate change is confronted with special barriers: distant impacts, complexity and uncertainty of the issue, external limits to individual alternative options, delayed or absent gratification for taking action, and self-interest to name but a few (cf. Moser 2010, pp. 33–36).

In order to create and raise public awareness and to initiate behavior change in support of climate and energy targets, governments have increasingly been employing multiple strategies of public engagement. Especially, over the past decade, the forms of engaging individuals and households with energy saving and actions against climate change have been strongly proliferating. Scientific assessments of climate warming by the Intergovernmental Panel on Climate Change (IPCC) and global events such as the annual United Nations Climate Change Conferences have reinforced the need and awareness for action on a broad base. Together with the growth of public engagement, the support by electronic media in various forms of (e-)participation has played an increasing role. In particular, the Internet holds enormous potential for facilitating information sharing, discussion, awareness raising, and mobilization of collective effort as well as for collaborating on policy decisions and their implementation in the pursuit of climate and energy targets.

A fast-growing body of research and reviews is studying the diverse engagement approaches and accumulating empirically grounded knowledge on their effectiveness for energy conservation and reduction of GHG emissions (e.g., Capstick et al. 2014; Whitmarsh et al. 2011; Peters et al. 2010a; Ehrhardt-Martinez et al. 2010). One of the to date most comprehensive collections of the variety of approaches to engage the public with climate change provides an overview of both theoretical contributions and practical examples of methods, media, and tools used (Whitmarsh et al. 2011). It also contains a useful attempt to structure the variety of participation activities into different categories. For a brief overview, Table 3.1 presents a simplified version of this typology made up of three broad clusters differentiated by the scope of their principal aims.

Table 3.1 Typology of climate change engagement activities. (Source: Whitmarsh et al. (2011, p. 276), slightly adapted)

Aim of activity	Format	Strategy	Variants
Awareness raising at public level	(a) Top-down (b) Bottom-up	Information provision and education	At a distance, use of multiple media
Behavior change plus awareness raising	(a) Top-down (b) Hybrid (c) Bottom-up	Information, education, interactive involvement, data collection, monitoring, measurement, and feedback	(a) At a distance (b), (c) Involvement with groups, empowerment, long-term effects
Public involvement in climate change policy and decision-making	Mainly top-down, some grassroots initiatives	Individual and group support, consultation, dialogue, and deliberation	Engaging citizens and stakeholders, multiple methods

3.3.1 Raising Awareness

A first class of engagement activities is characterized by the aim to raise awareness of climate and energy issues through the provision of appropriate information and various kinds of educational activities focusing on individuals. Engagement in this sense can be encouraged top-down by governments or other public agencies as well as initiated bottom-up by nongovernmental organizations, for example, grassroots movements or private organizations. Such strategies build on the assumption that it is primarily the lack of information on climate change and its impacts which needs to be compensated by communication and information measures. Examples for top-down measures are national programs such as the *ACT on* CO_2 campaign in the UK, which employed a mass media approach, combining television, online, and print. A bottom-up example was the *10:10* campaign, mainly an online effort supported by the Guardian and other liberal media, propagating a 10% reduction of carbon emissions at the individual level by 2010 (cf. Regniez and Custead 2011). The effects of such policies, however, have been assessed as meager (see e.g., Borgstede and Andersson 2010).

3.3.2 Initiating Behavior Change

A second group of citizen participation focuses on the more ambitious aim of pro-climate behavior change. Again, a variety of approaches is being practiced as regards the point of initiation, type of addressees, methods, and media employed; top-down as well as bottom-up initiated and hybrid exercises are present. They go beyond information and education and build on key elements and mechanisms such as encouraging engagement, enabling, exemplifying, positive visioning, tailored individual support and community action, and addressing individuals both at cognitive, affective, and behavioral levels. Typical strategies are informational measures and motivational methods such as goalsetting or commitment-making. The range of environmentally significant behaviors targeted extends across all areas of everyday life, from home energy use and recycling to personal transportation, nutrition, and general consumption.

A popular approach to pro-climate behavior is known as *social marketing,* based on scoping consumer types and context conditions, followed by tailoring appropriate change strategies to different segments of the population (cf. Barr 2008). This strategy communicates sustainability policy as a positive perspective, with established techniques of segmentation and social marketing aiming to "mainstream" sustainable lifestyles.

The *EcoTeams* program in the UK represents another approach. It ran over 15 years and is regarded as one of the most successful examples (Davidson 2010). It stands for promoting pro-environmental behavior through group activities on major environmental issues, combining tailored information provision, community building, social influence, measurement, and feedback over a couple of months.

Behavior change methods based on various monitoring and metering activities with individual feedback, using online tools such as smart meters or carbon calculators, represent a further important subgroup. Such approaches are influenced by assumptions of behavioral economics and intend to "nudge" people towards more sustainable behavior by providing tailored information, such as on energy use (cf. Thaler and Sunstein, 2008, and Sect. 3.5 below). Comprehensive reviews of relevant studies found energy savings ranging from 1 to over 20 % (cf. Fischer 2008; Ehrhardt-Martinez et al. 2010).

Other routes which have tried to enhance energy efficiency are large-scale programs of the *Energy Saving Trust* in the UK, with a focus on direct engagement with individuals and advice on energy saving as well as on home energy efficiency and eco-renovation through community-organized *Open Eco Homes* events. Within the EST programs, direct engagement with individuals and household energy advice are reported to have the biggest effects (see Chaps. 8 and 9 in Whitmarsh et al. 2011).

Community-based initiatives are another important category, often initiated as grassroots movements such as the *Low Carbon Community Network* (LCCN; see Peters et al. 2010a, Chaps. 9–15): The *Community Carbon Reduction Programme* (CRed) started with raising awareness of climate change and works with pledges to quantify carbon reduction, certificates reminding of the pledge made, and reporting success via a CRed online tool. An interesting type of project is represented by citizen-initiated efforts, so-called *ecovillage and transition town movements,* aiming for intentional community carbon reduction by redesigning material structures as well as prevailing ways of living in affluent societies. Examples of ecovillages include individual projects in the USA and in Scotland, whereas over 150 transition town initiatives are spread all over the world. Another community-level engagement involving households is the *ECHO* Action program, run in nine cities across Europe. Key activities focused on workshops providing three levels of engagement, from consumption and behavior reviews to more simple improvements in everyday behavior, and finally substantial changes in homes, mobility behavior, and the like, also including the use of monitoring tools.

Two other types of behavior change approaches target individual households and/or individuals with a focus on incentives and low-income groups. Examples are the *electricity-saving premium* and *energy consulting for low-income households* in Frankfurt, evaluated by Rubik and Kress (2014). According to their index of the comparative potential and impact of various measures in the housing sector, household energy advice in the low-income class has high potential and impact, whereas the electricity-saving premium shows high potential but (still) modest impact. In Australia, the *EnergySavers* energy behavior change program also addressed low-income households and achieved positive effects with a combination of information materials and group discussions within demographic groups (Hall et al. 2013).

Finally, a special category of public engagement to be mentioned as linked to the behavior change category is participation in carbon-offset activities such as voluntary carbon-offset schemes for aviation as compensation for emissions caused by flights. However, the growing number of carbon-offsetting organizations has come under criticism from efficiency as well as ethical points of view.

3.3.3 *Involvement in Policy and Decision-Making*

The third cluster of engagement procedures mainly addresses political and administrative decision-makers. Deliberation- and consultation-type approaches are classical methods in this category. A prominent example is the perhaps largest ever global citizen consultation process on climate and energy named *World Wide Views* (WWV), which involved citizens from 38 countries (cf. Rask et al. 2012). The result of their deliberations was condensed into nine key proposals to the respective national governments. Cohen (2012), however, criticizes this type of outcome as lacking specific prescriptions and acknowledgement of policy realism. He developed the outlines of a variant of participative budgeting, calling it *participative emissions budgeting* and suggesting it as an alternative. The role of citizens here is to make choices about the allocation of financial funds to pro-climate projects. Further examples of public participation with links to policy and decision-making are deliberative exercises at national or subnational levels (e.g., Edwards et al. 2008). From a realist perspective, it is rather clear that deliberative exchange and consultation results in general are hardly ever directly translated into government decision-making but can influence and inform it in more indirect ways.

3.4 The Discourse on the Effectiveness of Current Approaches

To date, it seems very difficult to come to a definitive comparative assessment of the current approaches' and the different (e-)participation formats' effectiveness in regards to the reduction of GHG emissions. The situation is complicated by an apparent contradiction between evidence of experiences demonstrating substantial potential for emissions reduction through behavior change (e.g., Abrahamse et al. 2005; Heiskanen et al. 2010) and arguments that the behavior change agenda as a whole is deemed to failure since the individual would not be the appropriate addressee (Shove 2010).

Capstick et al. (2014) provide one of the most recent comprehensive reviews of the current approaches' reach in terms of the amount of change achieved, including some meta-analyses. The authors point out that many of the relevant studies lack a quantification of the amount of emission reductions and energy conservation achieved; those which do provide such information report more modest levels of decline, for example in energy consumption around 10 % or less on average. Capstick et al. argue that this reduction result primarily covers direct emissions from energy use and neglects indirect emissions embedded in products and services, for example food; that the focus on "simple and painless" behavior changes distracts from the societal and infrastructural conditions which entail climate-damaging practices; and that the big disparities in energy consumption even between similar households are disregarded. The authors sum up the results of their review: "…while there is an evidence base that behavioral interventions can reliably bring about change, this is limited to a small reduction in a minority subset of individual emissions, brought

about principally in experimental settings, and often without consideration of the socio-cultural contexts within which behavior (change) occurs" (p. 5). They conclude that achieving a radical emission reduction with a chance to curtail global warming also requires a radical reorientation of approaches, including those of the supporting social science research. The suggested aim of such a reorientation rests on three columns: the deliberate decision for advocating substantive changes to pro-climate lifestyles in social science research as a normative aim, focusing the inquiry on areas of the highest carbon emission, and integrating disciplinary approaches.

The demand for an integrative and interdisciplinary perspective is of particular relevance in view of a fundamental rift which has become apparent in the current discourse on the response to climate change. Approaches focusing on individuals and "behavior change" as the main route to effective climate protection strategies are challenged by approaches which reject such a view and focus on how behavior is embedded in sociocultural and material contexts. They argue for policy interventions to be commensurate with the structures in which individual behavior arises and takes place. This divide between "individualist" (behavioral change and social marketing oriented) and "structural" models (emphasizing "social practices"—cf. Shove, Pantzar and Watson 2012, and "multi-level system transition," cf. Geels 2005) partly reflects discipline-specific approaches. The sociopsychological model of human behavior gave rise to the so-called Attitude–Behavior model introduced by Fishbein and Ajzen (1975), focusing on attitudes and norms as determinants of behavior. A widespread sociological model, in contrast, focuses on social practices and social structures, thereby "contextualizing individual responsibility for environmental change" as well as pointing to constraints of individual action (Spaargaren 2003, p. 690).

Shove (2010) has formulated strong criticism of "the dominant paradigm of 'ABC'—attitude, behaviour, and choice" (p. 1273) as a source for climate-change policy, "which is dominated by efforts to nudge behaviour, modify attitudes and encourage individuals to make better, greener choices" (Shove 2014, p. 415). She argues this way of framing the problem would misguide climate governance, marginalize other possible approaches grounded in social theories of practice and transition, ignoring the fact that individual behaviors are deeply embedded in social, institutional, and material contexts, which limit the image of "consumer sovereignty." However, while Shove contends that theories of individual behavior and social theories of practice were incompatible, other scholars seek to integrate them (cf. Capstick et al. 2014, 9 ff.; Kurz et al. 2015).

3.5 Theoretical Background of the (e-)Participation Format in the "e2democracy Project"

The rationales behind strategies of public engagement with climate change, aimed at tangible contributions in the form of lowering carbon emission through changes to pro-climate behaviors and lifestyles, build on various theoretical assumptions. Each of the variety of strategies applied—from communicative and informational

instruments, motivational, supportive, or exemplifying components to economic incentives—implicitly or explicitly refers to expected chains of effects. It is beyond the scope of this work to provide a comprehensive review of the relevant theories informing public participation strategies on climate targets, which aim to influence and support a behavior change among participants.[8] We will confine ourselves to an outline of major components of the theoretical framework, which inform the specific (e-)participation format of the local climate initiatives studied in the e2democracy project (see Chap. 7).

3.5.1 Information Feedback to Nudge Pro-climate Behavior

The idea that regular monitoring of individual consumption of energy over a certain timespan combined with appropriate feedback of normative information to participants might stimulate energy conservation has been discussed and tested with mixed success for a long time. From the perspective of behavioral economics, Thaler and Sunstein (2008) have set this idea into a larger framework. They claim that small nudges can have huge impacts by changing behavior in a socially desired direction. With examples of improving decisions about health, wealth, and happiness, they want to prove that an intelligent design of "gentle nudges" will influence the choices people make.

They claim that "social nudges can also be used to decrease energy use" (p. 74), referring to a project by Schultz et al. (2007): In San Marcos, CA, 300 households were informed about how much energy they had used in previous weeks and about the average energy consumption of households in their neighborhood. The effects reported were striking; in the following weeks, the households with above-average energy-consumption levels significantly decreased their energy use. However, the consumption levels of those below the average significantly increased. Surprisingly, this so-called boomerang effect was avoided by adding a message conveying social approval or disapproval (happy or unhappy "emoticons") in one group of households, with the big energy users receiving an unhappy emoticon, showing an even larger decrease. The more important finding was that when below-average energy users received the happy emoticon, the boomerang effect completely disappeared. They interpreted that being informed of below-average energy use gives the feeling of having some space to increase consumption; however, combining the information with an emotional nudge can avoid this increase (p. 75).

Thaler and Sunstein claim that a great deal can be done to reduce energy consumption with well-chosen designs and devote a complete chapter to "Save the Planet" by offering intelligent "choice architectures," including incentives and

[8] Steg and Vlek (2009) review approaches to encouraging pro-environmental behavior, including its causal factors and determinants as well as intervention strategies. Kaufmann-Hayoz et al. (2012) provide a useful description and comparison of major theoretical perspectives on consumer behavior.

feedback information. From a behavioral economics point of view, behavior can be changed most effectively in a socially desirable direction by setting adequate incentives. With regard to energy consumption and environmental pollution, the most important incentive is to increase the costs or the prices of undesired behavior (p. 196). However, incentives cannot work if people do not get feedback on the environmental consequences of their actions (p. 195). Therefore, appropriate feedback and information contents are necessary complementary conditions for the effectiveness of incentives. With regard to energy consumption as well as CO_2 emissions, Thaler and Sunstein also mention a number of tools for providing feedback information on individual consumption and emission (pp. 200–210), including smart meters in combination with web-based monitoring. The (e-)participation format in the e2democracy project draws on these suggestions and uses an online carbon calculator as a key tool for monitoring and information feedback (see Chap. 8).

3.5.2 Community Action and Social Learning

A principal assumption of the (e-)participation designs in the e2democracy project is that consumption monitoring and feedback of CO_2 footprints as a means to promote the understanding of individual climate impacts will only have a chance to go beyond this and lead to pro-climate behavior when embedded into a collective initiative. Recent literature suggests placing more focus on community action, particularly at local level, and engaging individuals not only as consumers but also in their role as citizens. The theoretical basis for community engagement as a special resource is the concept of "social capital." Collective action on climate change can both profit from a community's productive potential and strengthen it by such engagement activities (cf. Peters et al. 2010b). It is assumed that cohesion and motivational drives engender mutual benefits to members of already established communities and social networks as suggested by social learning and persuasion theories. In addition, trust and knowledge are special assets, which play a role as social signals in supporting and disseminating pro-climate behavior patterns facilitated by communities and social networks.

Further argument for the importance of community-building and shared action is that these are "key elements of a creative and practicable form of ecological citizenship" (Seyfang 2009). This is meant to increase the sense of responsibility for the environmental impact of one's behavior and at the same time increase political engagement in these matters. Other advantages of community action as pointed out by Mulugetta et al. (2010, p. 7542) include demonstrating lower carbon options in practice, offering a platform for mutual exchange and sharing of experience.

This reemphasizes "social learning" as an important aspect and widely applied notion in the environmental discourse. Bandura's (1977) social learning theory provides some important elements, suggesting that individuals learn through observing others, in particular what attitudes they convey as well as their behavior and the results of their behavior. The link to the motivating potential of social learning is

modeled by four learning stages in this process suggested by Badura: attention, retention, replication, and motivation. Garmendia and Stagl (2010) also highlight social learning as a key element of the route to sustainability—"a process that is going beyond the acquisition of mere factual knowledge" and that entails a "need to look beyond individual actors" (p. 1714). According to the authors, relevant social learning processes include deliberation and helping overcome individual and predefined interests and values, thus increasing the opportunities for a shared understanding and joint action.

Heiskanen et al. (2010, 7587 ff.) extend the view on communities and argue that these are important to deal with crucial constraints of individual behavior change. In their study of four types of communities (place-based, sectoral, interest-based, and virtual), they show that these are able to tackle, each to a different extent, four types of constraints:

- Social dilemmas (encouraging individual efforts through visible contributions by others)
- Social conventions (challenging existing, deeply rooted social practices)
- Lack of infrastructure (influence on creation of supporting infrastructure)
- Helplessness (empowerment by community resources)

Based on these arguments, the e2democracy project combines local community-based (e-)participation of citizen panels with long-term individual and collective CO_{2e} monitoring in collaboration with local governments targeting a reduction of CO_{2e} emissions. Individual CO_2 footprint monitoring is embedded in collective social action as local climate initiatives.

3.5.3 Social Practices and "Transition Management"

The social practice perspective (cf. Shove et al. 2012) intends to open up a more realistic view on social change and the conditions of changing individual behavior. It provides an alternative theoretical model for what psychologists address as "habitual behavior." Proponents of social practice theory reject the separation between an individual actor and their context. Instead of placing the isolated individual, their attitude, or a norm center stage, actual behavioral practices are regarded as the primary unit of analysis. Examples can be found in all areas of everyday life such as practices of cleanliness, comfort, or holiday-making. Social practices are deeply entrenched in sociocultural, economic, and material structures and necessitate a much more differentiated conception of behavior change than many intervention approaches do.

Shove (2010) extends the view to societal transformation in the transition towards sustainability and points out this involves changes at multiple levels, including new technological artifacts, regulations, infrastructures, user practices, and cultural meanings (p. 1278). It is difficult to deliberately change social practices,

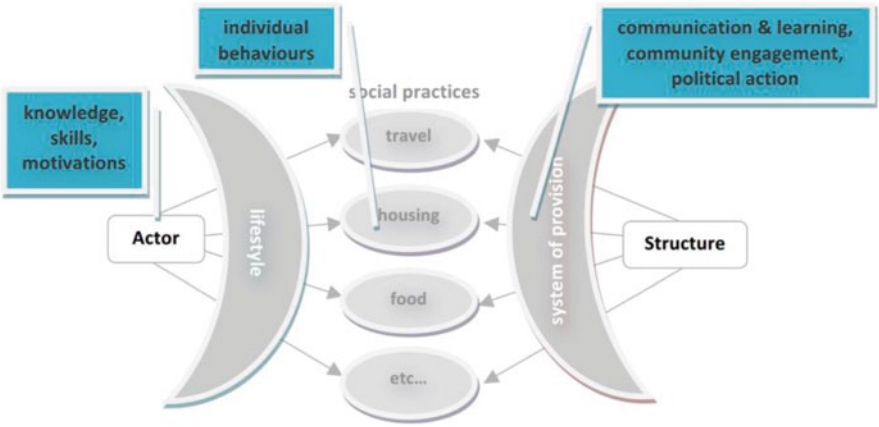

Fig. 3.1 Individual and structural aspects of carbon capability. (Source: Whitmarsh et al. 2009 (mapped onto social practices model of sustainable consumption; Spaargaren 2003))

but community action can play a role in this. Communities and collective action are regarded as better suited to deal with barriers posed by "social dilemmas, social conventions, socio-technical infrastructures and the helplessness of individuals" (Heiskanen et al. 2010, p. 7586).

Spaargaren (2003) presented the social practice perspective in a graphical model to illustrate the key idea focusing on social practices as influenced by and coevolving with systems of provision and impinging on actions of individuals. Whitmarsh et al. (2009) built on this model to illustrate the core elements of their concept of "carbon capability" defined as "(t)he ability to make informed judgements and to take effective decisions regarding the use and management of carbon, through both individual behaviour change and collective action" (p. 2). Figure 3.1 provides a graphical representation of the model as an attempt towards an integrative perspective.

3.6 Conclusions

The main aim of this chapter was to lay the foundation for the topics covered in several chapters of this book, devoted to applying the comprehensive evaluation framework introduced in Chap. 2 in the special field of climate governance. This research was dedicated to evaluate (e-)participation through a quasi-experimental field study of a set of local climate initiatives in the e2democracy project. The brief overview of the genesis of environmental democracy and the emergence of multiple approaches practiced in public engagement with climate change has shown the increasing importance of participatory governance in this field. Current discourse

is characterized by a rift between two rivaling theoretical models: approaches focusing on individual behavior change and approaches that place "social practices" and "transition management" at center stage. Some scholars, however, are working on an integration of these perspectives despite the tensions it entails. By outlining major components of the theoretical framework behind the (e-)participation format of the climate initiatives in the e2democracy project, we have tried to show that it also seeks to take an integrative perspective.

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Chapter 4
Evaluating Public (e-)Information Provision

Basilio Acerete, Ana Yetano and Sonia Royo

Abstract This chapter analyzes the Web sites of the environment departments of European local government signatories of the Aalborg+10 Commitments. It represents an example of evaluating a first category of e-participation, that is, electronic access to information. The aim is to establish the extent to which the signatories make use of the Internet to promote e-participation and environmentally friendly behaviors among their citizens. Our results show that the developments in e-participation are higher in those areas just giving information than in areas of interactive communication. The Internet, as a tool to revitalize the public sphere, is still limited to those countries with higher levels of transparency and a culture of citizen engagement.

4.1 The Role of ICTs in Sustainable Development Policies

Collective interventions due to global issues like climate change should not exclusively rely on global approaches but can also be undertaken on smaller scales (Ostrom 2009). Household consumption patterns and behavior have a major impact on natural resource stocks, environmental quality, and climate change. Furthermore, projections indicate that these impacts are likely to increase in the near future (OECD 2011). So, although sustainable development is a global philosophy[1], it must also be related to local issues, and it needs citizens to become involved (Cuthill 2002).

[1] 1992 Earth Summit in Rio, Kyoto Protocol 1997, Copenhagen Climate Change Conference 2009, and 2012 Rio+20 Conference.

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Evolution towards a sustainable community may be achieved by empowering citizens to take responsibility and action for their own "backyards" (Cuthill 2002). In environment-related activities, citizens may not only be consulted on governmental action, but they have to make their own contribution by changing their behavior as well (for example, among others, as regards responsible consumption and lifestyle choices, waste avoidance, reduction in energy consumption, and reduction in private motorized transport). A citizen who is well-informed about environmental policies and initiatives can be part of the global effort in environmental protection (e.g., by recycling). In this context, the use of information and communication technologies (ICTs), and particularly the Internet, may have an important role in informing, educating, and empowering citizens, helping to develop a "critical consciousness" about sustainability and climate change. Thus, the use of Internet-based platforms, such as local government Web sites, can emerge as a cost-effective mitigation policy in reducing CO_2 emissions by actively involving citizens in the fight against climate change. In this chapter, the offerings of these Web sites are used as examples to evaluate one of the first categories of e-participation, that is, participation via electronic access to information.

After signing the Aarhus Convention in 2003, the European Commission launched a directive on public access to environmental information as well as a directive on public participation with respect to environmental plans and programs. However, the analysis of the implementation of citizen participation shows that, in most countries, procedures for active participation remain less developed (Royo et al. 2011; Yetano et al. 2010). The United Nations e-Government Survey devoted a special section to examining the efforts made by member states in providing environment-related online information and services and related opportunities for citizen engagement (United Nations 2012). Their findings indicate that, at the central level, the majority of countries provide online information or education to citizens regarding the environment. However, few countries provide features designed to proactively notify citizens about environmental issues, and the study concludes that citizen engagement on environmental issues is still in its infancy.

On a day-to-day basis, local government is the level of government closest to European citizens and has unique opportunities to influence individual behavior towards sustainability through the raising of education and awareness. Since the Aalborg+10 Conference in 2004, more than 700 local governments have signed the Aalborg Commitments and the number is still increasing[2]. Online citizen participation in local democracy depends, among others, on the opportunities offered by municipalities (Saglie and Vabo 2009). Therefore, analyzing the e-participation initiatives on offer becomes essential to understanding their level of diffusion and development. However, public sector literature has signaled that, on many occasions, public sector reforms or improvement initiatives are more rhetorical than real (Bouckaert and Peters 2002; Grizzle 2002; Kelly 2002). As some authors have pointed out (Hood 1995; Pollitt and Bouckaert 2000; Pollitt et al. 2007; Torres 2004), dissemination of public sector management innovations is influenced by the organizational and administrative culture, historical background, and legal structure. In

[2] See http://www.sustainablecities.eu/aalborg-process. Accessed 28 July 2015.

fact, the public administration style has been an important element in explaining the evolution of other areas of public sector reforms and the recent developments in e-government related to transparency, accountability, and e-participation (García-Sánchez et al. 2011; Pina et al. 2007, 2010).

In this chapter, we analyze the Web sites of the environment departments of the European local governments that have signed the Aalborg+10 Commitments. Among the countries in this study, we have identified five broad styles of public administration: Anglo-Saxon, Eastern-European, Nordic, Germanic, and Napoleonic (Hood 1995; Pollitt and Bouckaert 2000; Pollitt et al. 2007; Torres 2004). With regard to citizen participation developments, studies have characterized Anglo-Saxon, Nordic, and Germanic countries as showing greater developments in this area, while Napoleonic and Eastern European cities usually show a slower evolution in citizen participation (Allegretti and Herzberg 2004; Royo et al. 2011; Yetano et al. 2010). Hence, a priori, a higher level of development of e-participation can be expected in Anglo-Saxon, Nordic, and Germanic cities.

We aim to establish the extent to which European local governments are making use of the Internet in order to promote environmentally friendly behaviors among their citizens and to offer them opportunities for strengthening democracy by creating e-participation tools. Particular attention will be paid to the type of citizen participation being promoted through local government Web sites with regard to environmental issues: information, consultation, or active involvement (Martin and Boaz 2000; OECD 2001; Shand and Arnberg 1996). Specifically, this study answers the following research questions: (1) What is the level of use of e-participation by European local governments in promoting responsible behavior among citizens with respect to climate change? (2) Are European local governments using the Internet to promote higher levels of citizen participation and involvement or just to enhance transparency on environmental topics? and (3) Does the public administration style of European local governments affect the approach adopted in the use of e-participation with regard to environmental issues?

Local governments that have signed the Aalborg+10 Commitments have demonstrated a political commitment that signals the intangible preconditions on which more specific activities can and must build. Regarding the general evaluation framework for e-participation presented in Chap. 2 of this volume, our analysis focuses on components representing "activities" carried out and "outputs" obtained, such as the different offerings of information provision and communication and their usability and accessibility. In this chapter, we do not analyze the use of these Web sites by citizens or the changes in attitudes and/or behavior derived from their use, but we focus on the outputs as a precondition in order to achieve outcomes and impact.

4.2 The Aalborg+10 Commitments

The Aalborg Commitments are an initiative sponsored by the European Commission to provide support in implementing European strategies and policies for sustainable development. In the First European Conference on Sustainable Cities and

Towns, which took place in Aalborg (Denmark) in 1994, the *Charter of European Cities and Towns Towards Sustainability* (the "Aalborg Charter") was adopted as a framework for the delivery of local sustainable development. A group of ten networks of cities and towns that were active in sustainable development (such as Eurocities and ICLEI) have also joined this initiative.

The Aalborg Commitments were adopted in 2004, as a follow-up to the Aalborg Charter. The Commitments envisage "cities and towns that are inclusive, prosperous, creative and sustainable, and that provide a good quality of life for all citizens and enable their participation in all aspects of urban life." Signatories voluntarily agree to: (1) produce a review of their city within 12 months; (2) set individual environmental targets, in consultation with stakeholders, within 24 months; (3) monitor progress in delivering the targets and regularly report to their citizens.

There are ten Aalborg Commitments (see http://www.sustainablecities.eu), and they incorporate sustainability in a very broad sense. They have a strong focus on environmental protection and highlight the importance of citizen participation, although they do not specify the mechanisms or tools that should be adopted and leave much leeway to municipal governments in deciding how to put the commitments into practice. The first commitment (governance) deals with participatory democracy and other commitments deal with environmental protection, including the second (local management towards sustainability), the fourth (responsible consumption and lifestyle choices), and the sixth (better mobility, less traffic). As shown by Portney (2013), sustainability is a multidimensional concept and not all cities have the same environmental problems but, in any case, signatories are expected to promote both citizen participation and environmental protection.

Most of the items selected for analysis in this chapter have been drawn up from the lists of the Aalborg Commitments and the European Commission framework *Cohesion Policy and Cities* (European Commission 2006). Other relevant items usually included in the analyses of the content of local governments' Web sites have also been taken into account, as shown in the next section.

4.3 Methodology

Comparability of the cases has been maximized by selecting cities which have signed the Aalborg Commitments and that meet certain requirements in terms of population and country of origin. By January 2011, a total of 644 local governments had signed the Aalborg Commitments. These local governments included cities, regions, provinces, and other types of local government. They belonged to 35 different countries (some of them non-European, such as Egypt, Israel, Morocco, Senegal, and Tunisia). The sample of our study was defined as European cities of over 50,000 inhabitants, but we had to limit the number of cities studied in Italy and

Spain[3]. In this way, our final sample is made up of 67 European cities. The countries covered and number of cities per country are as follows: Austria (1), Belgium (1), Bulgaria (2), Denmark (3), Estonia (3), Finland (5), France (4), Germany (5), Greece (4), Iceland (1), Italy (8), Latvia (1), Lithuania (2), Norway (3), Portugal (3), Spain (7), Sweden (8), Switzerland (2), and the UK (4). Larger local governments were selected for this study as they are usually the most innovative in the adoption of new technologies and, at the same time, they have more need of them because the distance between the governors and the governed is greater (Bonsón et al. 2012; Norris and Moon 2005).

We carried out a comprehensive Web content analysis of the cities selected, combined with a study of the documentation provided on their Web sites. The Web sites were accessed during February–April 2011 and 134 items were analyzed (see Tables 4.1, 4.2 and 4.3). Most items included on the Web sites are rated "1" if they appeared on the Web site and "0" if not. Some items scored 0.5 if they partially fulfilled the coding criteria[4]. This method had been previously applied by Pina et al. (2007, 2010) and Torres et al. (2006) in analyzing local government Web sites.

We assessed the level of development of e-participation regarding environmental issues by grouping the 134 items into four different dimensions: transparency, interactivity, usability, and Web site maturity. Most of the items analyzed belong to the transparency and interactivity dimensions, the two key dimensions of the study. As indicated previously, citizen participation is usually classified into three categories (information, consultation, and active participation/cooperation). The transparency dimension is related to the first category (information) which, in our opinion, is a basic precondition to citizen participation but needs to be distinguished from the two other categories. As it is difficult in practice to draw a clear distinction between consultation and active participation (OECD 2001), our interactivity dimension includes items related to these two categories of citizen participation. The other two complementary dimensions analyze the usability of Web sites and aspects related to Web site sophistication.

Transparency (71 Items) on Web sites refers to the extent to which an organization makes available information about internal working, decision processes, and procedures (Pina et al. 2007). Transparency is the literal value of accountability: accountable bureaucrats and/or organizations must explain or account for their

[3] In Italy and Spain, the inclusion of all the signatory cities with more than 50,000 inhabitants would have distorted the composition of the sample. According to García-Sánchez and Prado-Lorenzo (2008), the number of municipalities that have signed the Commitments in Italy and Spain is so much higher than in other countries that it cannot be assumed to be realistic. Public management literature (Hood 1995; Pollitt et al. 2007; Torres 2004) often distinguishes southern European countries for adopting symbolic policies. So, in these two countries, only the five most populated cities have been included, together with some other cities with a good reputation regarding sustainability and environmental policies (see http://www.sustainablecities.eu). Accessed 28 July 2015.

[4] All the coding was undertaken by one person with previous experience in Web site analysis. Therefore, inter-coder reliability is not a problem in this research. A full crosscheck of the coding criteria was carried out by the three authors with the first five cases to ensure the quality of the process.

Table 4.1 Transparency dimension: average of cities' scores (%)

1. Transparency-accountability	*71.2*
1.1. General information about the department	*67.3*
Address and telephone number of the department	91.0
Department organization chart	53.0
Number of employees	37.3
Budget	86.6
Annual report about sustainability/the environment	58.2
Mission statement/vision for the department	77.6
1.2. Citizen consequences	*82.8*
Information about environmental procedures (permits, …)	89.6
Provides instructions on how to complete these actions	89.6
Provides a searchable index for downloadable forms or forms to submit online	88.1
Provides instructions for appealing against decision-making processes or gives the address of an ombudsman inside the department or local government	64.2
1.3. General information about environmental issues	*74.5*
Strategic plan for a sustainable city/about environment-related topics	97.0
Information about causes and probable impacts of climate change	94.0
Index for reports, publications, regulations, …	80.6
Drafts of new regulations regarding sustainability/the environment	37.3
All environmental publications are available in electronic format for free	91.0
Participation in national or European environmental networks/projects	97.0
Agenda 21 project and information	83.6
Agenda 21 schools' program and information	79.1
Information about activities/initiatives/programs linked to Agenda 21	83.6
Policies for sustainable local public service delivery (clean energy, …)	92.5
Local government's sustainable procurement policy	92.5
FAQ (frequently asked questions) about environmental topics	31.3
Glossary for technical or difficult terms related to environmental topics	3.0
What's new or news section about environmental matters	80.6
1.4. Information about specific policies and initiatives	*74.3*
1.4.1. CO_2/energy	*69.0*
General information about CO_2/energy consumption	71.6
CO_2/energy consumption reduction policies	70.1
CO_2/energy consumption reduction projects (requiring the involvement of citizens/businesses/public sector entities)	65.7
Information/advice about how to reduce emissions	70.1
Links to local government agencies or to other organizations	67.2
1.4.2. Water	*54.9*
General information about water consumption	52.2
Water consumption reduction policies	52.2
Water consumption reduction projects (requiring the involvement of citizens/businesses/public sector entities)	50.7
Information/advice about how to reduce water consumption	52.2
Links to local government agencies or to other organizations	67.2
1.4.3. Waste management/recycling	*88.8*
General information about waste management/recycling	91.0

Table 4.1 (continued)

Recycling or waste management policies	91.0
Recycling or waste management projects (requiring the involvement of citizens/businesses/public sector entities)	91.0
Information/advice about how to recycle	91.0
Location of "household waste recycling centers"	83.6
Links to local government agencies or to other organizations	85.1
1.4.4. Air quality	*72.8*
General information about air quality	80.6
Air quality policies	77.6
Air quality projects (requiring the involvement of citizens/businesses/public sector entities)	71.6
Information/advice about how to improve air quality	58.2
Links to local government agencies or to other organizations	76.1
1.4.5. Transport and mobility	*80.1*
General information about transport and mobility	89.6
Transport policies (existence of a mobility plan)	89.6
Transport projects (requiring the involvement of citizens/businesses/public sector entities)	86.6
Information/advice about how to improve transport behavior	89.6
Information (or link to information) about the public transport network (bus, trams, trains, ...)	92.5
Information about cycle ways	83.6
Public bicycle stations	79.1
Information about other measures to avoid cars in the city center (P&R spaces, etc.)	65.7
Public transport with low emissions (bus, tram, …)	88.1
Information about advantages/benefits/subsides for cars with low emissions	31.3
Links to local government agencies or to other organizations	85.1
1.4.6. Parks and green spaces	*78.5*
General information about parks and green spaces	80.6
Green space policies	77.6
Green space projects (requiring the involvement of citizens/businesses/public sector entities)	77.6
Location of parks and green spaces	80.6
Links to local government agencies or to other organizations	76.1
1.4.7. Noise pollution	*64.6*
General information about noise pollution	67.2
Noise pollution policies	64.2
Noise pollution reduction projects (requiring the involvement of citizens/businesses/public sector entities)	64.2
Information/advice about how to reduce noise pollution	62.7
1.5. Indicators and data about sustainability	*32.3*
Sustainability indicators defined	38.8
Objectives and time frame established	31.3
Sustainability indicators reported (data for only one recent year, several years…)	26.9

Table 4.1 (continued)

1.6. Information about citizen participation processes in environmental issues	*43.8*
Information about current participatory processes (online/offline) regarding environmental/sustainability policies	55.2
Information about the level of participation and results of past participatory processes (online/offline)	47.8
Information about future (expected) participatory processes	28.4

Table 4.2 Interactivity dimension: average of cities' scores (%)

2. Interactivity-citizen dialogue	*39.2*
2.1. Obtaining information from the department	*68.1*
Department's general e-mail	79.1
Sub-units' e-mails	55.2
Individual employees' e-mails	55.2
Searchable database for reports, publications, etc.	80.6
Online request for information or publications	70.1
2.2. Development of e-services	*67.2*
Forms for downloading	92.5
Provides online form completion and submission	95.5
Online payment of utility bills, taxes, fines or other government obligations	85.1
Possibility of making an appointment with officials or staff	6.0
Provides link to appeals process for decisions and/or an ombudsman	56.7
2.3. Services to provide periodic information	*29.9*
E-mail alerts about new reports/news about environmental topics	19.4
RSS feeds (about new reports/news) about environmental topics	51.5
SMS alerts about issues of interest	11.2
Possibility of redistributing the contents of the Web site through blogs or social networks	47.0
Periodic electronic journal about sustainability	30.6
Information about air quality regularly updated on the web	73.1
Information about water quality regularly updated on the web	3.0
Information about noise pollution regularly updated on the web	3.0
2.4. Projects with online participation (or possibility of signing up to a project online)	*9.3*
CO_2/energy	7.5
Water	6.0
Waste management/recycling	6.0
Air quality	4.5
Transport and mobility	10.4
Parks and green spaces	10.4
Agenda 21	10.4
e-Participation processes in the last year	19.4
2.5. Initiatives to promote responsible behavior	*45.0*
Location of "household waste recycling centers" on an interactive map	48.5
Simulators (for example, of household electricity consumption)	32.8
Journey planner (public transport)	53.7

Table 4.2 (continued)

2.6. Initiatives to allow citizens to express their opinion regarding sustainability	*43.5*
Complaints/suggestion boxes (Web site)	98.5
Chat/instant messaging	9.0
Asking for feedback/opinions about specific topics (by e-mail; forms)	53.7
e-Consultation (short opinion surveys yes/no; specify preferences)	56.7
e-Consultation (Web survey more than one or two questions or just specify preferences)	53.7
Blogs	13.4
Web forum	26.9
Facebook page/group for environmental topics (or other type of social network)	32.8
Activity on Facebook official page (1 last week; 0.5 last month; 0 otherwise)	47.0
2.7. Initiatives to participate in sustainability plans	*25.4*
e-Rulemaking	25.4
e-Petition system (or e-petitions accepted)	25.4

Table 4.3 Usability and Web site maturity dimensions: average of cities' scores (%)

3. Usability	*61.2*
Provides other-language access to the Web site	46.3
Site map	82.1
A to Z index (alphabetical order index)	41.8
Search engine	97.0
Help section	46.3
Homogeneity of the different subpages	95.5
Provides a text-only or accessible version of the Web site	59.7
Provides audio access to the Web site for the visually impaired	20.9
The Web site contains some conformance icon that guarantees compliance with some accessibility standards	61.2
4. Web site maturity	*54.4*
No broken links	77.6
Provides the date of publication ("last updated") on the main page of the department (or in a key subordinate page), and it has been updated within the last month	83.6
Content arranged according to different topics (versus content arranged according to the hierarchical structure of the department)	94.0
Credit card payments	85.1
Secure servers (https://...)	91.0
Private areas with passwords are used in order to access personal information	91.0
Site entails the use of digital signature for transactions	88.1
Live broadcast of important speeches or events	19.4
Privacy policy	56.7
Security policy	41.8
Interactive database of indicators	4.5
Indicators downloadable in Excel format	4.5
Audio/video files for environment-related activities	19.4
Possibility to comment on those audio/video files	4.5

actions. The items checked in this dimension are grouped into six broad categories, which deal with: general information about the environment department; explanations and instructions regarding the requirements imposed on citizens resulting from the department's activities (citizen consequences); general information about environmental issues; information about specific policies and initiatives; indicators and data about sustainability; and information about citizen participation processes in environmental issues.

Interactivity (40 items) is a measure of the degree of immediate feedback and of the development of possibilities to interact with the environment department, either through online services or through citizen dialogue and e-participation initiatives. The items analyzed are classified into seven categories related to: possibilities of obtaining information from the department; development of e-services; services to be updated with periodic information; projects with online participation (or the possibility of signing up to a project online); initiatives to promote environmentally friendly behaviors; initiatives to allow citizens to express their opinions regarding sustainability processes; and initiatives to participate in sustainable planning.

Usability (9 items) refers to the ease with which users can access information and navigate the Web portal (Gant and Gant 2002). We have included this dimension since Web portals deliver value to users according to the accessibility and usability of the specific contents. The features included in this section refer to general characteristics of the local entity Web site and online facilities for people with some kind of disability. Lastly, *Web site maturity* (14 items) embraces those aspects that indicate a high degree of Web site sophistication, such as, among others, no broken links, regular updating of the Web site, credit card payments, and secure servers.

The partial scores in transparency, interactivity, usability, and Web site maturity were obtained by totaling the individual scores for each item in each dimension and dividing the total by the maximum possible score in each dimension. The total scores of the Web sites by city were obtained by adding the scores of "transparency," "interactivity," "usability," and "Web site maturity" with weights of 40 % for the first two dimensions and 10 % for the last two. The first two dimensions are the most important in this research because they measure the development of e-participation on environmental topics. The last two are complimentary dimensions that represent the capacity of the local government Web site to support e-participation developments. Thus, analysis of the development of e-participation requires the study of these four dimensions, but with an emphasis on transparency and interactivity dimensions. This weighting method was previously used by Pina et al. (2009; 2007). According to O'Sullivan et al. (2007), index definitions should be consistent with past research unless a rationale exists for doing otherwise. Given these scores per city, to assess the homogeneity of e-participation options within each country, we calculated a total score per country, including also the standard deviation.

To analyze the data obtained through the Web site content analysis, we first carried out a descriptive analysis to provide a general perspective of the use that European local governments make of the Internet to educate citizens about responsible consumption patterns and behavior, and to foster citizen participation in environment-related activities and policies. In order to test the hypothesized influence of

the public administration style (as a proxy of the culture of transparency of each local government) on climate e-participation developments, the Mann–Whitney test was used.

4.4 Analysis of Results

4.4.1 Descriptive Statistics

In the transparency dimension (see Table 4.1), the category related to service delivery ("citizen consequences", that includes explanations of and instructions regarding the requirements imposed on citizens resulting from the department's activities) is the most highly developed. High scores were also obtained with regard to general information about environmental issues and information about specific policies and initiatives (waste management/recycling, air quality and transport and mobility). Conversely, the items included in "indicators and data about sustainability" and "information about citizen participation processes in environmental issues," which would allow citizens to have access to updated data about the state of the environment and past and future participatory processes on this matter, presented levels of implementation below 45%. So, the disclosure levels are lower when greater effort is required to elaborate on the information or when it is related to participatory processes.

As regards the interactivity dimension (see Table 4.2), we clearly see that there is an important drop in the global mean (39.2 versus 71.2% for transparency). The categories related to the possibility of obtaining information from the environment department and the development of e-services are the most developed, with average scores of 68.1 and 67.2%, respectively. Only three items have been implemented by more than 90% of the cities analyzed: forms for downloading, online completion and submission of forms, and complaints/suggestion boxes. The least-developed group of items are those related to the possibility of receiving periodic information about environmental topics (29.9%), the existence of projects with online participation or the possibility of signing up to a project online (9.3%), and initiatives to participate in sustainability plans (25.4%). Intermediate scores, around 45%, are obtained in the categories "initiatives to promote responsible behavior" and "initiatives to have a say in sustainable processes." We again see important variations in the categories, with a sharp decrease in those that imply opening the debate to citizens (e-rulemaking and e-petitions) and the existence of projects with online participation.

Similar results can be found in the usability and Web site maturity dimensions (see Table 4.3). Usability shows a high degree of development in technical items, such as the search engine, the homogeneity of subpages, and site map, but low percentages of development in those items which enhance the accessibility of Web sites and bring about social inclusion, such as text-only or accessible versions, audio access for the visually impaired, different languages, or compliance with inter-

national accessibility standards. Likewise, in the "Web site maturity" dimension, the technical items (no broken links, published date) and those related to service delivery (credit card payments, secure servers for transactions, private areas, digital signature) are the most developed, whereas the items related to innovation and citizen participation, such as live broadcast of important speeches or events, interactive database of indicators, indicators downloadable in Excel format, audio/video files for environment-related activities and the possibility of commenting on them, show the lowest scores.

The average total score of the sample is 55.7% (see Table 4.4), and since 134 e-participation items were analyzed, this result shows a moderate degree of development of e-participation among the biggest European cities that signed the Aalborg Commitments. The transparency of local governments on internal working and decision processes dealing with procedures to achieve environmental commitments is the dimension that scores the highest average value (71.2%). On the contrary, the possibility of citizens interacting online with the corresponding local government department is the dimension with the lowest score, only 39.2%. The other two dimensions, usability of the Web portal and sophistication of the Web site, have values quite close to the average e-participation score.

Table 4.4 Scores of e-participation dimensions by country

Country	Trans.	Inter.	Usab.	Mat.	Total	Max.	Min.	SD
Germany	93.0	52.5	83.3	58.6	72.4	76.2	71.2	2.2
UK	90.5	50.6	80.6	55.4	70.0	75.3	65.8	5.1
Sweden	82.2	51.1	80.6	55.4	66.9	74.2	60.3	5.4
Denmark	85.0	47.1	75.9	54.8	65.9	71.1	62.7	4.7
Belgium	80.3	41.3	94.4	50.0	63.1			
Norway	78.4	40.8	83.3	57.1	61.7	66.2	59.4	3.9
Austria	73.2	40.0	94.4	64.3	61.2			
Latvia	76.1	42.5	38.9	57.1	57.0			
Switzerland	86.6	33.1	50.0	39.3	56.8	58.3	55.4	2.0
Spain	76.5	34.1	57.9	58.2	55.8	70.2	29.4	11.0
France	73.4	34.1	65.3	60.7	55.6	66.5	47.8	8.3
Italy	70.4	35.9	41.7	56.3	52.3	72.4	14.7	17.6
Finland	70.7	29.5	54.4	41.4	49.7	59.4	40.6	7.6
Portugal	59.6	28.3	48.1	57.1	45.7	68.1	30.4	19.5
Iceland	71.8	31.3	50.0	50.0	51.2			
Estonia	45.1	36.7	35.2	54.8	51.2	53.8	23.0	16.4
Lithuania	54.9	35.0	50.0	42.9	45.3	53.1	37.4	11.0
Bulgaria	33.1	28.8	38.9	53.6	34.0	34.6	33.4	0.9
Greece	21.1	33.4	40.3	53.6	29.5	39.8	12.2	12.7
Mean	*71.2*	*39.2*	*61.2*	*54.4*	*55.7*	*76.2*	*12.2*	*14.6*
SD	*22.3*	*12.3*	*21.8*	*12.3*	*14.7*			

Abbreviations: *Trans*. Transparency, *Inter.* Interactivity, *Usab*. Usability, *Mat*. Maturity, *Max*. Maximum, *Min*. Minimum, *SD* Standard Deviation

Table 4.4 summarizes the scores of the local government Web sites by country[5]. We have classified the countries into three groups, based on whether the cities in each country are above or below the average score:

a. All cities above the average: central and northern European countries (Germany, the UK, Sweden, Denmark, Belgium, Norway, Austria, and Latvia).
b. Some cities above and some cities below the average: southern European countries (Spain, France, Italy, and Portugal), Switzerland and one more country that could be considered an outlier among Nordic countries (Finland).
c. All cities below the average: the countries on the periphery of the European Union (Iceland, Estonia, Lithuania, Bulgaria, and Greece).

The high scores obtained by countries within the first group are worth highlighting, all of them ranking above the average in all dimensions, in particular, Germany, the UK, Sweden, and Denmark. On the contrary, in the third group, the cities show very poor figures with scores below the average in all researched dimensions. Finally, the countries of the second group combine cities that are within the first positions in the ranking, with other cities that are at the bottom of the ranking (see Table 4.5). In general, the cities in the first group present the lowest levels of dispersion in the level of development of e-participation on environmental topics, so the cities in these countries show homogenous patterns within each country, whereas countries in groups 2 and 3 present a high degree of dispersion in the total scores. Portugal and Italy are the countries with the highest levels of dispersion (for instance, as can be seen in Table 4.5, two Italian cities occupy the fourth and the penultimate positions in the ranking). It should be remembered that, in some countries, e-participation on environmental topics has homogenous development at the local level, whereas there are other countries with quite heterogeneous development. This finding is consistent with the development in other public sector reforms, thus the explanation of environmental e-participation seems to have a country component.

If we consider e-participation concerning environmental issues in the cities of the sample, taking as the reference point the average score of 55.7%, we see, in Table 4.5, that 39 cities (60% of the sample) reach a figure higher than the average score. Most local governments obtain transparency scores of over 75% (44 local governments). On the contrary, the maximum score obtained in interactivity is 65% and only 12 local governments obtain scores over 50% in this dimension. These results show a good disposition among local governments in making use of the Internet to provide information and promote the responsible behavior of citizens towards climate change. However, the opportunities for active e-participation are still limited because local government Web sites have not yet fully exploited interactive tools and citizen dialogue applications.

[5] These results have to be taken with caution, as the number of cities analyzed per country differs and in some cases (Belgium, Austria, and Latvia) only one city has been analyzed. However, this grouping has exploratory value for an initial interpretation of the results.

Table 4.5 Ranking of cities and scores for e-participation dimensions (%)

City	Country	Trans.	Inter.	Usab.	Mat.	Total	City	Country	Trans.	Inter.	Usab.	Mat.	Total
Hamburg	GER	94.4	63.8	72.2	57.1	76.2	Bologna	ITA	83.1	33.8	55.6	64.3	58.7
Leicester	UK	94.4	57.5	88.9	57.1	75.3	Nantes	FRA	78.9	37.5	55.6	64.3	58.5
Malmö	SWE	85.9	61.3	88.9	64.3	74.2	St. Gallen	SWI	87.3	33.8	55.6	42.9	58.3
Ferrara	ITA	90.1	60.0	66.7	57.1	72.4	Madrid	SPA	78.9	30.0	66.7	71.4	57.4
Stockholm	SWE	85.9	45.0	100.0	100.0	72.4	Riga	LAT	76.1	42.5	38.9	57.1	57.0
Heidelberg	GER	91.5	48.8	94.4	64.3	72.0	Geneva	SWI	85.9	32.5	44.4	35.7	55.4
Göteborg	SWE	87.3	55.0	88.9	57.1	71.5	Malaga	SPA	80.3	33.8	33.3	57.1	54.7
Aberdeen	UK	93.0	53.8	77.8	50.0	71.5	Lahti	FIN	76.1	33.8	44.4	50.0	53.4
Kaiserslautern	GER	91.5	50.0	83.3	64.3	71.4	Tartu	EST	59.2	50.0	38.9	57.1	53.3
Barcelona	SPA	93.0	47.5	72.2	78.6	71.3	Genova	ITA	76.1	38.8	22.2	50.0	53.1
Neu-Ulm	GER	91.5	51.3	83.3	57.1	71.2	Kaunas	LIT	63.4	42.5	50.0	57.1	53.1
Freiburg	GER	95.8	48.8	83.3	50.0	71.1	Hammeenlinna	FIN	77.5	26.3	50.0	50.0	51.5
Aalborg	DEN	91.5	50.0	94.4	50.0	71.1	Reykjavik	ICE	71.8	31.3	50.0	50.0	51.2
Almada	POR	88.7	46.3	72.2	64.3	67.6	Orleans	FRA	67.6	25.0	72.2	57.1	50.0
Norrköping	SWE	76.1	65.0	83.3	28.6	67.6	Tallinn	EST	53.5	40.0	50.0	64.3	48.8
Glasgow	UK	91.5	46.3	66.7	57.1	67.5	St. Etienne	FRA	60.6	31.3	61.1	50.0	47.8
Kristiansand	NOR	77.5	51.3	83.3	64.3	66.2	Pamplona	SPA	69.0	25.0	50.0	50.0	47.6
Paris	FRA	86.6	42.5	72.2	71.4	66.0	Napoli	ITA	57.7	28.8	50.0	71.4	46.7
Edinburgh	UK	83.1	45.0	88.9	57.1	65.8	Palermo	ITA	71.8	26.3	27.8	42.9	46.3
Vasteras	SWE	87.3	41.3	77.8	64.3	65.6	Kotka	FIN	66.2	21.3	50.0	35.7	43.6
Odense	DEN	87.3	42.5	72.2	57.1	64.9	Tampere	FIN	52.1	23.8	66.7	35.7	40.6
Reggio Emilia	ITA	90.1	46.3	44.4	57.1	64.7	Halandri	GRE	26.8	40.0	66.7	64.3	39.8
Brussels	BEL	80.3	41.3	94.4	50.0	63.1	Coimbra	POR	50.7	26.3	33.3	50.0	39.1
Saragossa	SPA	84.5	38.8	72.2	64.3	63.0	Alytus	LIT	46.5	27.5	50.0	28.6	37.4
Jönköping	SWE	76.1	60.0	50.0	28.6	62.3	Cornellá	SPA	45.1	25.0	55.6	35.7	37.2
Rome	ITA	83.1	46.3	44.4	57.1	61.9	Patras	GRE	26.8	33.8	61.1	64.3	36.7
Kolding	DEN	76.1	48.8	61.1	57.1	61.7	Trikala	GRE	29.6	42.5	22.2	50.0	36.1
Umea	SWE	81.7	40.0	77.8	50.0	61.5	Bourgas	BUL	29.6	33.8	50.0	42.9	34.6
Vienna	AUT	73.2	40.0	94.4	64.3	61.2	Sofia	BUL	36.6	23.8	27.8	64.3	33.4
Vaxjo	SWE	77.5	41.3	77.8	50.0	60.3	Ponta Delgada	POR	39.4	12.5	38.9	57.1	30.4
Seville	SPA	84.5	38.8	55.6	50.0	59.9	Narva	EST	22.5	20.0	16.7	42.9	23.0
Stavanger	NOR	78.9	35.0	83.3	57.1	59.6	Ancona	ITA	11.3	7.5	22.2	50.0	14.7
Trondheim	NOR	78.9	36.3	83.3	50.0	59.4	Thessaloniki	GRE	1.4	17.5	11.1	35.7	12.2
Turku	FIN	81.7	42.5	61.1	35.7	59.4	*Average*		*71.2*	*39.2*	*61.2*	*54.4*	*55.7*

4.4.2 Hypothesis Testing: Importance of the Public Administration Style

As differences among countries seem to follow a path similar to other public administration reforms, the statistical significance of those differences among administration styles was tested. Table 4.6 shows the average e-participation indexes in the five public administration styles along with the standard deviations. As can be seen, on average, Anglo-Saxon, Germanic, and Nordic cities present the highest scores and the lowest standard deviations. We analyzed the results of the Mann–Whitney test of the difference in the means among the public administration styles. As can be seen, Anglo-Saxon and Germanic cities are those which present the highest e-participation indexes (with no significant differences among the two groups). Nordic cities present slightly above-average scores, whereas Napoleonic cities present slightly below-average scores (and the highest levels of dispersion in the total scores). Lastly, Eastern European countries are those presenting the lowest scores.

Table 4.6 Mann–Whitney tests

Means	Transparency	Interactivity	Usability	Maturity	Total
Anglo-Saxon	90.5	50.6	80.6	55.4	70.0
Nordic	78.7	42.6	72.2	51.8	60.9
Germanic	88.9	46.1	76.4	54.5	67.1
Napoleonic	64.3	34.2	51.9	56.9	50.3
Eastern European	48.4	35.0	40.3	51.8	42.6
Standard deviations	Transparency	Interactivity	Usability	Maturity	Total
Anglo-Saxon	5.1	6.0	10.6	3.6	4.3
Nordic	8.7	12.3	16.9	15.9	9.2
Germanic	7.1	10.3	18.0	10.8	7.6
Napoleonic	26.3	11.6	20.2	10.6	15.7
Eastern European	18.1	10.5	12.5	12.5	12.1
Mann–Whitney test (asymptotic significance)					
	Transparency	Interactivity	Usability	Maturity	Total
Anglo/Nordic	0.009[a]	0.152	0.348	0.400	0.044[b]
Anglo/German	0.729	0.496	0.864	0.790	0.610
Anglo/Napoleonic	0.009[a]	0.010[b]	0.009[a]	0.762	0.007[a]
Anglo/Eastern	0.007[a]	0.017[b]	0.005[a]	0.927	0.007[a]
Nordic/German	0.006[a]	0.541	0.504	0.362	0.154
Nordic/Napoleonic	0.185	0.031[b]	0.001[a]	0.098	0.013[b]
Nordic/Eastern	0.000[a]	0.169	0.000[a]	0.678	0.001[a]
German/Napoleonic	0.001[a]	0.011[b]	0.006[a]	0.702	0.005[a]
German/Eastern	0.001[a]	0.082	0.003[a]	0.664	0.001[a]
Napoleonic/Eastern	0.054	0.844	0.086	0.399	0.116

[a] Differences statistically significant at the 1% level
[b] Differences statistically significant at the 5% level

4.5 Discussion and Conclusions

This chapter analyzes the level of development of e-participation in environmental topics in the European local governments that have signed the Aalborg Commitments. Our results show that, similar to other citizen participation studies (Yetano et al. 2010), the developments in e-participation are higher in those areas related to giving information to citizens (that which we have called the transparency dimension). It is noticeable that when the provision of information requires greater effort by the local governments, such as the disclosure of sustainability indicators (see Table 4.1, Sect. 1.5), the level of disclosure decreases.

As regards interactivity, we have seen that more than two thirds of the cities provide contact information for the departments and some kind of e-services. But, again, as the items related to interactivity become more developed and require greater efforts from local governments, the number of cities providing these interactive tools is sharply reduced: Only about 45 % of the cities offer initiatives to promote responsible behavior or to capture citizens' opinions, just 30 % provide periodic or continuously updated information, and less than 10 % have online citizen participation programs.

Similar results have been found for Web site maturity and usability. These levels of development show that local governments are usually willing to develop e-participation tools when they do not require significant effort by them. Nevertheless, opportunities for active participation, up-to-date indicators, or e-petition initiatives are hardly developed. So, the creation of an interactive e-dialogue still seems to be a pending issue for European local governments fighting against climate change. If this seems to be the case even for local governments actively committed to promoting citizen participation in environmental topics (cities that are signatories of the Aalborg Commitments), the general situation among local governments is very probably gloomier than our results show.

The comparison among countries shows two types of behavior (as said before, these results have to be taken with caution, as the number of cities analyzed per country differs and in some cases only one city has been analyzed): those countries in which the cities show similar behavior and others with great variations. This suggest that becoming a signatory of the Aalborg Commitments does not always foster the development of e-participation in environment-related initiatives and that local government characteristics need to be studied to understand the developments in this area (see, for example, Brody et al. 2008; Portney 2013; Zahran et al. 2008). In this sense, it could be argued that the signing of the Aalborg Commitments, in some cases, becomes merely window dressing in order to show an image of modernity, global citizenship, and commitment towards the environment and citizen participation, without promoting significant changes in government-to-citizen relationships.

Traditionally, public administration style has helped in understanding the differences in public sector reforms (Pina et al. 2007). We have seen that this classification is also useful in explaining the differences in e-participation related to environmental issues; Anglo-Saxon, Nordic, and Germanic cities being among the

leaders in this regard. According to our results, German cities are the leaders in this area, which is usually the case in e-participation (Yetano et al. 2010), but not in other public sector reforms (Pina et al. 2009). We also have to note that Germany, the UK, and the Nordic countries have a long history of environmental awareness (Ball 2002; Cooper and Pearce 2011; EIU 2009). Napoleonic and Eastern European countries showed the same low-adoption rate typical of other public sector reforms. In the case of Eastern cities, they have less experience with environmental policy (EIU 2009), but the use of e-participation can be an effective tool in dealing with the problems arising from decades of environmental neglect during the communist period. The greater variations in the e-participation indexes are found in those styles with lower levels of development, where some *islands of innovation* can be found.

Our results have shown that, to some extent, public administration style seems to be conditioning the level of development of environment-related e-participation initiatives (including climate issues) among European local governments. In this way, the theoretical claims that indicate that the Internet is going to foster a revitalization of the public sphere should be taken with caution—at least as far as local government-initiated activities are concerned. Some advances have been observed, but to date they are still limited to those countries and cities with higher levels of transparency and a culture of citizen engagement. Thus, it does not seem feasible that the strategic use of the Internet is going to lead to a revolution in government-to-citizen relationships or a convergence in governance styles and decision-making structures (at least in the short term). Germany, Austria, and Spain, the countries of the e2d project, show different behavior. While German and Austrian cities have shown greater development in environmental e-participation, Spain is among those countries with varying degrees of adoption. The public administration style is helpful in explaining these differences, as southern European countries have often been accused of adopting symbolic policies.

Overall, these results indicate that membership of environmental associations does not equal action. Future studies should compare cities that are members of environmental associations with non-members in order to confirm the *soft* effect of the membership. Finally, this research also points to the need for legislators and environmental associations to consider further improvements in current environmental agreements in order to achieve in-depth changes within local governments.

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Chapter 5
Evaluating Public (e-)Consultation Processes

Herbert Kubicek

Abstract In this chapter, the primary research question of the e2d project, the applicability and validity of evaluation tools, is applied to six cases of public consultations. Following the general idea of a twofold relativity theory of evaluating (e)-participation as outlined in Chap. 2, three pairs of similar cases are subjected to evaluation from an organizer's as well as from a participant's view by means of different tools. As a result, it is recommended that in every case a verbal assessment should be made by external observers based on a template, which has been demonstrated here. In addition, a quantitative assessment of the same success criteria can be achieved by interviewing organizers. Because we found a high level of variance in the views of different organizers in different departments on the same consultation process, as many organizers as possible should be interviewed. Their views can be complemented by surveying participants, which leads to partly different results. The votes of participants are also influenced by the point in time at which the assessment is undertaken. In most cases, it is only possible to get citizens to assess the process as well as its output and outcome, but not the impact at the time of their participation, as often it takes several months until impacts materialize and participants cannot be reached anymore as they have not registered.

5.1 Basic Evaluation Approach and Tools

In Chap. 2 we introduced a twofold relativity theory of evaluating participation processes. The evaluation criteria must be chosen with regard to the kind of participation procedure and the individual expectations and aims of the organizers and/or participants (Kubicek et al. 2011).

There are many different forms of public consultations as regards their purpose, activities, and tools. The common features are that a political body or public administration asks for contribution by the public in general or by certain target groups on a defined matter as an input for a planning or decision-making process. Within the policy life cycle, consultations are part of the second phase of analysis, after

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agenda setting and before policy formation (Macintosh 2004). The constellation of actors includes the consulting party, that is political bodies or administrative units; the consulted parties, which may be divided into the target groups or stakeholders, active participants, and onlookers; and in some cases moderators as a third party as well as providers of online services and tools.

We will call the consulting party "organizers." They define the objectives as well as the rules and procedures of a consultation process. They either ask for a certain kind of input from individuals, in particular facts, ideas or preferences, or start a process of collective opinion building, in which participants exchange ideas, comment on each other's propositions and perhaps reach a consensus on the matter in question. This type of consultation is called "deliberative participation" (Crocker 2007). According to Coleman and Gøtze (2001), deliberative processes, in contrast to other forms like polling, "[…] encourage preference formation rather than simple preference assertion" (pp. 5–6). Obviously, both kinds of consultations call for partly different evaluation criteria.

For an appropriate evaluation concept, a design has to be developed, which allows for assessing to what extent the objectives and the expectations the organizers and participants have at the beginning of the consultation have ultimately been met. Ideally, this should be done through a before and after analysis, collecting data on aims and expectations at the beginning, and data on the corresponding experience at the end. The list of expectations and possible aims has to be tailored to each case, taking account of the topic and the institutional context of the consultation.

Within the e2d project, three different tools have been developed for evaluating public consultations:

- A template for assessing success criteria and success factors by external observers, in these cases the research team, partly based on data collected and partly based on their observations
- Questionnaires for assessing aims and expectations of organizers at the beginning and their assessment at the end of the consultation
- Questionnaires for assessing the expectations and final assessments of participants

Each of the following three sections will present the application of one of these three tools to two similar cases.

5.2 Assessment of Different Success Criteria by External Observers

The first generic tool which has been developed and tested is a template for assessing the success of a consultation process. In this section, we will describe its application to two similar one-phase online consultations on local climate policy in

Pamplona and Saragossa.[1] Such an evaluation by means of an external review is the minimum that should be applied in any case. The template presents a kind of reference model and allows for comparisons of the success between similar or different cases and thereby for organizational learning.

5.2.1 Objectives, Actors, Process, Output, and Outcome

According to the conceptual framework, consultation processes should be described at least by their objectives, the main actors, and processes as well as their output and outcome. Output refers to the information presented for consultation, that is, propositions or questions, outcome to the comments, or answers received. These elements were very similar in two consultations in Spain, and yet, their assessment delivered different results.

The Pamplona Case In July 2012, the Local Agenda 21 Office in the Environment Department of Pamplona started an online consultation with three objectives:

- To determine the degree of knowledge of the initiatives promoted by the council in order to reduce CO_2 emissions in the city
- To select the initiatives considered as most important among those promoted by the local government
- To receive proposals for other measures that could be taken by the City Council to reduce CO_2 emissions

The consultation was carried out online for 10 weeks only via the city web site and addressing all citizens. In addition to the Local Agenda Office, other departments were involved, in particular "Communication," "Social affairs," "Informatics," and "Translation" (because of the two official languages Spanish and Basque).

To create awareness, in addition to a press release on July 23, the council sent e-mails to neighborhood associations, consumer associations, and key organizations working in the field of the environment, asking them to disseminate the information via their web sites, by e-mail to partners, etc. Additionally, notice was given to the citizens of Pamplona who participated online in the CO_2-monitoring e2d project. Later in September, information about the consultation was sent to the staff and students of the Public University of Navarre by e-mail.

Altogether there were 223 participants. They were shown a list of ten measures already taken by the local government and were asked to mark those of which they were aware and the three which they considered most important:

[1] Data for this section have been provided by the University of Saragossa (UNIZAR) research team, Vicente Pina, Sonia Royo, Lourdes Torres, and Ana Yetano. For a more comprehensive analysis of all the data collected in these two cases, see Royo et al. (2014).

"The Local Government of Pamplona wants to know the level of information and the importance given by citizens to the policies and projects related to energy effectiveness, renewable energies and reduction of CO_2 emissions. Among the following initiatives, please

1. Indicate which actions you already knew,
2. Select the three initiatives that you consider the most important.

What other measures do you think the City Council could adopt in order to reduce CO_2 emissions?"

Table 5.1 shows the output (items) and outcome (answers) to this survey.

One initiative (out of ten) is known by almost all participants (programs of sustainable mobility, 92%); six of the ten initiatives were known by more than 60% of the participants; 66.7% of the participants knew the objective of reduction of CO_2 emission stated by the council. Participants also selected "programs of sustainable mobility" as the most important initiative. Mostly, the initiatives which are best known are also considered most important.

New measures were suggested by 146 of the 223 participants. Two thirds of them concerned measures related to mobility (e.g., more cycle lanes, improving public transport, reducing downtown traffic), followed by proposals for economic measures such as cheaper public transport, greater control for industries (emission

Table 5.1 Results of the Pamplona survey among citizens

	(a) (%)	(b) (%)
The objective of reducing the CO_2 emissions by 20% by 2020 with the implementation of an action plan (Covenant of Mayors)	66.7	25.0
Installation of solar photovoltaic cells on public schools with didactic aims (network of photovoltaic schools)	43.6	9.4
Campaign to raise public awareness for citizens and schools: museum of environmental education, energy workshops, green house program, etc.	69.3	34.4
Programs of sustainable mobility: cycle lanes, municipal bike rent service, car sharing service, public transport improvement, and mobility week	92.0	71.9
Reduction of light pollution from public lighting and traffic lights with LED technology	62.7	40.6
Reduction of energy consumption in public buildings through incentives to the managing body	40.4	31.3
Promotion of electric vehicles: installation of recharging points, acquisition of electric vehicles, etc.	60.9	6.3
Campaign ENGAGE/Compromise about climate change with citizens, businesses, and institutions	31.6	9.4
Pedestrianization, urban elevators, and streets with maximum speed of 30 km/h	69.8	31.3
Energy agency for advice and information	20.4	3.1

LED light-emitting diode
Multiple response, $n = 223$

taxes, tax reduction for electric cars), and public awareness measures. The rest was split across several other subjects such as Christmas lighting or the prohibition of energy generation from coal.

The Saragossa Case A similar consultation had been launched by the Citizen Participation Department and the Local Website Unit of the local government of Saragossa in April 2011 via the city's web site. It was also open for 10 weeks. The raising of awareness through e-mail was exactly the same as in Pamplona and resulted in 231 participants in this case.

Three initiatives (out of ten) were known by more than three quarters of participants; mobility-related initiatives are the best known by the public. One third of the participants knew the Climate Change and Saragossa Air Quality strategy. But there was no broad consensus among the participants when selecting the most important initiatives. The creation of cycle lanes and the implementation of a municipal bike service have been selected as important by 58.3 % of participants. Of the 231 participants, 42.9 % suggested possible new initiatives to be promoted by the council. As in Pamplona, most of them related to mobility issues.

Can these consultations be considered to be successful? In what regard and to what degree? What can be improved? In order to answer these questions, a structured description focusing on relevant success criteria is necessary.

5.2.2 Comparative Application of the Template

A generic template has been developed with a list of questions to assess the success criteria outlined in Chap. 2. The University of Saragossa (UNIZAR) team answered these questions for the two Spanish cases, partly based on the interviews with the organizers, partly according to their own observations and judgment (see Table 5.2).

Although the same procedure has been applied in both cases and similar numbers of participants and contributions have been reached, managers in Pamplona are more satisfied than the ones in Saragossa. Besides this important difference, there is a high level of consensus that there were sufficient resources, yet limited impact on democracy as well as problems with inclusion and the representativeness of participants.

Such an assessment by external reviewers may question the views and statements put forward by the organizers. For example, a sociologist from the city administration of Pamplona argued that the results were not valuable because the sample of participants was not representative.

For collecting suggestions for future initiatives, representativeness may not be absolutely necessary, likewise for the quality of the contributions. With regard to the assessment of the importance of existing measures, however, representativeness does matter.

Table 5.2 Template for evaluating consultation processes by observers

Success criteria	Pamplona	Saragossa
(1) Solution-relevant information: Were the organizers satisfied with the results?	Generally speaking, organizers are satisfied with the participation procedure. However, the satisfaction with the number of participants is low. Managers responsible for the Local Agenda 21 and Environment Department are very satisfied with the number of comments and suggestions, whereas the manager responsible for Communication is not satisfied in this regard	Organizers are not satisfied with the participation procedure in terms of the number of participants and the comments/contributions
To what extent were the contributions/discussions objective and relevant to the issues?	Almost all contributions were relevant to the issues	
How many contributions (and comments) were received?	There were 320 suggestions of possible initiatives to be promoted by the council from 146 participants	There were 169 suggestions of possible initiatives to be promoted by the council from 99 participants
How intensive were the discussions?	There was no facility for discussions (not applicable)	
Has the topic been covered in its entire scope?	The contributions have covered a wide range of environmental issues. Most of the suggestions deal with the issue of mobility. Others deal with economic measures, measures to raise public awareness, sustainable urban development, energy savings in public buildings, public management measures, lighting, and various other measures	
Have new insights been gained?	Yes	
(2) Influence on results: To what extent have participants influenced decision-making (by their contributions)?	Managers think that some of the comments should be included in the policies of the municipality and that there is a chance for local environmental policies to change because of the new insights	Managers have doubts about the usefulness of the results and whether the comments can feasibly be included in the policies of the municipality
(3) Outreach: Total number of participants in relation to the target group as a whole	223 participants In Pamplona, 70.9 % of the population (198,473 inhabitants) use the Internet; population +15 years old: 171,088 (2010)	231 participants In Saragossa, 71.6 % of the population (698,186 inhabitants) use the Internet; population +15 years old: 600,428 (2011)
How many people participated actively (with own contributions)?	A total of 65.5 % suggested possible initiatives to be promoted	A total of 42.9 % suggested possible initiatives to be promoted

Table 5.2 (continued)

Success criteria	Pamplona	Saragossa
(4) Inclusiveness, representativeness, and structure of participants: To what extent did the active participants correspond with the sociodemographic structure of the target group (age, gender, social class, migration background, etc.)?	People in the 18–50 age range and citizens with a university education are overrepresented (77.4% of respondents vs 34.5% of the population). Retired people and housewives are underrepresented The municipal sociologist from Pamplona thinks that an e-consultation cannot provide significant results because it is biased in sample selection. The UNIZAR team does not agree	Males, people in the 18–50 age range and citizens with a university education are overrepresented (66.5% of respondents vs 31.6% of the population) Retired people and housewives are underrepresented
Was there a balance of contributions from all social classes? Have the interests of groups with educational deficits been considered?	Citizens with a primary school (0.5% of respondents vs 25.3% of the population) and secondary school/technical education (20.1% of respondents vs. 35.4% of the population) are underrepresented	Citizens with a primary school (6.9% of respondents vs 30.9% of the population) and secondary school/technical education (23.5% of respondents vs 34.6% of the population) are underrepresented
Did participants represent particular interest groups or did they take part as individual citizens?	Ninety-eight percent of the participants stated that they took part as individual citizens	Ninety-three percent of the participants stated that they took part as individual citizens
(5) Improving the acceptance for measures: What are the reasons for noncontribution by participants?	It is UNIZAR's view that the topic under consultation (propose other measures that could be taken by the City Council to reduce CO_2 emissions) was perhaps too specific for ordinary citizens to have an informed opinion	
(6) Efficiency: Did the procedure require too many resources (time, money, and staff) in relation to the results achieved?	The managers involved consider that there were enough resources in order to carry out the consultation. Participants think that the e-consultation is more appropriate than an offline consultation in terms of cost for participants and cost for the local council. Similarly, most of them agree that the e-consultation carried out has a higher level of efficiency (measured in terms of a higher level of influence) than participating in a forum, petition or sending e-mails in a protest campaign)	
(7) Enhancement of democracy: Increase of trust and political engagement	Organizers say the consultation process gives citizens a feeling of enhanced influence on the development of local policies, and encourages citizens to act more responsibly, but have doubts as to whether the initiative has had a positive effect on other citizens that have not participated	
Was there an increase in prestige of the organizing authority?	Organizers see benefits for the local government in terms of better image and transparency. They consider that it shows that they are testing new forms of governance	
(8) Future plans	There is a clear consensus in favor of carrying out further participation processes in the future	There is no consensus about carrying out further participation processes in the future

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The most significant difference between the assessments of the organizers in both cases concerns their satisfaction and the perceived relevance of the proposals.

In Saragossa, managers doubted the usefulness of the results, while their colleagues in Pamplona were more positive. In order to find out reasons for this difference in satisfaction, one can compare the success factors according to our concept outlined in Chap. 2. However, for the two consultations in Pamplona and Saragossa, there are no differences which provide an explanation. Therefore, according to our relativity theory, we have to look for differences between the organizers.

They may not only be due to different personal preferences but due to organizational assignments as well. In Pamplona, the organizers came mostly from the environmental department, whereas in Saragossa they came mostly from the Citizen Participation Department. Thus, they have different tasks and different professional backgrounds and experience. Furthermore, the results indicate that the level of knowledge of participants is also important. In the two cases, the recruitment methods were similar, but the higher percentage of respondents with a university education and greater knowledge about previous initiatives in Pamplona seems to have led to a greater number of proposals, which were considered to be more valuable by managers.

With regard to the validity of methods and instruments for evaluating consultation processes, the different views of the organizers in both cases are very important because this illustrates the relativity not only in relation to the kind of participation procedure and roles but also between those holding the same role.

5.3 Organizers' Assessment of Public Consultations

For the assessment by organizers, two questionnaires have been developed. The first one deals with their aims, expectations, and basic assumptions at the beginning of a consultation, and the second one is about their experience and judgment on selected aspects at the end. For this kind of evaluation, as many organizers as possible should be interviewed in person or by telephone. It is not an alternative to the template presented in the previous section but rather an important input to the external evaluation that should be applied whenever possible. In the e2d project, these questionnaires have been applied to two multistage and multichannel consultations on programmatic declarations, a consultation on the Vienna Charta and one on the Bremen Social Democratic Party of Germany (SPD) program.[2] Their common objective was to collect input for and to test the acceptance of a final public document. In the case of the Vienna Charta, the city administration started a

[2] Information on the Vienna case has been provided by Georg Aichholzer, Doris Allhutter, Niklas Gudowsky, and Stefan Strauss; data for the SPD case by Ralf Cimander.

broad dialog on issues of living together respectfully, which was to end in a Charta issued in consensus by all participating groups of inhabitants of the City of Vienna, Austria. In the second case, the Bremen chapter of the SPD started a consultation on its government program to be presented in the forthcoming elections to the state parliament and the governor of the city-state of Bremen, Germany.

5.3.1 Objectives, Actors, Process, Output, and Outcome

At first, we compare the two cases with regard to their objectives, actor constellations, process, output, and outcome:

The Case of the Vienna Charta The Vienna Charta project was organized by the City of Vienna to initiate a broad discussion among the Viennese population on common issues of a respectful living together in everyday life and to set the course for a sustained positive social climate in the city.[3] All inhabitants of Vienna (1.7 million) were invited to suggest relevant topics for discussion, to actively participate in discussing them, and to arrive at an agreement for a respectful living together in everyday life based on their personal contributions. The final outcome should be laid down in a Charta. The city government understood its role as enabling this process and offering an appropriate framework; it was not its aim to influence policy decisions. Deliberation (rather than polling) was the dominant objective.

The organizing bureau was located within the Department for Diversity and Integration. The concept for the participation process was developed in 2011 and built on the conviction that it should allow for offline as well as online participation. A project board elaborated a basic document on democracy, human and constitutional rights as well as women's and children's rights, which was published on the project homepage and served to guide the process by pointing out basic rules, which were not disputable.

The project was organized as a four-step process. It started in March 2012 with a 2-week collection of topics that the Viennese wished to discuss. Submissions could be made online as well as by phone, resulting in a total of 1848 suggestions, which were then presented online (765 postings which concerned requests to the administration or to politicians were not published as well as 36 postings which concerned the Vienna Charta as a whole). An independent advisory board clustered the topics into three key subject areas with seven subtopics: "Behavior: getting along with each other," "Attitude: not always the same," and "Space: feeling good in a tidy environment."

This served as a basis for the second step, the so-called "Charta talks." To reach as many people as possible, organizations, businesses, and associations as well as

[3] Further information sources on general project features, organization, and outcome on the project homepage https://charta.wien.gv.at/. Accessed 27 July 2015.

individual citizens were invited to act as Charta partners. A total of 325 partners heeded the call and initiated 651 face-to-face deliberations. Between April and October 2012, around 8500 citizens participated in the Charta talks, the core of the process, which took place in a wide range of locations such as pubs, parks, club houses, public swimming pools, offices, youth centers, branches of companies, and retirement homes. This allowed for the representation of a cross-section of Vienna's population: people of all ages; blue- and white-collar workers; entrepreneurs; nonworking persons as well as people with different mother tongues and countries of origin, different religious beliefs, worldviews, and political opinions. The talks lasted about 1.5 h on average. Overall, participants discussed for about 12,700 h. The City of Vienna provided two moderators for each such event, who facilitated the discussions, summed up the results, and published them online. The Viennese could then give their opinions on the collected and summarized results for each of the topics in moderated online forums and by phone for over 2 weeks in the beginning of October. In this phase, 172 contributions were submitted; together with the proposals in the first online phase, the postings received altogether 45,633 "likes" from other participants.

Following these discussions and proposals, the organizers and the advisory board drew up a summary of the participating citizens' major demands for common rules for living together in Vienna (phase 4). The overall result, the Vienna Charta as a two-page agreement on basic principles for living together in everyday life, was presented in November 2012. Issues are summarized under three headings: the call for mutual respect, appreciation of diversity, and demands for an attractive public space. Subtopics include basic etiquette, support in learning German as common language, rules for traffic behavior as well as specific rules of conduct and politeness. The organizers followed a broad publication strategy and published the results online and offline via a multitude of media (web sites, magazines, posters, leaflets, official correspondence, etc.). The partner organizations also helped distribute the results. The total cost of this participatory exercise was about € 450,000.

The Case of the Government Program of the SDP Bremen

In June 2010, the board of the subchapter Bremen of the SDP decided to invite not only members but also citizens and civil society to participate in the development of the government program for the May 2011 elections to the state parliament and governor of the city-state of Bremen for the period 2011–2015. Bremen is the smallest of the 16 federal states of Germany, with about 650,000 inhabitants.

The participation process consisted of four phases:

- Six working groups headed by active party members nominated by the board and open to party members only drew up principal claims and promises on six key issues and policy fields.
- In October and November 2010, these principal claims were presented for discussion at seven local meetings open to the public and with invited representatives from civil society. In addition, seven online forums on the Internet were opened for discussion of these basic points.

- Based on the feedback gained in the local meetings and the Internet forums in December 2010, the board drafted the government program, presented it at a press conference, sent the text by post to the delegates of the coming party convention and, in parallel, published the text on the Internet with a request for comments.
- On February 26, 2011, the draft was presented to the party's state convention for approval. Comments from the Internet discussion were treated in the same way as demands for revision put forward by the delegates in the assembly.

As it was the first time a political party had nonmembers participating in the development of a government program, the board wanted an evaluation of this process in order to assess the added value. The questions asked for the evaluation were:

- To what extent do members and nonmembers agree with the principal claims put forward in the government program?
- Does the consultation produce new ideas in addition to those proposed by the internal working groups?
- What are the differences between online and offline consultations with regard to effectiveness and efficiency?

In this chapter, only the first two questions will be dealt with. The online–offline issue is considered in Chap. 16.

In this case, the organizers are the political board of the party and its local chief manager as well as the chairpersons of the six working groups. In personal interviews, they were asked about their expectations at the beginning and their assessment of the process at the end.

In addition, there were surveys of

- Members of the working groups ($n = 54$)
- Participants in the public meetings ($n = 179$)
- Participants in the first online consultations on principal claims ($n = 41$, 166 comments)
- Participants in the second consultation on the draft program ($n = 41$, 144 comments)

In this chapter, we will only present the data collected from the organizers.

5.3.2 The Organizers' View

Organizers conceive consultations as instruments to achieve certain objectives and hold assumptions and expectations. Accordingly, the interview guides for organizers deal with possible objectives and expectations and with the achievements.

Therefore, one interview guide has been developed to ask about the background of the organizers, their objectives and expectations as well as their estimates about advantages and disadvantages of different channels of communication, and a second

one to be used after the consultation process, asking about their satisfaction and how the objectives and expectations have been met or frustrated.

In the case of the Vienna Charta, the consultation has been organized by the Department for Diversity and Integration within the city government and a project board. Interviews have been conducted with organizers in different functions ($n = 6$). In the case of the SPD government program, the consultation has been organized by the Bremen Party office, headed by the chairman of the party as political leader and a managing director. Interviews were conducted with these two persons, an assistant manager at the Party office and with the six chairpersons of the working groups ($n = 10$). In this chapter, we will only present the results of the interviews after the consultation. For a few items, data from participants will be used for cross-checking.

1. Satisfaction

The most general indicator is the overall satisfaction of the organizers. It serves only as a starting point for more differentiated indicators. There were big differences between the two Spanish cases, but there are only small differences between the Vienna and the Bremen cases: 100 % of the Viennese organizers and 90 % of those in Bremen were very much satisfied with how the participation procedure went. Only one organizer in the Bremen case was not satisfied.

For a more differentiated assessment, the most common success criteria for consultations are the number and composition of participants and the number and quality of the contributions. Organizers were asked to assess their satisfaction with various aspects along a five-point scale.

All organizers of the Vienna Charta were very satisfied with the number of participants in the meetings, but only half of them were very satisfied or more or less satisfied with the number of participants via the Internet. In Bremen, the level of satisfaction with the number of participants in meetings and via the Internet was lower, and there was less agreement. Also, all the organizers of the Vienna Charta were satisfied or very satisfied with the quality of the contributions, while only two out of ten organizers of the SPD consultation said they were satisfied.

These findings point to some methodological problems with this kind of data. While the number of participants and the number of contributions are easy to measure, it is hard to tell whether a certain number means more or less success. According to our relativity theory of evaluation, it depends on the expectations of the organizers. However, expectations are mostly based on experience. Organizers of consultations in the public sector have a lot of experience with face-to-face town hall meetings and other kinds of assemblies, but still today have little experience with online consultations. In the ex-ante interviews, most of them were not able to give a figure of how many participants they expected for the online consultation and how many they think are necessary in order to call it a success. Therefore, the variance in evaluating participation via the Internet is higher than with regard to public meetings. The difference between the Vienna and the Bremen case is due to different kinds of respondents. In the Vienna case, only full-time public servants have been asked about one and the same procedure, while in the Bremen case, in

addition to the employees from the party office, the six voluntary chairpersons of the working groups have been interviewed as well, who, furthermore, had quite different experiences with their respective groups.

With regard to the generalizability of results, the composition of the participating citizens is often considered an important factor and is evaluated by the criterion of representativeness and assessed by the distribution according to gender, age, level of education, professional status, ethnic group, or other criteria from population statistics. Organizers have, therefore, been asked how satisfied they are with these aspects among participants. Both groups are most satisfied with the gender distribution, the age distribution, and social status. But as for the number of participants, on a five-point scale, the organizers of the Vienna Charta show a higher degree of satisfaction by one point with regard to these criteria. And there is an even bigger difference with regard to the satisfaction with the number of participants with a migration background. While five of the six organizers of the Vienna Charta are very satisfied in this respect, no one among the organizers in Bremen was very satisfied.

The validity of these statements can be checked by the data from the survey of participants. And, indeed, the distribution of the respondents by sex and age seems to be quite representative of the Vienna population.

However, it is not necessary in all cases for the participating population to be representative of the whole population in sociodemographic terms but rather for the target group of the consultation. In the case of the Vienna Charta and the SPD government program, the target groups were the inhabitants of Vienna and the voters in Bremen. But in the case of the SPD program, there were additional requirements. As the government program was not an objective in itself, but rather a means to raise the chances of winning an election, organizers were interested in reaching people who were nonmembers of the party and who speak for certain groups in the population, knowing their needs and claims. Therefore, participants were not differentiated by sex, age, etc. but rather by their relation to the party and their relevance for the election campaign, that is, party members, stakeholders in certain policy fields and ordinary citizens.

As it was an explicit objective of the SPD consultation to involve nonparty members, organizers have been asked how satisfied they were with the participation of these three target groups. Almost all organizers were satisfied with getting stakeholders and members involved. However, 90 % were unsatisfied or very unsatisfied with the participation of ordinary citizens.

2. Effects of the consultation

According to our relativity theory of evaluation, organizers hold different expectations with regard to the effects of their consultation. They were offered eight different kinds of possible effects and have been asked to what extent they had expected these effects at the start and to what extent they have occurred.

Although the idea of comparing expected effects with the degree to which these expectations were met is plausible and easy to understand, it is not obvious how to put the results into numbers for a comparative analysis. A viable quantitative expression of the relation between expected and perceived effects is the comparison

Table 5.3 Effects expected and experienced by organizers of the Vienna Charta

Effects	Expected mean	Experienced mean
1. Better image of the city government of Vienna	3.3	3.8
2. Proof that the city government of Vienna is testing new forms of governance	4.5	4.8
3. Improvement of social cohesion within the participants of the talks	4.7	4.8
4. Better transparency in dealing with important themes	3.8	4.0
5. A positive effect on other citizens in the area that have not participated	4.2	4.5
6. A boost to the ego of participants through acting as responsible citizens	4.8	4.7
7. A feeling of enhanced influence as a community of citizens	4.7	4.7
8. A strengthening of ties among the population of Vienna	4.3	4.3

Five-point scale; 5 = absolutely expected/occurred, 1 = not at all expected/occurred, $n = 6$

of the respective averages. Table 5.3 shows the results of different kinds of potential effects of the Vienna Charta. For each of the eight possible effects, we can compare the different degrees of expectation and realization as reported by the organizers. In most cases, the degree of effects experienced is, on average, slightly higher than averaged expectations.

However, this is not a statistically valid exercise as the scales generate rank order values, and we cannot be sure that all respondents considered an equal distance between the points of the scale. Given the small differences, we may only conclude that there have been no strong disappointments as regards these expectations.

Again, from our relativity theory of evaluation it follows that for different consultations the degrees of expected and perceived effects vary more or less. In the SPD and the Vienna Charta case, the same questions have been put to the organizers with regard to the kind of effects but with different scales. While the Vienna team used a five-point scale, the Bremen team used a ten-point scale in order to get a more differentiated picture. Therefore, averages are not directly comparable. As we cannot assume that the scores are cardinal values but rather ordinal values, it seems more appropriate to build a rank order of the different kinds of perceived effects for both cases and compare these rankings (Table 5.4).

While the organizers of the SPD consultation see the strongest effects in better transparency (I), better image (II), and proof of testing new forms of governance (III), the organizers of the Vienna Charta report social cohesion and individual benefits among participants as the strongest effects and rank image gain (rank VIII) and transparency (rank VII) lower. These differences are plausible, considering the different objectives of both consultations. The organizers of the SPD government program wanted a positive image as an asset for the election campaign, while the organizers of the Vienna Charta strove for social cohesion in the process and as its result.

Table 5.4 Effects perceived by the organizers of the two consultations

Perceived effects of the consultation	SPD Bremen ($n = 10$)		Vienna Charta ($n = 6$)	
	Mean[a]	Rank order	Mean[b]	Rank order
1. Better image of the SPD in Bremen/of the city government of Vienna	7.9	II	3.8	VIII
2. Proof that SPD/the city government of Vienna is testing new forms of governance	7.9	II	4.8	I
3. Improvement of social cohesion within the participants of the working group/talks	6.5	V	4.8	I
4. Better transparency in the development of specific programs/in dealing with important themes	8.1	I	4.0	VII
5. A positive effect on other citizens in the area that have not participated	6.1	VII	4.5	V
6. A boost to the ego of participants from acting as responsible citizens	6.6	VI	4.7	III
7. A feeling of enhanced influence as a community of citizens	5.9	VIII	4.7	III
8. A strengthening of ties among the local SPD community/the population of Vienna	6.8	IV	4.3	VI

SPD Social Democratic Party of Germany

[a] Ten-point scale

[b] Five-point scale; 10 (5) = fully applies, 1 = applies not at all

5.4 Participants' Assessments of Consultations for Local Development and Planning

According to our relativity theory of evaluation, we assume that organizers assess a consultation process partly by different criteria than participants and, with regard to the same criteria, mostly have a different view. Therefore, wherever possible, an evaluation of a consultation process should not only build on the organizers' view but also on the participants' view. Compared to the organizers' view, it is more complicated, and sometimes not possible, to collect information about their expectations from participants before or during their participation and to obtain an assessment of the results at the end because of a lack of personal identification or because there is no opportunity to get individual feedback on the publication of results. In the two following cases, which deal with a consultation on local development and planning in two German communities, it was possible to carry out an ex-ante and an ex-post survey of participants and to gain interesting insights which show the importance of the point in time of conducting such a survey and to some degree question the value of ex-ante surveys.

5.4.1 Objectives, Actors, Process, and Output

At the beginning of this chapter, we pointed to two different objectives of public consultations by their organizers, that is,

- gaining proposals and new ideas for solving a problem and/or to improve the definition and analysis of problems, planning or decisions, and/or
- getting an opinion or finding out priorities concerning existing alternatives, and/or to better estimate the acceptance of these measures.

Projects may concentrate on one of these objectives. But they may also be taken as objectives for sequential phases of a consultation on a certain subject. This has been done in two German cases, where the German team has not only been involved in the evaluation but has also advised the organizers and provided the online facilities.

Both cases follow the same procedure but with slightly different subjects:

- The determination of priority measures to implement the vision "Climate City of Bremerhaven"[4]
- The multi-generational design of a neighborhood of the community of Wennigsen, Lower Saxony[5]

The Case of Climate City of Bremerhaven The first example deals with a consultation carried out by the city government of Bremerhaven. In order to prepare her work program, the newly appointed head of the environmental department wanted to know what the citizens thought of the already existing slogan or vision "Climate City Bremerhaven" and which measures they thought suitable for its implementation.

The consultation started with a kick-off meeting on January 18, 2011, which had been announced in the local newspapers. In this public meeting, the head of the environmental department introduced her request, the German team described the two-step participation procedure, and the participants were able to make first suggestions, which were immediately entered in the online forum, visible for all on a screen in the assembly room.

From January 17 until March 1, the first phase of the consultation, the collection of ideas, took place online and via a telephone hotline. In the announcement and in a press report on the kick-off event, the URL of the online consultation was published. On the city's web site,[6] there was a teaser and a link to the online platform provided by the German team.[7]

Instead of putting broad general questions and having one open discussion forum, the consultation was structured by five subject areas with several leading questions each:

[4] http://www.stateboard.de/bremerhaven/. Accessed July 27, 2015.

[5] http://www.stateboard.de/wennigsen/. Accessed July 27, 2015.

[6] www.bremerhaven.de. Accessed July 27, 2015.

[7] http://www.stateboard.de/bremerhaven/. Accessed July 27, 2015.

1. Concepts and aims

Should a Climate City aim at saving 40 % CO_2 emissions by 2020, and do the city and their organizations act in a sufficiently climate-friendly manner? Which, in your opinion, are the concepts and aims Bremerhaven, its citizens, and companies should follow to be worthy of being called a Climate City?

2. Mobility

A Climate City must reduce CO_2 emissions by vehicles. This can be done by giving priority to bus and train transport, an improved cycle path network, car sharing or a city toll, and other measures. Do you have any concrete proposals in this area?

3. Energy supply

How should the Climate City of Bremerhaven provide itself with energy in the medium term? Should the focus be on alternative energy sources such as wind, water, sun, and others or on the enhancement of the long-distance heating network or both? What ideas do you have for the future energy supply in Bremerhaven?

4. Housing

A large part of the produced energy is used in residential buildings, and the field of housing is responsible for more than 40 % of climate-damaging emissions. Are programs for building restoration or energy consultants required in order for us to become a Climate City? Do you have further ideas that need to be dealt with in the field of housing in a Climate City?

5. Industry, trade, services

Industry, trade, commerce, and service providers are important players concerning climate protection. In your opinion, what contribution can companies make to turn Bremerhaven into a Climate City?

The answers to these questions could be formulated freely; they were immediately visible to visitors to the Internet pages, who could comment on them. In the idea collection phase, the five subject areas attracted different degrees of attention. Most proposals concerned the subject of mobility.

For 2 weeks in March, the proposals and comments were sorted by the environment department and rephrased into aims in terms of concrete future states in order to make them comparable for the next step of evaluation. Different formulations for the same future state were combined. Unrealistic proposals were not eliminated because the contributions should not be censored but only structured. These results of the first phase were presented at a second public meeting on March 19.

The following day, the second phase, which included voting for priorities, was started online only. Three votes could be given per subject area. People were not obliged to register in order to keep barriers to participation low. The results of the vote were presented at the third public meeting. Table 5.5 shows the four proposals with the highest number of votes in the field of mobility among the 766 votes cast by 257 voters.

It is remarkable that the first two proposals are out of reach of the city government, the first one because of the immense investment and the budget deficit and the second one because it falls under the authority of the National Railroad Company.

Table 5.5 Climate City Bremerhaven—highest-ranked proposals on mobility

Proposals	%
In a Climate City there is a tram	24.0
A Climate City expands the rail network for local public transport. Therefore, the station of Speckenbüttel will be reopened	22.5
Most urgently, a Climate City needs a climate-friendly traffic concept for the whole traffic in the city	19.8
In a Climate City, extending the paths for bicycles and pedestrians is given priority	11.0

$n = 257$

The Case of Neighborhood Design in Wennigsen

The second example deals with a consultation in the community of Wennigsen at Deister, Lower Saxony, about improvements to the living and neighborhood conditions repeatedly demanded by the inhabitants in the neighborhood Hohes Feld. This neighborhood was built in the 1970s. Nowadays, 60% of the 550 inhabitants are aged over 60. When the old inhabitants die, young families with children move in, placing completely different demands on their new neighborhood. Due to limited resources, priorities concerning the constructional design of the neighborhood had to be defined. To find out these priorities, the mayor wanted a consultation concerning the areas playgrounds, green areas/trees as well as living environment and other topics such as height of pavement. The multistage procedure was planned and carried out in collaboration with the Institute for Information Management Bremen (ifib).

1. *Idea collection* (November 15, 2011–January 8, 2012)

Residents were formally invited via the official gazette to a town hall meeting as a kick-off. The mayor introduced the whole procedure, and ifib presented the online procedure as well as the input mask for the first phase of idea collection. This was started immediately at the meeting, which was attended by more than 160 of the 550 inhabitants. In order to strengthen trust in the seriousness of the consultation, a former mayor was asked to act as a moderator; she was introduced at the meeting. In addition to the online collection of ideas, planned to take about 6 weeks, three working groups for the three areas of action were established. Site visits were offered to enable an intense discussion of possibilities, especially for those residents who had no Internet access. In view of the age structure of the inhabitants, this was especially important. The inhabitants without Internet access had the opportunity to submit their proposals on paper in the citizen office, but only one person made use of it. The others found family members or neighbors who entered their suggestions.

After the idea collection phase, working groups and site visits, the administration checked the 112 proposals submitted online. This check by the administration had been agreed upon so that in the second phase of defining priorities, only those proposals were brought to vote that were legally admissible (e.g., compatible with the tree protection ordinance) and lay within the financial framework. At the same time, similar proposals were combined.

2. *Voting for priorities* (January 20–31, 2012)

The 40 questions concerning the design possibilities to be voted upon were presented by the administration at the second citizen meeting. The voting procedure was also discussed. The 23 people who attended this meeting, that is, far fewer than at the first meeting, emphasized that only inhabitants of Hohes Feld should be allowed to vote. In order to reduce the administrative burden, to ensure data protection in the sense of data economy when collecting personal data and to allow neighborly help, it was agreed that each of the 200 heads of the households should get a street-related password by mail. It was also possible to vote in the city hall. A total of 184 of the 300 invited persons took part in the online voting. At more than 60 %, this is a seldom-reached participation rate, all the more remarkable in view of the age distribution of the target group. The results were presented at the third citizen meeting, which was attended by representatives of the administration, members of the local council, and 50 citizens.

One of the problems brought up at the first meeting was the foliage of the mostly old trees. Many of the older inhabitants who were directly concerned wanted to have at least some of these trees cut down. After the mayor and the moderator had advised them of the tree protection ordinance, the working group had discussed the pros and cons, and at the second meeting, the voting had a different result. Only a quarter of the participants still voted for cutting down the trees.

5.4.2 The Participants' View

Organizers have been asked the same questions as in the two cases presented in the previous section, and they were mostly very satisfied. Because of limited space, for these two cases, we will concentrate on the participants' view. In the kick-off meeting, a questionnaire on the expectations was distributed, and in the final meeting, a corresponding questionnaire about satisfaction and how far expectations had been met was distributed. The first questionnaire was also offered in the first online phase. Table 5.6 shows the participation rates in the different stages and events.

Table 5.6 Participation rates in meetings and online

	Bremerhaven	Wennigsen (Hohes Feld)
Residents	113,000	550
Participants at kick-off meeting	38	160
Online idea collection:		
Proposals	262	112
Comments	2020	na
Participants at second meeting	30	23
Voters at online voting	257	184 (300 invited)
Participants at third public meeting	43	36

- *Sociodemographic composition of participants*

Altogether 56 participants in the Wennigsen consultation and 113 in the Bremerhaven consultation have filled in the questionnaires. Regarding their sex and educational levels, the participants in the Wennigsen consultation correspond much more closely to the structure of the respective population: the share of female participants in Wennigsen was 46.4 % and in Bremerhaven 28.3 %. In Wennigsen, 35.7 % of the participants had a university degree and as many as 46 % in Bremerhaven. Also, the participants' age profile differed less from the distribution among the population in the Wennigsen case, although the figures at first sight show a much higher degree of retired people in the Wennigsen case. However, as mentioned before, the population of this particular neighborhood has a share of more than 60 % people older than 60 years. Therefore, 57.1 % retired people is quite representative, while for the city of Bremerhaven a share of only 15.9 % is much too low.

- *Satisfaction*

The level of satisfaction expressed in the written and online surveys differs in the two cases. While in Wennigsen, more than 80 % of the respondents were very satisfied overall with the course of the procedure, only 54 % in Bremerhaven said so. According to the analysis of the success criteria described at the beginning of this chapter, it can be assumed that people evaluated the clarity and the ease with which the aims pursued could be understood differently in each case. The figures in Table 5.7 confirm this trend. When comparing the answers to "clarity of aims and rules" and "transparency of the procedure," the two positive answer categories, when combined, place Wennigsen 10 % points ahead of Bremerhaven (a plus around 80 % against a plus of 70 %).

Compared to the consultation in Wennigsen, the participation rate in idea collection and online voting in Bremerhaven was clearly lower in relation to the target group. This is due to the fact that people were less concerned by the measures that were voted on. Only very few of the 44 participants commented negatively or made no statement. On the one hand, this is a good result. On the other hand, one has to consider that the majority of those who were not satisfied with the procedure did not come to the final meeting.

Satisfaction with the results varies depending on the subject areas in both cases. In Bremerhaven, 21 % were very satisfied with the proposals on mobility but only 5 % with the proposals for energy supply, housing, and the area of industry, trade, and services. In Wennigsen, the percentage of those who were very satisfied varied between 29 % regarding parks and trees and 15.9 % for playgrounds. It is remarkable that there is greatest satisfaction with the results for a topic where proposals by the local population ultimately did not find majority support (e.g., cutting down trees on public ground).

- *Expectations ex ante and ex post*

A supplementary approach to appraise the level of satisfaction is the question of how far certain initial expectations have been fulfilled or not. Independently of the

Table 5.7 Evaluation of specific aspects of the consultation procedure by participants

Do you agree to the following statements about the consultation procedure?		Fully agree (%)	Rather agree (%)	Rather disagree (%)	Fully disagree (%)	Undecided/no answer (%)
The aims of the participation procedure were stated clearly and understandably	Bremerhaven[a]	35.1	43.2	2.7	8.1	10.8
	Wennigsen[b]	52.3	38.6	0	2.3	6.8
The rules of the participation procedure were fair	Bremerhaven	54.1	27.0	5.4	2.7	10.8
	Wennigsen	59.1	27.3	4.6	2.3	6.8
The course of the procedure was transparent from the beginning to the end	Bremerhaven	54.1	21.6	10.8	2.7	10.8
	Wennigsen	56.8	25.0	9.1	2.3	6.8
The use of the online platform for idea collection and voting was simple	Bremerhaven	48.7	27.0	13.5	0	10.8
	Wennigsen	75.0	4.6	4.6	0	15.9

[a] $n = 113$
[b] $n = 56$

aims of the administration, the invited inhabitants have their own expectations of such an offer. The majority in Bremerhaven and in Wennigsen expected a transparent and fair process; only 7 and 3.6%, respectively, expected that their proposals would be included in the action program or implemented. At the final meeting, a questionnaire was distributed, asking how far the initial expectations had been fulfilled. The share of those participants who say their expectations have been met is between 40 and 66% (Table 5.8). This is a bit lower than the share of participants who had said they were very satisfied (54% in Bremerhaven and more than 80% in Wennigsen).

However, there are doubts about the validity of these statements. Comparing the percentage of those who expected these different effects ex ante to those who say in the second survey that they had not expected the particular effect, there are huge differences in both directions. Respondents do not seem to remember very well what they had previously said they expected.

- *Impact*

Often politicians and the public administration hope that a consultation will have positive effects beyond the problem at hand: that citizens' trust in political institutions will increase or that their aversion to politics will be reduced and that citizens will be motivated to engage in politics.

Therefore, citizens were asked whether their opinions on local politics have changed because of the participation project. While in Wennigsen, 56% of the respondents now judge local politics more positively as a result of their experiences, only 32% in Bremerhaven say so. In Bremerhaven, 13.5% say that they judge local politics even more negatively now.

Finally, participants have been asked if the concrete experiences will lead them to take part in further participation projects in the future. For future offers in Wennigsen, 81% say yes, for offers of other organizations only 52%. This is plausible because the respondents in Wennigsen had positive experiences with the actors, who will also be responsible in the future. Here trust was increased. But this does not mean that unspecified organizations with unspecified problems would act similarly. So, with half of the respondents the existing basic skepticism remains. Against this background, it is surprising that 78% in Bremerhaven say they would participate in future local participation projects and 84% with other organizations (Table 5.9). In Wennigsen, this share is remarkably lower, and almost 50% did not answer this question. This may be because, in their small neighborhood of 600 inhabitants, they could not imagine which other institution might invite them for a consultation in the future.

The lower satisfaction rate of the respondents in Bremerhaven is most likely due to a greater lack of clarity. Here the area of mobility got the most votes, especially the proposal to provide a further tramline. On the last day of the voting, this proposal advanced from the third to the first position, possibly due to a mobilization of longtime supporters of this claim. But at the final meeting, this proposal was rejected by several members of the local council because it was not feasible due to a lack of funds. The responsible people in Bremerhaven did not want a pre-decision

Table 5.8 Participants' expectations and their fulfillment regarding the consultation process in Bremerhaven and Wennigsen

You have started the participation procedure with certain expectations. How do you judge the participation procedure in hindsight?		Expectations (ex ante) (%)	Statement ex post			
			Not expected (%)	Fulfilled (%)	Not fulfilled (%)	No answer (%)
I expect(ed) that my contributions would somehow be included in the measure plan	Bremerhaven[a]	7.1	35.1	40.5	8.1	16.2
	Wennigsen[b]	3.6	22.7	52.3	11.4	13.6
I expect(ed) an open democratic process leading to a fair transparent result, even if my ideas are/were not included in the measure plan	Bremerhaven	62.0	16.2	51.3	16.2	16.2
	Wennigsen	73.2	13.6	65.9	9.1	11.4
I only want(ed) to know what others think/thought of my ideas	Bremerhaven	26.6	45.9	13.5	10.8	29.7
	Wennigsen	16.1	4.7	25.0	9.1	18.2

[a] $n = 113$
[b] $n = 56$

Table 5.9 Participants' interest in future participation projects

In the light of your experience with this consultation, would you participate in a similar procedure in the future?		Yes (%)	No (%)	Don't know (%)	No answer (%)
In another participation procedure of the political system in Wennigsen and Bremerhaven	Bremerhaven[a]	78.4	13.6	5.4	2.7
	Wennigsen[b]	81.2	0.0	6.8	11.4
In another participation procedure by other organizations	Bremerhaven	83.8	5.4	8.1	2.7
	Wennigsen	52.3	0.0	34.1	13.6

[a] $n = 113$
[b] $n = 56$

before the voting as in Wennigsen since they did not want to be accused of censorship. At the final meeting, the participants asked the politicians in vain to make more concrete statements on which proposals should be implemented in which period of time; only then did they fill in the questionnaire. In Wennigsen, however, members of the council said at the final meeting that they would implement some of the proposals, with a high rate of agreement. This is not only due to the different openness or degree of compulsion of the politicians but also to the type and number of proposals resulting from the consultation: The scope of the subject and, therefore, the number of possibilities to act are negatively correlated to the degree of concretization and the obligation to report, and the subsequent implementation by the organizing administration.

Informal consultations are not legally binding. What degree of political importance and obligation the administration and politics assign to the results of the voting and what they announce to the participants seems to be of crucial importance for the satisfaction with the procedure, and thus for the acceptance of the results. The inquiry after the expectations shows that the majority does not expect that their own proposals will be implemented but that they are dealt with in a fair and transparent manner. It is, therefore, essential to define at the start what influence the voting will have on the decisions and, above all, to report in detail why individual proposals were or were not considered. In this regard, the division into the two phases of idea collection and priority formation and the presentation of the results has proved valuable. In both cases, more than 50 % of the respondents judged the process to be transparent.

5.5 Methodological Conclusions

The main objective of the e2d project is to develop and test concepts and tools for an appropriate evaluation of participation processes. In this chapter, different tools for evaluating informal public consultations have been presented, which were tested

in six different cases. The tools employed include a template for an evaluation by researchers or external observers as well as interview guides and surveys for organizers and participants ex ante and ex post. The basic idea is to assess the objectives and expectations at the beginning of a consultation and to check to what extent they have been met or missed at the end.

Although only a small part of the data collected with these tools for each case have been presented, it became apparent that the variety of objectives, procedures and contexts is much greater than originally expected. Even for the pairs of similar cases, there are still significant differences with regard to the objectives and expectations of their organizers.

Therefore, the *most important lesson* to be learned is that it is no use striving for a standard set of objectives and expectations against which all kinds of consultations can be evaluated appropriately. There were good reasons why the three research teams in the e2d project selected tools differently and adapted them to their respective situation. Accordingly, it would not make sense to suggest the different variants of tools employed as standards. They rather serve as examples, and it seems more reasonable to document the major components of the generic tool from which selections and adaptions can be made, tailored for each individual project, as each evaluation will need a unique design and unique instruments.

A *second* important lesson to be learned for an actor-centered evaluation is that the results depend to a critical degree on the actors taking part in the exercise. In the two Spanish cases, different opinions held by the actors interviewed could be explained by the different positions they held in the consulting organization. The same is true for the six organizers interviewed in the Vienna case and the ten in the Bremen case. A closer look at the variance in their responses showed that there is no collective view among the organizers within a consulting organization and that a high agreement in the satisfaction with different aspects is the exception rather than the rule. It is, therefore, crucial for a well-founded evaluation to carry out a stakeholder analysis, to identify relevant organizers and make sure that they take part in the evaluation.

A *third* lesson concerns the idea of an ex-ante and ex-post comparison of expectations and actual experience. While this may work in interviews with organizers, we learned that when it comes to participating citizens, many of them did not remember in the ex-post survey what they had expected at the start. This can raise questions over the validity of the ex-post survey. However, with regard to the impact of participation and future behavior, it is not relevant what they had expected before the consultation but only what they think at the end, whether their expectations and aspirations have been met, regardless of what they said months earlier. Therefore, with regard to the cost of conducting an evaluation, for a final assessment, it is sufficient to conduct only an ex-post survey and to ask how expectations have been met or missed. Ex-ante surveys, however, are relevant as input for organizers in order to design and adapt an ongoing process to the expectations of the participants.

The *fourth* and final lesson is that a final assessment can be collected from the organizers but, in most cases, not from the participants. They can only reply if there is a final presentation of the results of the consultation as in the case of Bremerhaven

and Wennigsen. And even in these cases, only the results of the consultation and the intention of the organizers have been presented but not the implementation of these results. This may take several months, and participants of the consultation usually cannot be reached any more unless they have registered an e-mail address. As this is seldom the case, most evaluation exercises can assess the process of a consultation procedure much better than its result. Furthermore, the question of whether the process or the results are more relevant for the attitudes and future behavior of participants and thereby for their impact remains open.

These lessons apply no matter to what extent online channels and face-to-face meetings are used. An attempt to analyze the differences between these communication channels will be presented in Chap. 15.

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Chapter 6
Collaborative Forms of Citizen (e-)Participation

Georg Aichholzer and Stefan Strauß

Abstract An important category of government–citizen interactions comprises various forms of citizen participation that can be described as cooperation, collaboration, or coproduction. The essence of such relations between public agencies and citizens is a collaboration in policy-making and the implementing of policy decisions on shared goals. Prominent collaborative (e-)participation models are participatory budgeting, citizen assemblies, citizen panels, community councils, round tables, and similar procedures, especially in domains such as urban and regional planning and local governance. Electronic communication and an expanding repertoire of Internet-based applications play an essential role in facilitating collaborative participation. Possible impacts can be increased influence of citizens on public decision-making and positive effects on the implementation of policies, on transparency, political culture, and the competences of participants.

6.1 Introduction

In modern democracies, an increasing part of interactions between government and citizens includes various forms of active participation in policy-making and decision-making. International organizations such as the Organisation for Economic Co-operation and Development (OECD) have propagated the idea of active participation of citizens in public policy-making as a principle of good governance, based on a partnership with the government (OECD 2001). Over the past decade, alongside the discourse on new forms of governing, the notion of "collaborative governance" has taken hold as a widely acclaimed paradigm. According to Ansell and Gash (2008), in such a governing arrangement "public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement pub-

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lic policy or manage public programs or assets" (p. 544). In this view, collaboration explicitly includes the participation of citizens both as individuals and as organized groups, and the scope of collaboration extends to all stages of the policy cycle.

In theories on New Public Management, collaboration has already been on the agenda for quite some time, producing a rich literature on "collaborative public management" (McGuire 2006; O'Leary and Vij 2012) and visions of "collaborative public administration" (Vigoda-Gadot 2004). More recently, the Presidential "Memorandum on Transparency and Open Government" (2009) in the USA, with transparency, participation, and collaboration as strategic guidelines, has prominently reinforced the theme. This massive increase of concentration on collaboration has even been interpreted as a "collaborative turn" in public policy (O'Flynn 2008).[1] It is debatable to what extent the explosion of collaboration rhetoric is matched by corresponding progress in conceptual clarity, integrative research, aggregation of knowledge, and theory building (O'Flynn 2008; O'Leary and Vij 2012; Wewer 2013).

In this chapter, we want to contribute to clarifying the scope of *collaborative* forms of citizen (e-)participation in government and public administration functions as a distinctive third category, after having focused on *information sharing* (Chap. 4) and *consultative* forms of (e-)participation (Chap. 5). For this purpose, we first look at the concept of collaboration in more detail, distinguish between various forms of working together and identify rationales and drivers behind them. We then review some concepts which establish a role for collaborative citizen participation and present an overview of different major forms and functions described in the literature. A typical domain of collaborative (e-)participation is the governance of sustainable development. We point out some contributions in this field and finish with a brief preview of the study of citizen panels collaborating on climate protection at a local government level in the environmental electronic democracy (e2democracy) project which is the subject of subsequent chapters of this book.

6.2 Conceptual Clarification

In representative democracies, government–citizen relations include a wide range of interactions in policy-making in between elections. Focusing on this kind of interaction, the OECD distinguishes three basic categories, characterized as *information, consultation*, and *active participation* (OECD 2001, pp. 15–17). They represent increasing levels of influence that citizens can exert on policy-making, with active participation as the one where "citizens actively engage in decision-making and policy-making … based on the principle of partnership" (p. 16). As this type of interaction between citizens and government involves various forms of working together, one can also speak of *collaborative participation* as covering large areas of what is called *active participation* (see also Chap. 2).

A simple definition of collaboration, for example, in the Oxford Dictionary, is "the action of working with someone to produce or create something." In the

[1] Jeremy Rifkin (2011) even postulates an "emerging collaborative age" as a general trend.

German and French language, however, the term "collaboration" has been negatively connoted since the Nazi era with the meaning of "cooperating treasonably," which is why the term "cooperation" should be preferred to "collaboration" in these languages.

In scientific usage, numerous different definitions of *collaboration* abound, many of them distinguishing it from *cooperation, coordination*, and *coproduction*. For example, Thomson and Perry classify collaboration as a "higher-order level of collective action than cooperation or coordination" (2003, p. 23), referring to a definition Thomson had developed earlier: "*Collaboration* is a process in which autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together: it is a process involving shared norms and mutually beneficial interactions" (p. 23). In a similar way, Gray's seminal work conceived of cooperation and coordination as elements in the development towards collaboration, which is characterized as a longer-term integrated process (1989, p. 5). Himmelman (2002, pp. 1–5) establishes a continuum of forms of working together, adding "networking" at the lower end, and sees "a willingness of the parties to enhance one another's capacity … for mutual benefit and common purpose" as a distinct characteristic of collaboration at the other end. In another variant of a collaborative continuum, Selden et al. (2002) place "service integration" as the top level above collaboration.

This is where the concept of *coproduction* comes in. It is mainly an established concept for citizen participation in service planning and delivery, and goes beyond the principal necessity of contributions by users or consumers of a service as a specificity of service production, most typically in human services such as education or health care. Coproduction relationships of citizens as users and part of communities have been emerging in many forms, involving different roles of users, communities, and professionals and combinations thereof, in particular citizens as coplanners or codeliverers of services together with professionals (Bovaird 2007). However, coproduction is not limited to the delivery of services. It also extends to the realm of policy-making and implementation. This wider concept of coproduction stands for collaborative participation embodied in actions for the production of a public good or achieving certain policy targets and problem solutions. All these different notions and related attempts to integrate the evolving Iinformation and communications technology (ICT) support (e.g., Linders 2012) have to be considered when defining the scope of collaborative forms of (e-)participation.

6.3 Drivers and Functions

To identify the rationales and motivations behind collaborative (e-)participation, it seems useful to look at them once again from a wider governance perspective. In the view of Kooiman et al. (2008), the emergence of new forms of governance "are 'answers' to ever growing societal diversity, dynamics and complexity, and

responses to major societal issues such as poverty and climate change" (p. 2). The notion of "interactive governance" used to characterize the new forms of interactions among civil, public, and private actors in the role of problem-solving and opportunity creating. This entails a growing importance of collaborative forms of governance interactions, due inter alia to mutual dependencies.

The OECD (2001, p. 18) points out three overarching reasons for strengthening government–citizen relations by active participation:

- Better quality and more effective implementation of public policy
- Greater trust in and legitimacy of government
- Encouraging more active citizenship for a stronger democracy

Ansell and Gash (2007) hold that "(c)ollaborative governance has emerged as a response to the failures of downstream implementation and the high cost and politicization of regulation … and to the accountability failures of managerialism" (p. 544). Similarly, Ackerman (2004) considers increased accountability through co-governance as the central idea behind an active involvement of citizens and civil society in government functions. He posits "co-governance for accountability" (p. 448) in contrast to the coproduction of specific services and influencing government through pressure from outside, illustrated by case studies of successful examples from participatory budgeting in Brazil to police and school reform in Chicago. Other scholars also name a number of internal and external drivers of collaborative relationships between government, citizens, and other societal actors, such as the search for better and more effective problem-solving, the demand for responsiveness to community needs, or capacity and skills issues, in particular the striving for unlocking local knowledge (e.g., Wanna 2008, p. 8; Parkinson 2006, p. 3).

Advances in ICTs, in particular applications based on the Internet, have also been a major driver behind discovering new potentials of collaboration for enhancing public policy and decision-making. "Citizen sourcing" and "Wiki government" are expressions of what Noveck (2009) has summarized in her idea of a "collaborative democracy" (p. 37) where citizens not only contribute opinions but also expertise to the process of governance. Dutton (2011) elaborates on these strategies of citizen-sourced advice to government, pointing out three types of "collaborative network organizations" characterized by their functional focus in supporting collaboration based on the Internet (pp. 11–13): (a) *sharing* (content, e.g., documents, data etc.), (b) *contributing* (e.g., to facilitate group communication) and, (c) *cocreating* (e.g., joint writing and editing). The difference between citizen consultation and citizen-sourced expertise should not be ignored; however, he finds "(i)t is impossible to entirely divorce advice or expertise from public opinion" (p. 25) in the collaboration between citizens and public institutions.

While the manifold advantages and opportunities of collaboration are in the foreground, Wanna (2008) also addresses the problems and risks government and public administration might have to face, the difficulties of ensuring political buy-in, the risk of losing control and decision delays, or the blurring of lines of accountability. Concerning nongovernment actors, imposed formal or informal behavior constraints

or a temptation to disengage and disrupt contributions are seen as potential problems. For Dickinson and Sullivan (2014), a thorough assessment of collaborative performance also requires analyzing dimensions which go beyond efficiency and effectiveness, including cultural performance.

6.4 Collaborative (e-)Participation Models

As criteria to differentiate collaborative (e-)participation from information sharing and consultation levels of (e-)participation, and to identify particular models within this category, we refer to established classifications in the literature described as "co-governance," "collaboration," "cooperation," or "coproduction." Viewing participation models from the perspective of democratic innovations, Newton (2012, p. 9) lists the following collaborative arrangements under the rubric of "co-governance": participatory budgeting, citizen assemblies, neighborhood development, village and community councils, community policing experiments, and planning boards on health, education, and planning issues. Kubicek (2014, pp. 275–276) adds further participation forms falling under the umbrella of "cooperation and coproduction": round tables, planning workshops, participation in advisory boards or in self-government of social institutions, and citizen panels, all of which can be supported by ICT components and the Internet. In her categorization of collaborative e-engagement mechanisms, Macintosh (2003, p. 95) explicitly mentions e-petitions, e-referenda, e-communities, and electronic citizen juries. Due to the lack of a standardized terminology and the existence of local variants with other names, the list is expandable. For example, Brown (2006) includes citizen juries and deliberative polls under "citizen panels." Mechanisms studied by Pratchett et al. (2009) with a focus on community empowerment, for example, "asset transfer and other facilitative mechanisms for community management and/or ownership of assets and social enterprise" (p. 23) can also be called collaborative participation.

In their much-quoted publications, Innes and Booher (2003, 2004) developed the idea of *"collaborative participation"* (2003, p. 426) or *"practices of collaborative engagement"* (p. 419) as an alternative type of public participation which in their eyes was thought to solve the dilemmas and failures so often experienced in practice. They contend that collaborative forms are superior in addressing most of the core purposes for participation, last but not least in solving "wicked problems." Their normative model depicts collaborative participation as inclusive of stakeholders, based on dialogue, processes of learning, open exchange of information, with joint problem-solving and sometimes also the resolution of conflicts, and the creation of innovations. Practical success mainly depends on the quality of dialogue, networked processes, and institutional capacity (a combination of social, intellectual, and political capital). Examples cited include collaborative dialogues on environmental regulation, budget decision-making and collaborative regional initiatives in the USA and Local Agenda 21 experiments in participatory planning and other collaborative processes in Europe.

A very similar concept of "cooperative citizen participation" as an alternative paradigm is proposed by Klages and Vetter (2013, p. 25 f.) in Germany, opposed to what they call "utopian," "fictitious," and "pseudo participation." It is a plea for citizen participation based on citizen panels as a systematic and continuous practice focused on (a) the local level and (b) cooperative multi-stakeholder processes allowing for win-win situations for citizens, local government, public administration, and other players. Conditions considered essential for success are institutionally guaranteed individual participation opportunities on a continuing basis, combined with a detailed set of principles for making participation worthwhile for all players involved (p. 45). Klages et al. (2008) see local citizen panels as the main instrument of cooperative participation. Preference for this model is based on an evaluation of a number of participation methods including forms such as planning cell, citizen forum, petition for a referendum, and citizens' survey.

Collaboration between citizens, the private sector, and public agencies is especially known from certain fields. These are participatory budgeting, citizen assemblies, community organizing, neighborhood development, and decentralized planning (Talpin 2012); all can include both offline and online formats.

Participatory budgeting (PB) is one of the most prominent models. It has its origins in Porto Allegre, Brazil, where it has been practiced on a regular basis since 1989. As an institutionalized inclusion of citizens and civil society organizations in decisions on budget allocations, mostly at municipal level, it aims to reinforce accountability. Over the past 25 years, PB first spread in Brazil and Latin America, then also across Europe, with several hundred cities adopting the concept (Talpin 2012, p. 186). Along with its spread, a differentiation process took place. A study of PB projects in 20 European cities identified six ideal typical variants (Sintomer et al. 2008). The formats also vary as PB practice employs traditional, online, or hybrid communication channels, with e-participation designs becoming the dominant model (e.g., Mkude et al. 2014; Peixoto 2009; Miori and Russo 2011). An evaluation of e-participatory budgeting cases in Germany and Brazil (Rahman and Tewari 2014) concludes that "(t)he journey from PB to e-PB is a learning curve" … but the "Internet has proven an efficient medium (85 % online participation in case of Cologne)."

Citizens' assembly and *citizens' jury* are collaborative participation models which connect deliberative quality with binding public decisions (Talpin 2012, p. 187). The British Columbia Citizens' Assembly held in Canada in 2004 is the most-quoted example. Initiated top-down to solve a decision stalemate on a contentious electoral reform, it was designed as a three-stage process (learning, public hearing, and deliberation) extending over 1 year, followed by a binding state-wide referendum based on the proposal reached by a group of 160 randomly selected citizens. Although their agreed position was not adopted because the referendum failed to achieve the required quorum, scholars assess this model as holding great potential for improving democratic quality. The combination of random selection, information provision and deliberation, high autonomy and empowerment of citizens represents a special strength. A weakness in the specific case was an insufficient bottom-up mobilization and the linking of the assembly activities to deliberation in

the wider public sphere. Talpin also reports on an example of citizens' juries practiced in Berlin from 2001 to 2003 to decide on development projects in the most deprived neighborhoods. Representing a mix between mini-publics and participatory budgeting, this innovative model was open to any resident or local association (Talpin 2012, pp. 188–189).

In the remaining part of this chapter, we will concentrate on the field of environmental issues and sustainable development and the format of *citizen panels*, from which we have drawn the design of the collaboration processes in the *e2democracy* project (see Chap. 7).

6.5 Collaboration for Sustainable Development

Collaboration processes in the governance of sustainable development have been initiated worldwide in the context of the Agenda 21 Programs. The signing (by 169 nations) of the Agenda 21 for development in the twenty-first century required that "each local authority should enter into a dialogue with its citizens, local organizations and private enterprises and adopt a local agenda 21" (United Nations 1992, article 28.3.). The newly emerging participatory structures and processes have become subjects of research in many countries, addressing their promises as well as their limits as manifested in focus groups, round tables, planning cells, and the like (c.f. Coenen 2009; Agger 2010; Lafferty and Eckerberg 2013). A related field with a long tradition of collaborative public participation is regional planning (c.f. Innes and Booher 2003; Hawkins and Wang 2012). In collaborative planning, citizens or residents and other stakeholders have the opportunity to participate in planning processes through a diverse set of methods (public meetings, web forums, questionnaires, field trips, etc.) and to have some influence on the outcome (Faehnle and Tyrväinen 2013). The benefits as summarized by Innes and Booher (2004) are, for example, exploring preferences, improving decisions and advancing fairness and justice (p. 422).

The Open Government discourse has reinforced collaborative relationships by the trend to share data (OGD, Open Government Data) between public agencies and the wider public and to stimulate its collaborative use.[2] This includes ICT-supported forms of urban and regional planning processes for sustainable development such as the deployment of geo-information systems (GIS).[3] GIS can be used for a variety of applications, for example, for settlement mapping, creating topographic sheets, mapping recreation areas such as forests, and visualizing environmental aspects of regions such as areas of pollution (Livengood and Kunte 2012; McCall and Dunn 2012). Some approaches offer possibilities for participants to feed data into these

[2] See http://www.opendataimpacts.net/report/wp-content/uploads/2010/08/How-is-open-government-data-being-used-in-practice.pdf. Accessed July 27, 2015.

[3] See e.g. http://gispoint.de/fileadmin/user_upload/paper_gis_open/537510014.pdf. Accessed July 27, 2015.

systems for the collaborative creation of interactive maps; for instance to highlight critical areas—so-called crisis mapping—based on crowd-sourcing, such as used after the 2010 Haiti earthquake. With embedded discussion forums, wikis and similar tools, citizens can explore challenges in these areas and share their ideas on how to cope with them.

Further experiences point to possible effects of the increased level of interactivity; for instance, complex topics can be explained better and the use of e-tools in planning processes (e.g., GIS) contributes to an improved quality of the information provided by the participants (Lührs et al. 2010). Related examples are novel modes of community-based collaboration in the field of environmental protection and sustainable consumption where eco-feedback systems and carbon footprint calculators play a role for participation in climate policies and guidance for behavior changes (e.g., Aichholzer et al. 2012).

It is evident that e-participation is of special importance in the area of regional planning and environmental governance. The list of innovative tools, methods, and systems for the support of collaboration, largely Internet-based, is expanding (Lucke 2010; Hanzl 2007). The spectrum ranges from more general and established tools to domain-specific and very new components, including online surveys; online forums; argumentation maps; groupware; online complaint and suggestions management; open data portals; administration- and agency-internal wikis; city-wikis and region-wikis; blogs (weblog, photoblog), podcast, and webcast; simulation games; public participation GIS; online monitoring instruments (e.g., carbon calculators); planning support systems; and augmented reality systems. Having analyzed the status quo of experimenting with IT tools, Hanzl (2007) finds practical use of many tools still in its infancy, but also great potential for groupware systems. Social media and Second Life are also becoming relevant for community organizing and for virtual workshops around planning issues (Evans-Cowley and Hollander 2010).

6.6 Citizen Panels

The use of citizen panels has some features in common with the use of panels in the social sciences. Here, panel studies are part of the classical repertoire of research methods. They comprise a form of longitudinal inquiry in which the subject is followed at certain intervals over a long period, usually over years. What is characteristic of, for example, household panels is the collection of repeated measures from the same group of people at different points in time (Andreß et al. 2013). Based on a stable unit of observation, this allows the monitoring of the dynamic of change over time. Citizen panels as a specific method of participation are also characterized by a relationship with a stable core of the same participants over a longer period. There are small and large citizen panel models. The former are mainly used for complex issues and can also appear under names such as consensus conference or planning cell. Large citizen panels (500–2500 citizens) are often two-stage processes. Klages et al. (2008) refer to such citizen panels as practiced in Great Britain

at local or regional levels. They consist of citizen surveys carried out on a regular basis which frequently include the use of online instruments and are supplemented by more intensive forms of participation. This combination is regarded as advantageous with respect to criteria such as representativeness, openness and low costs, dialogue orientation, flexibility, activation potential, and motivation advancement. In the first stage, a representative sample of citizens who are willing to participate in polls on local issues on a regular basis is surveyed three to four times a year (with appropriate feedback as an incentive and a refreshing of participants after about 3 years). In the second stage, these surveys are supplemented by deepened interactions with sub-groups using instruments such as group discussions, focus groups, or future workshops. The application of this citizen panel concept in several German cities proved successful with regard to the first stage but the integration of more intensive participation forms in a second stage was not or only insufficiently achieved (Klages et al. 2008, pp. 82–83).

A quite new large-scale variant designed as a combination of online and offline participation is the so-called *citizen forum* in Germany (Hohberg et al. 2014), conducted with 400 citizens representing 25 regions after a multistage selection process in 2011. Aiming to develop proposals on how to improve social cohesion in Germany, the process started in autumn 2010 and had its main activities from March to May 2011, including two online discussion stages, and ended with so-called "citizen programs" elaborated by each of the 25 regions and handed to the federal president on the closing day.

In the context of local governance issues such as climate policies, collaborative multi-stakeholder participation can contribute to enhancing decision-making and problem-solving. It can build on a variety of additional functions, for example, increasing identification with climate targets, enhanced access to information, awareness raising and opinion formation, exchange and discussion, incorporating local knowledge, and inviting proposals for measures. Participation may also foster legitimation and control of policy implementation as well as feedback on policies.

These potentials of citizen panels underline an essential difference from the use of household panels as a research method. These mainly contribute opinions and data whereas citizen panels collaborate on public issues and targets with individual and collective action including changes of behavior. However, like in panel studies, it cannot be expected that all panel participants maintain their participation over the full period of time, especially when the process is long-lasting or requires frequent contributions. Panel studies that require individuals to provide information at multiple points in time often suffer from a high degree of sample attrition (cumulative nonresponse over time). This phenomenon is a significant problem for longitudinal studies because it reduces and may bias the representativeness of study results (Ahern and Le Brocque 2005). Evaluating the quality of panel study data is difficult since (a) panel studies vary considerably with respect to sample size, duration, study objectives, and study design; and (b) there is no standardized definition or operationalization of this term, which causes a considerable variation of different operating numbers (Lee 2003; Lipps 2009).

Considering the reasons for panel attrition, the literature stresses two main factors for nonresponse (e.g., Martin et al. 2001):

- The higher the time and effort it takes a respondent to provide the required information, the higher the attrition rate.
- A vast majority of studies stress that (financial) incentives increase response rates over time.

Most panel studies offer the respondents financial benefits. Panel studies with annual data collection have shown an attrition rate between 2 and 50 % (Lee 2003; Frankel and Hillygus 2013).

6.7 Citizen Panels for Climate Protection in the e2democracy Project

The e2democracy project (see Chap. 7) established citizen panels collaborating with local governments on climate protection in three countries, providing a quasi-experimental field-study of the impacts of this special participatory design. It consisted of identically organized participation processes in seven municipalities, each targeting a reduction of CO_2 emissions at local level by at least 2 % per year. The assumption was that target achievement was more likely in successful coproduction, that is, in effective collaboration between local government, citizens, and companies. The participation design together with sufficient long process duration (up to 2 years to account for seasonal influences) and free choice between traditional and online communication formats laid the basis for a comparative evaluation of its impacts. The main impacts measured included changes of climate awareness and behaviors of the panelists as well as of CO_2 emissions at individual and community levels.

Local governments in the seven municipalities that were interested in establishing a participation process based on collaboration with citizen panels organized the processes so as to provide some agreed common core features: (1) access to information offering guidance on climate-friendly behavior (regular newsletters, information via project website, or leaflets); (2) an online carbon calculator and, alternatively, a personal "CO_2 household book" on paper for panelists to document their individual consumption data and receive individual CO_2 balances as feedback on a regular (bimonthly) basis; and (3) various forms of theme-oriented meetings and events where panelists could exchange experiences and suggestions among each other as well as with municipal governments and other local actors. The study design and evaluation approach are described in more detail in Chap. 7; subsequent chapters inform about the process organization and results.

This evaluation design required the participants to collect and enter detailed information into the tools provided every 2 months over a period of up to 2 years (which is much more often than in most panel studies), without or with only very modest material incentives (unlike the vast majority of studies). Therefore, a higher panel attrition rate had to be expected although, as mentioned above, comparisons with other panel-data are difficult. This said, a rate of above 50 % would still be in line with the figures known from the panel study literature.

6.8 Conclusions

As shown, the concept of collaborative (e-)participation refers to open dialogue and consensus-oriented collective decision-making and coproduction of public goods and not merely to consultation. It also includes collaborative implementation of policy decisions based on shared goals such as climate targets. A set of widely diffused collaborative practices or participation models has been identified all of which increasingly use online formats, mostly in combination with traditional modes of communication. Among the most prominent examples which make use of Internet-based applications are participative budgeting and citizen panels. However, the use of new instruments is not per se an indicator of the systematic integration of citizens, civil society, and businesses into the collaborative execution of tasks by public agencies and administrations. Compared to the measure of systematic practice in public policy and administration, "collaborative participation" as well as "collaborative administration" may still be catchwords. However, they could well play a role in signaling a new governance culture and an attitudes change within public administration.

Fung (2006) and Beetham (2012) have suggested a set of useful criteria to compare and assess different models of collaborative participation in practice. Participant selection is one (open, self-selection, or restricted). e-Participation options in principle allow for greater openness than collaborative designs with traditional communication means. Small citizen panels like other mini-publics are restricted in terms of participant numbers but ideally representative, and so are large citizen panels. Most collaborative models are invited rather than claimed spaces (round tables might also be claimed). Formal collaborative procedures are most frequent in the domain of regional planning. One-off activities are more frequent than recurrent ones; large, two-stage citizen panels and participatory budgeting are examples of the latter. Collaborative participation as coproduction by multiple stakeholders in favor of public goods such as climate protection tends to require an above-average participation effort and duration of process. The e2democracy project has been introduced as an example of this kind. The methodological approach, outcome, and impacts of its particular participatory design as well as its specific challenges are the subject of the subsequent chapters of this book.

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Chapter 7
Evaluating Collaborative (e-)Participation in Climate Protection: Approach and Field Study

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Abstract This chapter presents an evaluation approach and its application in the assessment of a collaborative type of (e-)participation with a focus on outcome and impacts. The European research project e2democracy offered the unique opportunity for a comparative, quasi-experimental field study of a set of seven local exercises in three countries with largely identical design. In each region, citizen panels collaborated with local governments on achieving local climate targets over a period of up to 2 years. Common core elements of the participation process characterized by a combination of individual and collective components are explained and their potential effects and impacts are outlined. Checks for alternative explanations of impacts and potential biases caused by Hawthorne effects are addressed as integral parts. It is argued that this evaluation approach, based on a combination of methods and tools, will contribute to closing the evaluation gap in the practice of public (e-)participation.

7.1 Introduction

The call for closing the evaluation gap in the field of public participation and for systematic evaluation exercises has been on the agenda for more than a decade, but work on it is still in its infancy (cf. Rowe and Frewer 2004; OECD 2005; Abelson and Gauvin 2006; and in more detail Chap. 2). The European research project e2democracy (e2d), apart from evaluating public consultation processes (see Chap. 5),

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developed a particular methodological approach to the evaluation of a collaborative type of (e-)participation with a focus on assessing outcomes and impacts in the area of sustainable development and climate protection. A set of similar forms of citizen participation in climate policies at a local level was studied in seven regions in three countries. The project investigated the extent to which citizen participation in collaboration with local governments (including both online and offline formats) combined with long-term individual consumption monitoring and feedback can contribute to achieving local climate targets. The existence of a set of common core elements and the fact that the participation processes lasted up to 2 years offered the unique opportunity for a quasi-experimental field study and comparative assessment of (e-)participation applying the evaluation framework presented in Chap. 2. Additionally, the chosen field of climate change also allowed a comparison to be made of the impact in quantitative terms, that is, the size of the reduction in greenhouse gas emissions on a collective and individual level, measured in carbon dioxide equivalents (CO_{2e}).

In Sect. 7.2, we start with an overview of the research design and its methodological components before we introduce the empirical setting in Sect. 7.3. A description of the evaluation approach applied to the empirical case study follows in Sect. 7.4. In Sect. 7.5, we outline the theoretical background and causal mechanisms that form the basis for the expected impacts in the form of pro-climate changes in awareness, attitude, and behavior, including an effective reduction in CO_{2e} emissions. Sections 7.6 and 7.7 explain two further components of the research design: the comparative analysis of impacts and the checks for determining the causal contribution of the (e-)participation exercise to the impacts identified. We complete the chapter with an overview of the methods and tools employed for data collection (Sect. 7.8) and a concluding summary of major elements and issues of the research design for evaluating collaborative (e-)participation (Sect. 7.9).

7.2 Research Design for Evaluating Collaborative (e-)Participation in Climate Protection

In Chap. 2, we suggested a twofold relativity theory of the evaluation of (e-)participation, introducing a generic conceptual framework and claiming that the indicators for each category have to be defined depending on the specific form of participation and its context. Apart from online and offline consultations, the e2d project included a comparative evaluation of a particular form of citizen–government collaboration in local climate protection by citizen panels. The objective of these panels was not only to provide data for surveys or to work on common documents but to monitor and change the behavior of the panelists in order to reduce the CO_{2e} emissions of their households and thereby improve the climate balance of the local community. This type of collaboration is also called coproduction (see Chap. 6). Obviously, its evaluation requires indicators different from those for an evaluation of a public consultation on local climate policy or any other subject (see Chap. 5). To study a set of participation processes with an identical subject, fairly similar organization and targets, and measurable target achievement, in different contexts, offers a big

advantage for advancing the evaluation of (e-)participation. Such a setup allows for an evaluation which promises to overcome a significant deficit of existing evaluation research, that is, the limitation resulting from largely incomparable individual case studies and methods of (e-)participation.

In Fig. 7.1, we first provide an overview of the research design and the methodological components of the evaluation approach applied to the collaborative (e-)participation example before we describe each element in the subsequent sections.

Our *evaluation subject* is a homogeneous set of (e-)participation processes with a particular design, carried by citizen panels collaborating with local governments on achieving climate targets. The participation exercises comprise seven locations in three countries and represent a long form of participation with a standard duration of 2 years, in two cases 1 year and 18 months, respectively. A homogeneous set of (e-)participation exercises provides appropriate conditions for a comparative, quasi-experimental field study applying the input–activities–output–outcome–impacts *evaluation framework* introduced in Chap. 2. The first three evaluation components (input, activities, and output) are process aspects, while the latter two focus on its results. An operationalization of the components as applied to the (e-)participation of the seven citizen panels in local climate initiatives is provided in Sect. 7.4.

In each of the seven cases, the *participation process design* is characterized by some common core elements: agreements between the local government, businesses and citizens on the aim of reducing CO_{2e} emissions by at least 2% per year; citizen panels collaborating with local governments on achieving or exceeding the agreed target; using a common carbon calculator as a tool for bimonthly individual consumption monitoring and feedback of CO_{2e} footprints; provision of issue-specific information, events and opportunities for exchange; free choice of participation mode—via traditional means (in person, via mail, telephone, etc.) or via e-participation; in addition, large-scale information measures via local media and kickoff events to spread invitations to all citizens, plus local telephone surveys before the start which served both to collect data and to raise awareness of the participation opportunity.

The rationale behind this participation design is to turn individual commitments into effective climate protection by enhancing problem awareness, creating an identification with public objectives and providing information on behavior impacts (carbon footprints), together with the provision of support in changing to pro-climate behavior, and exploiting the advantages of electronic media for facilitating participation and the pursuit of these targets. Expected effects of the (e-) participation process, based on individual feedback of comparative information on emissions, embedded in collective action of local communities are described in Sect. 7.5. Also included are the causal mechanisms leading to impacts in terms of pro-climate attitudes, behavior, and reduced CO_{2e} emissions.

Tailored to the participation exercises on local climate targets, our evaluation approach is to be used for a *comparative assessment of impacts*. We distinguish between impacts at two levels, individual and collective. Impacts at the *individual* level concern changes in awareness, attitudes, and behavior as well as changes in individual CO_{2e} footprints, that is, whether these have improved or deteriorated and whether the target of a 2% per annum reduction in emissions has been achieved

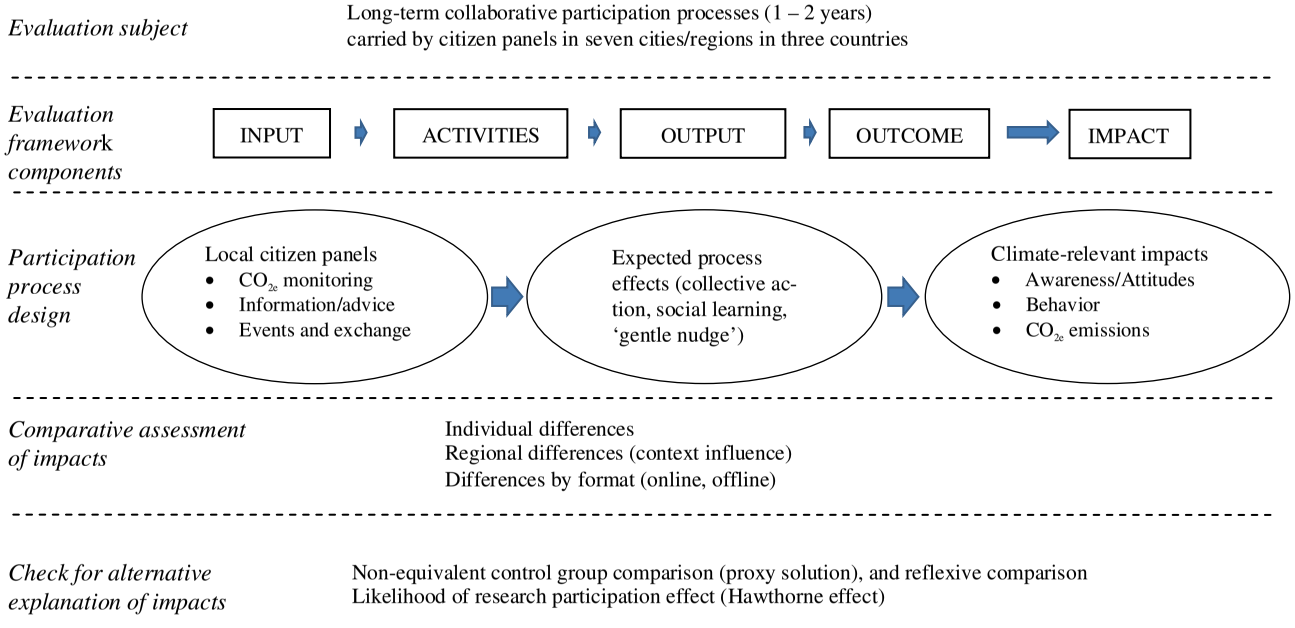

Fig. 7.1 Overview of the research design for evaluating collaborative (e-)participation in climate protection

(Chap. 11). Impacts at *collective* level are changes in the total volume of CO_{2e} emissions of the local panel compared to the target (Chap. 12). The main aspects considered in the analysis of impact differences are the influences of individual characteristics, the form of participation (online or offline), process characteristics, and, finally, the regional context (see Sect. 7.6).

A principal methodological issue is to determine the causal contribution of the participation exercise and the exclusion of the possibility that identified impacts are caused by factors other than (e-)participation in the local citizen panels. To ensure this, the evaluation design includes *checks for alternative explanations* of impacts. Research participation effects or the so-called Hawthorne effect deserve special attention (see Sect. 7.7).

7.3 The Empirical Setting: Seven Citizen Panels

The centerpiece of the collaborative type of (e-)participation within the e2d project is a set of similar forms of citizen engagement in climate governance at local level. The cases studied are distributed across seven regions in three countries: Bregenz and Mariazellerland[1] in Austria; Bremen, Bremerhaven, and Wennigsen in Germany; and Saragossa and Pamplona in Spain.

The *selection* process was guided by the search for local government authorities interested in citizen participation in climate policies and willing to implement a common participation format built on citizen panels and a number of other basic design characteristics. We identified candidates from among the signatories of the Aalborg+10 Commitments[2] and information on towns which indicated outstanding activities in climate protection and public participation (e.g., climate awards, participation records, etc.). For various reasons, some initial contacts did not result in participation in the study (Vienna in Austria; Munich, Freiburg, and Cologne in Germany; the Provincial Government of Biscay in Spain). In the end, a total of six towns and one region comprising five small municipalities embarked on participation processes with a common format, which served as the subjects of our empirical investigation. They provide a mix of small and larger towns as well as rural municipalities of varying size and structure (see Table 7.1).

The institutional backgrounds of the local organizers and process managers range from formal government departments to NGOs and grassroots organizations engaged in sustainable development. Three types of actors can be distinguished:

a. Municipal departments for citizen participation (Saragossa), and for environmental issues (Pamplona, Bregenz)
b. Nonprofit local sustainable development group (Mariazell)
c. Nongovernmental climate agency (Bremen, Bremerhaven, Wennigsen)

[1] As a shortcut for Mariazellerland, we also use the name Mariazell.

[2] See http://www.sustainablecities.eu/aalborg-process/commitments. Accessed 27 July 2015.

Table 7.1 Empirical setting: characteristics of the citizen panel locations

	Austria		Germany			Spain	
	Bregenz	Mariazell[a]	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
Status	Town	Region	City-state	City	Town	City	City
Population[b]	29,849	4690	547,340	113,366	14,099	197,935	674,725
Area (km²)	29.78	31.60	325.47	93.82	53.78	25.24	973.78
Population density[c]	1002	148	1682	1208	262	7842	693
Type of local organizer[d]	a	b	c	c	c	a	a
Participation rate[e] (%)	0.21	1.32	0.04	0.04	0.81	0.13	0.06

[a] Mariazell region consists of five neighboring municipalities (Mariazell, St. Sebastian, Halltal, Gußwerk and Mitterbach)
[b] Figures from 2011
[c] Population/km²
[d] Explained above
[e] Registration numbers relative to population size (in %)

7.3.1 Recruitment of Panelists

Recruitment activities varied among the seven sites, but also had some core elements in common. As an initial step to engage local stakeholders, the national e2d project teams presented the common core concept to the local councils and interested public. Moreover, in each town or region, a telephone survey among a representative sample of the population was carried out (with sample sizes between 502 and 926 respondents per site). Besides identifying problem awareness, readiness, and levels of commitment to participate and various attitudes and assessments related to climate change policy, the function was to draw attention to the upcoming participation project. In each region, the vast majority of the respondents (56–82 %) declared that they were willing to reduce CO_{2e} emissions and to participate in individual CO_{2e} monitoring. Another 9–17 % were willing to do so if government and business also would have to prove a reduction in CO_{2e} emissions.

The local institutions involved applied a mixed set of strategies to recruit participants. In Germany, the city-state of Bremen played a pilot role; the Minister for Environmental Affairs sent invitation letters to 4000 citizens randomly selected from the population register. As the response was far below expectations, additional measures such as local newspaper articles, invitations via e-mail lists and other channels were utilized, which proved to be more successful. Because of this experience, Bremerhaven and Wennigsen avoided costly mass invitation letters and focused on calls via local media, regular newsletters and the like. In Saragossa, Spain, the city council invited a group of volunteers that had already regularly participated in local initiatives in the past, and the council also launched various press releases and a radio interview. Pamplona recruited inhabitants who had stated

their interest in the initial telephone survey and also used press releases. In the two Austrian cases, personal invitations via mail to households were combined with a mix of additional channels. In the Mariazell region, all 2400 households received an invitation folder and endorsement letter from the mayors of the five local municipalities; appeals in local print media, via posters, personal campaigning, and e-mail lists were complementary activities. In Bregenz, the department for environmental protection invited citizens to participate via print media (newspaper articles, posters, flyers, etc.) and sent out invitations to 400 randomly selected households. In each region, participants had the option to choose between online and offline formats of participation at the time of registration. Taken together, these provisions were intended to ensure maximum openness and inclusion as regards participation opportunities.

7.3.2 Citizen Panels and Process Characteristics

The (e-)participation processes were carried out by *citizen panels* of different sizes that collaborated with local governments on achieving agreed climate targets. Participation concentrated on three types of interaction: (1) providing and accessing information for guidance on climate-friendly behavior via regular newsletters, project websites, movie clips, brochures, etc.; (2) participants' regular bimonthly reporting of individual consumption data for individual CO_{2e} footprints as feedback; and (3) various forms of theme-oriented events and exchange (e.g., group meetings and excursions, expert talks, chats with experts, discussion platforms, and other events). Regular individual CO_{2e} monitoring with visualized feedback, comparative over time and among participants, was a core element. Participants used a central tool (see Chap. 8 for further details), which took the form of either an online CO_{2e} calculator with instant feedback or an equivalent CO_{2e} household accounts book on paper with subsequent calculation and communications of CO_{2e} footprints by assisting staff. "Onliners" received regular e-mail reminders to update their CO_{2e} balances and were guided through this procedure if they encountered problems. Similarly, "offliners" were supported via telephone in updating their consumption data. The aim of these measurements was twofold: to stimulate informed choices and support responsible behavior towards reduced CO_{2e} emissions and to stabilize the participation process over a longer time period.

Kickoff events held in each region provided the participants with information on the project in general as well as on using the tool for CO_{2e} monitoring. Depending on local agendas, the participation processes started at different points in time: the first one in Bremen in March 2010; the panels in Austria and Spain between May and July 2010, in Bremerhaven in November 2010, and in Wennigsen in May 2011. The two Spanish panels ran from July 2010 until June 2012, with the peculiarity that

there were two subgroups in both panels.[3] The results of both subpanels cover 12 periodic measurements with only 2 months' delay in their starting date, so they were analyzed together. In Bremen and the two Austrian locations, too, the participation processes with CO_{2e} monitoring covered two full years. Only in two cases, the duration was shorter: in Bremerhaven (18 months) and Wennigsen (1 year).

Panel sizes varied between around 50 and 400 participants, making a total of 1159 registered participants (see Table 7.2). In view of the extensive information activities and the high level of verbal commitments expressed in local population surveys before the start, it was surprising that in all regions the actual registration figures turned out to be much lower than expected. Participation rates relative to population size in effect varied between 1.3 % for the Mariazell region and 0.04 % for Bremen and Bremerhaven, showing that the smallest regions were more successful in attracting participants. The overall participation format put comparably high demands on participants as regards effort, time, discipline, and endurance, and so a high level of panel attrition was expected. Over the full period of up to 2 years, dropout reached 63 % on average and was much higher among onliners than among offliners (see Table 7.2; in more detail Chap. 13).

As concerns incentives, the Spanish panelists received no material rewards at all for their participation in the panels. In Germany and Austria, modest recognition was awarded on the basis of a bonus system. Panelists could accumulate bonus points for continuously participating in CO_{2e} monitoring and three panel surveys. In Germany, bonus points could be exchanged for a package of energy saving bulbs or a current meter. In Austria, bonus points were rewarded with 20 to 70 € at the closing event. In both countries, the local organizers paid tribute to the three most effective CO_{2e} savers with small presents. Additionally, in Germany, an e-bike was awarded to the winner of a lottery at the closing event.

Table 7.2 Size of citizen panels in seven locations over time

City/region	Start date	Registered citizens at start (*N*)	Baseline measurement (*N*)	1st periodic measurement (*N*)	Final measurement (*N*)	Dropout since start (%)
Bregenz	07/2010	64	40	32	21	67.2
Mariazell	05/2010	62	38	27	22	64.5
AUSTRIA		126	78	59	43	65.9
Bremen	03/2010	213	136	90	60	71.8
Bremerhaven	11/2010	48	35	32	29	39.6
Wennigsen	05/2011	114	78	67	43	62.3
GERMANY		375	249	189	132	64.8
Pamplona	05/2010	260	121	111	73	71.9
Saragossa	07/2010	398	290	255	181	54.5
SPAIN		658	411	366	254	61.4
Total		1159	738	614	429	63.0

[3] One group started in July 2010, whereas the second started in September 2010 and ended 2 months later than the first group, in August 2012. The second group was much smaller; so, for the purpose of simplicity, the dates refer to the first and larger group.

7.4 Applying the Evaluation Approach

The generic evaluation framework explained in Chap. 2 comprises a chain of individual components and needs to be tailored for application to the conditions of the collaborative (e-)participation processes in the seven regions. The focus is to be on the assessment of outcome and impact. The possibility that the local climate initiatives will achieve their declared aims is built on a specific process design and assumptions about effects of this form of citizen participation. The effects to be assessed primarily concern climate-relevant impacts although (local) democratic impacts could also be considered. How the generic evaluation framework translates into the concrete conditions of the seven cases and research instruments for their measurement will be outlined for each of its major elements (Table 7.3).

The components *input* and *activities* define basic conditions which set the course for the participation processes and therefore need to be assessed first. Material endowment, organizational arrangements, political buy-in, and legal frameworks constitute the ground layer. While the design of the (e-)participation processes is largely similar in each region, organizational arrangements of the management by local organizers differs. Only in Bregenz, Pamplona, and Saragossa, management is in the hands of municipality departments; in the three German cases, it is outsourced to a nongovernmental local climate agency, and in the Mariazell case, the project is managed by a local grassroots organization. According to comparative assessment by the international research team, political commitment was high in Bregenz and medium in the two Spanish cases, but relatively low in all other regions. A balanced involvement of major stakeholders is assumed to be helpful; however, in most regions except for Bremen and Bremerhaven, there was relatively little to no involvement of businesses. All projects were faced with rather tight conditions as regards financial and personnel resources. Since the projects were financed as integral parts of general budgets, separate cost figures valid enough for a systematic comparison were not available. Only a very rough qualitative comparative assessment of the financial input was possible based on information from local organizers and on their assessment of personnel resources in person-months spent; it showed comparatively higher personnel input in Bremen, Wennigsen, Bremerhaven, and Bregenz, the lowest in Mariazell and the Spanish cities taking a medium position.

The comparative assessment of local government financial input showed a higher level for Bregenz, a low level for Mariazell, a relatively low level for Wennigsen, and a medium level for the rest (Chap. 9 provides further details).

Technical implementation of participation infrastructures and contents, related information activities, and feedback procedures describe dynamic characteristics to be assessed under the heading “activities.” In the e2d project, this concerned the technical creation and maintenance of project websites (linked to the international e2d project website), online CO_{2e} calculators as central tools, as well as equivalent offline counterparts (CO_{2e} household account books with support services), hotlines or helpdesks for answering participants’ questions and meeting rooms with corresponding infrastructures. Related management tasks included information measures

Table 7.3 Evaluation framework for assessing participation of citizen panels in local climate initiatives

Input	Activities	Output	Outcome	Impact
Financial resources Personnel resources Organizational procedures Legal provisions Political commitment	Technical implementation • Infrastructure and devices • General management Content provision • Calculator contents • Newsletter contents • Supporting information • Events Awareness creation • General information measures • Event-specific information measures Instructions on tool usage Feedback on • CO_{2e} monitoring • requests	(Online as well as offline formats) Quantity: • CO_{2e} calculator • CO_{2e} book • Newsletter • Meetings • Talks • Excursions • Advice • Chats • Forum discussions Quality: • Usability • Accessibility	Usage of CO_{2e} monitoring tools • No. of participants • No. of onliners, offliners Representativeness, inclusiveness of participation • Social structure • Issue knowledge, interest Participation in events • No. per category Quality, relevance of contributions • CO_{2e} data provided • Discussion contributions	Climate-relevant impact Awareness, attitudes (e.g., interest, issue knowledge) Behavior (change in six relevant fields) Tangible effects (CO_{2e} emissions) Democratic impact (local) Social capital building Social learning Civic skills development Trust in local governance
Process characteristics (administrative buy-in; involvement of business; dropout)				
		Measured by:		
Organizer interviews; document analysis; observation	Organizer surveys and interviews; document analysis; observation; citizen panel surveys	Website inspection; document analysis; observation; interviews; panel surveys	Website inspection; CO_{2e} calculator data base; citizen panel surveys; local population surveys; document analysis	Citizen panel surveys; CO_{2e} calculator data base; organizer surveys

for raising awareness and recruiting participants as well as local businesses for collaboration, the provision of contents for issue-specific additional information, events, websites, and regular newsletters and continuous support for the participation process. Introducing the panelists to the use of central tools and the support of offliners in CO_{2e} footprint monitoring were activities shared between local organizers and national research teams.

Altogether, these input factors and activities can be expected to determine *output* and *outcome* of the (e-)participation processes (online as well as offline formats) to a large extent both in terms of quantity and quality. Hence, as a next step, it is necessary to assess the various categories of output produced as listed in Table 7.3 (e.g., CO_{2e} monitoring duration, tool usability, number, accessibility, and quality of events) as well as the various dimensions of "outcome." While the output categories represent the supply side, the rubric "outcome" describes criteria as seen from a demand side or participants' perspective. Therefore, it is the extent and structure of uptake of (e-)participation that are to be assessed here: online versus offline usage, the participants' social profiles, the use of the various event categories, and the quality of the participants' contributions.

It can be assumed that the individual evaluation components from "input" to "impact" are connected to each other through a relation of successive determination. In this way, *impact* as the final link in the chain is determined by all antecedent components or process characteristics, but most immediately by the quantitative and qualitative aspects of the various categories of process outcome. It is clear that determination can only mean determination to a certain degree because outcome and impact are also subject to external context conditions and influences. For this reason, the empirical analysis will not only have to relate output to outcome and both to impact, but will also have to look at contextual factors influencing final impacts.

As already noted, the focus will be on climate-relevant impacts. In addition to detecting changes in climate-related awareness, attitudes, and behavior, the assessment can also build on more tangible criteria, that is, clear climate targets and CO_{2e} as the unit for identifying change in emission levels. This opportunity brings the exercise even closer to a recognized definition of evaluation as a "structured process of establishing success … against preset criteria" (Frewer 2005, p. 94). However, in the field of climate change too, it is a challenge to measure and account for performance in practice (Cooper and Pearce 2011). Concerns about measurement, control, and accountability have been raised as issues in previous research. Comparisons of CO_{2e} emissions between cities are difficult, mainly due to different local climate conditions, different national energy mixes, and because of different calculation methods. For example, urban inventory differences include (OECD 2010, p. 52):

- Different definitions of the urban area (i.e., by the larger metropolitan region, by city limits, or by another unit)
- Choice of inventory years presented
- Inventory scope (i.e., whether or not more than city-owned operations are reported and whether indirect emissions are included)
- Methodological issues (e.g., comparability of conversion factors; see Chap. 8 for further aspects)

In the e2d project, the assessment of CO_{2e} impacts is able to avoid at least some of these problems because for each region it will use a calculator with the same content items, the same 2-year monitoring period (except for two of one year), and distinguish between impacts at individual level and collective (total panel) level. A principal challenge for both climate-relevant and democratic impact assessment is to ascertain long-term effects. To achieve a participation period of up to 2 years is a very ambitious target, but is necessary in order to go beyond mere short-term effects and in order to check for influences from seasonal variation. An additional measurement of CO_{2e} footprints among the panelists over a certain reference period at a later point in time, say after 1–3 years, might be a useful control for the sustainability of effects, but was not possible within the e2d project.

7.5 Causal Mechanisms Linking (e-)Participation Design and Expected Impacts

The rationale behind the impacts expected from (e-)participation processes with a particular design requires some further explanation. The participation design builds on the common core features mentioned, consisting of three basic components: continuous monitoring of individual consumption and feedback of CO_{2e} footprints, provision of supporting information, and opportunities for exchange and advice. Figure 7.2 outlines the interdependency of this (e-)participation format and potential ultimate impacts, pointing out various mediating mechanisms which relate to theoretical arguments and empirical evidence presented in Chap. 3.

The information on project targets and what is expected from prospective participants, as communicated during their recruitment, ensured that citizens who registered were in principle ready to contribute to climate protection. The (e-)participation process itself provides for individually tailored information feedback on the panelists' consumption behavior including comparative information on the CO_{2e} footprints of other households, which adds normative and competitive elements. According to Thaler and Sunstein (2008), an information feedback design which establishes a suitable "choice architecture" in behavioral decisions can provide for a "gentle nudge" towards a certain target such as energy conservation. There is ample evidence that appropriate feedback has indeed been successful in promoting energy conservation as postulated with the "information saves energy" argument (Fischer 2008). Similar to energy conservation effects, information feedback on CO_{2e} footprints is intended to encourage behavior reflection and to offer guidance on the route to pro-climate behavior change. It is assumed that this is made possible through effects such as learning to understand the CO_{2e} consequences of one's actions in various areas of everyday behavior and their different magnitudes as well as through normative and competitive reinforcement from comparison with others.

Additionally, individual CO_{2e} footprint monitoring is embedded in collective social action since panelists become part of local communities through their involvement in joint climate initiatives. There are several arguments that local-level

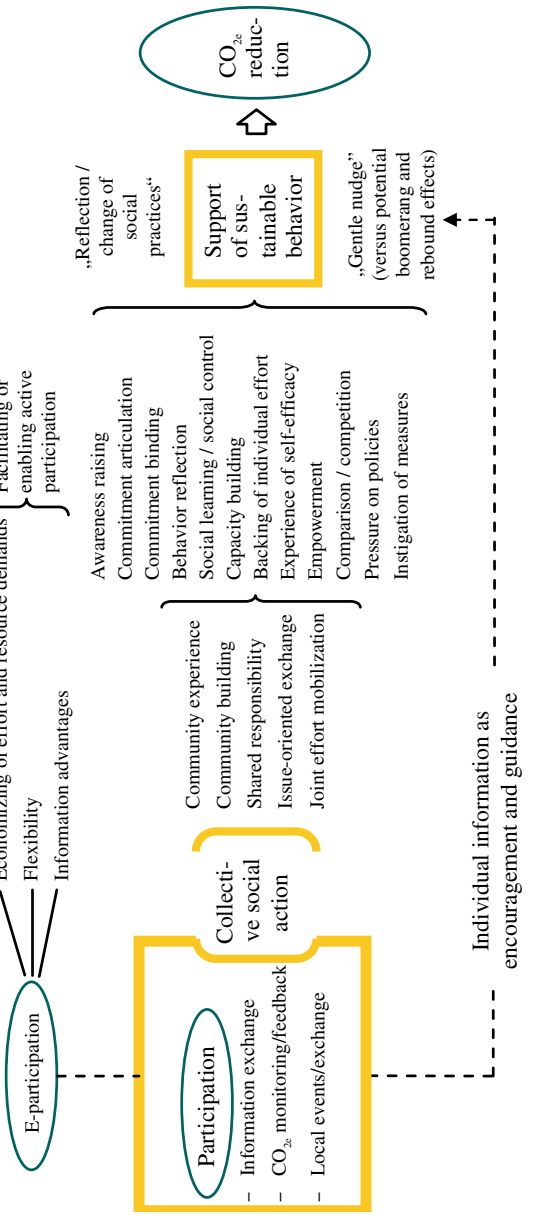

Fig. 7.2 Potential effects and causal mechanisms of (e-)participation in local citizen panels on climate protection

and community-scale interventions are a more promising approach to promote low-carbon lifestyles. Among other things, communities are regarded as better suited to deal with barriers posed by "social dilemmas, social conventions, socio-technical infrastructures, and the helplessness of individuals" (Heiskanen et al. 2010, p. 7586). Further advantages include demonstrating lower carbon options in practice, and offering a platform for mutual exchange and sharing of experience (Mulugetta et al. 2010, p. 7542). In the e2d project, (e-)participation in the citizen panels, in issue-specific local events, and various forms of exchange on achieving the climate targets offers opportunities for community experience, the experience of shared responsibility, the mobilization of joint effort, and social learning. A number of further potential effects and causal mechanisms with a strong community, social capital, and capacity building role are outlined in Fig. 7.2 and empirically analyzed in Chap. 10, which taken together are assumed to provide social backing for and reinforcement of individual commitments and behaviors in striving to reduce carbon emissions. It is essential that the participation process thus combines individual and collective components, both of which can contribute in specific ways and complement each another. Together they provide for conditions and mechanisms that have the potential to produce the effects outlined which are conducive to a change to and support of a more climate-friendly behavior, and ultimately a reduction in CO_{2e} emissions.

However, it would be naive to consider only positive effects and to neglect forces that may obstruct individual behavior change and operate in the opposite direction. Among these are boomerang or rebound effects (Schultz et al. 2007), climate-damaging social practices (Shove 2010; Shove et al. 2012), lack of alternative options due to socio-technical infrastructure constraints (e.g., regarding climate-friendly transport), and other barriers to a successful transformation of behavioral patterns into an effective reduction in carbon emissions. As far as possible, the empirical analysis will also have to take such factors into account. Of course, deficits in the provision of adequate process conditions and in its output can be a basic source for the potential failure or weakening of the assumed causal relationships and impacts. For example, gaps between expected and perceived usefulness and usability of tools can impair individual feedback benefits and obstruct the expected learning and guidance functions (cf. Juvan and Dolnicar 2014). Likewise, the failure to create appropriate opportunities for experiencing community and exchange along with the (e-)participation process can seriously undermine the potential of positive community effects.

Finally, the specific role of e-participation needs to be addressed. It is expected that free choice between online and offline formats will enlarge participation opportunities and that the special advantage of e-participation would be to economize and facilitate active participation. The online use of the CO_{2e} calculator and issue-related information should provide greater flexibility, instant access, and additional information-related functionalities. However, participation by traditional media includes being called every second month by telephone by a member of the project team to collect the data, and receiving individual CO_{2e} balances via mail in return. It can be assumed that these necessary elements entail higher social control and that emerging personal relationships will lead to higher efforts and less dropout among "offliners."

7.6 Comparative Analysis of Impacts

The primary objective of the e2d project is to apply the proposed evaluation framework and to identify impacts of the participation processes studied. Apart from assessing different impacts (changes in awareness, attitudes and behavior, ecological impacts) and impact at different levels (individual and collective), an integral aim is comparative assessment. The latter mainly means comparing impacts[4] in two respects: between regions and countries, and between the two principal participation formats (online/e-participation vs. offline/traditional participation). Focusing on the regional context is supported by the plea for a more rigorous evaluation of context attributes as explicitly expressed in evaluation review reports (Abelson and Gauvin 2006, p. v).

The expectation of regional differences in impacts builds on the possibility that context conditions can be more or less conducive or obstructive to achieving the intended impacts. For example, the level of the public perception of climate change as a problem may affect motivation and commitment, and there are indeed pronounced differences between countries. When asked for the single most serious global problem from a list with eight options, 16 % of the citizens in the European Union named climate change (European Commission 2014). Assessments varied significantly between member states, with Sweden coming first (39 %), Portugal last (6 %), and quite a strong north–south difference among the countries participating in the e2d project (Spain: 8 %, Austria: 24 %, Germany: 27 %). In representative population surveys carried out at the beginning of the e2d project, significant differences were also found regarding the same question at a regional level, with results ranging between 4 % (Saragossa) and 39 % (Wennigsen).

The additional focus on participation formats is motivated by the specific interest in evaluating the role of e-participation. Here, the assumed advantages regarding flexibility, instant information access, and other functionalities of online formats contrast with possible advantages regarding participation loyalty and reinforcement effects from social control among the offliners.

When it comes to explaining impact differences, a multilevel approach seems appropriate. In principle, differentiating factors will be considered at three levels:

- *Individual level*: relative starting position (CO_{2e} emission level), motivation, knowledge, education, capabilities, age
- *Process level*: input (resources, political commitment), activities, output
- *Context level*: climate (average temperature), topography, infrastructure (e.g., public transport); policy measures, socioeconomic structure

Additionally, further factors need to be taken into account which can be expected to differentiate not so much the impacts but the outcome, which is assumed to predetermine the impact as an intermediating factor. For instance, differences in partici-

[4] Output and outcome are treated separately in Chap. 9.

Table 7.4 Change rates[a] of electricity consumption[b] by households and of CO_{2e} emissions[c] by citizen panels

	KWh	Δ % Households	Δ % Panels	(e-)Participation net effect
Bregenz				
2010	53,275.212			
2011	52,521.493	−1.4	−6.1	−4.7
2012	53,343.996	+1.6	−7.6	−9.2
Mariazell				
2010	5924.183			
2011	5756.265	−2.8	−3.0	−0.2
2012	5717.838	−0.7	−2.9	−2.2
Pamplona				
2010	261,886.862			
2011	257,074.233	−1.8	+10.0	+11.8
2012	247,372.565	−3.8	+9.8	+13.6
Saragossa				
2010	976,394.344			
2011	982,580.521	+0.6	−3.8	−4.4
2012	1026,272.495	+4.4	−4.7	−9.1

[a] Change rates compared to previous year
[b] Figures provided via local organizers of citizen panels
[c] Figures from Chap. 12, Table 12.1

pation culture at national and regional levels may determine participation readiness and participation loyalty (endurance).

As individual variables are measured by different research instruments, the participant numbers relating to these are relevant. Overall, these vary between 738 (baseline) and 429 (final round) participants in the CO_{2e} measurements, and 494 participants in the first panel survey, 372 in the second, and 342 in the third. It is clear that participant numbers set constraints on the extent of simultaneous consideration of differentiating factors in the empirical investigation. A combination of quantitative and qualitative analysis will be applied to accommodate for this.

7.7 Control for Attribution of Impacts to (e-)Participation Exercises

When we identify changes in pro-climate awareness, attitudes, behavior, and CO_{2e} emission levels among the citizen panels in parallel to their (e-)participation in the local climate initiatives, the question arises to what extent these are caused by the (e-)participation processes. To ascertain this, it is necessary to exclude possible al-

ternative explanations. In theory, an experimental design is the classical method to clearly determine the causal effect of the (e-)participation exercise on the impacts identified. Such a design would require citizens being randomly allocated to a target group for (e-)participation in the citizen panel and to a control group which does not participate, and to compare the changes in both groups. Very frequently, and also in the case of the e2d study, a random selection is not feasible in practice. "Quasi-experimental designs" with "nonequivalent control groups" are another option and probably the most commonly used method in practice (Weiss 1974, p. 97 ff.). In this case, instead of random selection, individuals or groups with similar characteristics are used as control groups and before and after measurements are compared for both groups.

Our field study in the e2d project allows for a quasi-experimental design of the evaluation: The fact that the (e-)participation processes lasted up to 2 years enables a longitudinal evaluation through repeated measurements which permit change among the participants (target group) over time to be identified. However, without a control group, alternative explanations such as changes in energy consumption caused by macroeconomic effects could not be excluded. To find a control group for each panel, even one which is not fully equivalent for comparison, is a difficult task because it requires by and large equivalent data on CO_{2e} emissions from citizens who did not participate in the process. Such data are not readily available and parallel measurements of CO_{2e} emissions from nonparticipating residents could not be incorporated into the research design. Therefore, an attempt was made to find a suitable alternative option. The solution for the e2d project was to apply an approximation method which takes the local population as a nonequivalent control group and to use available data on local household energy consumption for comparison. The direction of the development trends, the net difference between the change in panelists' CO_{2e} emissions and the change in energy consumption by local households in general can then be used as an indicator of the (e-)participation effect. Additionally, reflexive comparison is employed based on self-assessments by the panelists of the causal contribution of the participation exercises to their change in climate-related awareness, attitudes, and behavior.

The search for appropriate data on local household energy consumption was successful in at least four of the e2d project sites, namely the citizen panel locations in Austria and Spain. However, comparable information across all four locations was only available for electricity consumption. Unfortunately, no data were available for the three German cities. Given these limitations, our comparison is an attempt to gather further evidence but does not claim to represent a full-fledged control for the attribution of impacts to the (e-)participation exercise. Table 7.4 compares annual change rates during the relevant years (2010–2012) of local household electricity consumption and the citizen panels' CO_{2e} emissions.

Before interpreting the results, it has to be emphasized once again that the available comparison group data can only serve as a rough approximation to an equivalent control group. Moreover, available data periods do not exactly match the individual periods of the e2d (e-)participation exercises. However, the outcome of the

Table 7.5 Research instruments and distribution of participants

	Population survey *N*	CO_{2e} data *N*	Panel survey 1 *N*	Panel survey 2 *N*	Panel survey 3 *N*	Organizer survey 1 *N*	Organizer survey 2 *N*
Bregenz	510	21	31	25	21	5	4
Mariazell	502	22	25	21	24	5	4
Bremen	811	60	91	58	58	3	4
Bremerhaven	809	29	31	24	24	3	2
Wennigsen	926	43	47	34	40	5	5
Pamplona	800	73	78	54	46	2	2
Saragossa	800	181	192	156	129	3	2
Total	5158	429	495	372	342	48[a]	23

[a] Including 22 respondents from cities which ultimately did not implement the (e-)participation process

control for trends in household electricity consumption as represented by virtual (e-)participation net effects supports the basic hypothesis of the qualitative field experiment. It suggests that the (e-)participation process can indeed be regarded as the cause of reduced CO_{2e} emissions by the citizen panels in all regions except for Pamplona (where in contrast to household energy consumption trends, the panel's CO_{2e} emission levels even increased). Additionally, as part of a complementary reflexive comparison, residential CO_{2e} emission trends at regional level can be used where available. Corresponding data for Saragossa provided via the Spanish e2d project heads show an emission increase by 2.3% from 2010 to 2011 and 6.7% from 2011 to 2012, which also support the interpretation that the opposite trend in the citizen panel is due to the (e-)participation exercise.

A possible effect which requires special consideration is a potential bias in favor of positive impacts caused by scientific observation. Such research participation effects are known under the widely used term "Hawthorne effect" and describe possible impacts on behavior caused by the awareness of being studied. A first systematic review found some evidence of research participation effects, but with insufficient clarity as to size, conditions of incidence, and underlying mechanisms (McCambridge et al. 2014). In the case of the collaborative (e-)participation exercises in the e2d project, the possibility that an awareness of being observed had an influence on the behavior of panelists cannot be ruled out. However, there are three arguments which make a strong bias from such research participation effects less likely: (1) it is less likely that favorable results will be maintained over a long observation period of up to 2 years; (2) it is more likely that social control mechanisms may lead to an early dropout rather than to staying in the process and pretending favorable results; and (3) measurements do not only rely on reported subjective assessments but also include continuous data from various metering devices and different areas of activity which makes it less likely that desirable behavior will be maintained across all sectors. The e2d evaluation design does not include an assessment of a potential Hawthorne effect but attempts to account for it by employing a

multi-method approach and by reflecting on its possible influence when interpreting the results across individual methods.

7.8 Research Instruments and Data Collection

A variety of methods and tools were employed to evaluate the impacts of the collaboration processes in the seven locations. Key instruments were representative population surveys, a CO_{2e} calculator with a joint database, three waves of surveys among the citizen panels and two surveys among local organizers. Table 7.5 provides an overview of participant numbers for the main instruments. According to the individual citizen's preferred medium, the panel and organizer surveys were conducted via an online questionnaire or alternatively via telephone interviews.

- Before the start of the (e-)participation process, a representative telephone survey asked about climate change awareness, interest in climate protection, and assessment of various measures among samples of 500–800 people in each of the seven locations.
- An online CO_{2e} calculator and a CO_{2e} household accounts book as the case may be were deployed for panel members to enter their consumption data every second month and to provide detailed information on their carbon footprint on various activities as feedback. The resulting database with profiles at individual and aggregated levels was used to assess impacts in the form of change over time.
- Three panel surveys, at the beginning, midway, and end of the process, served above all to identify awareness, attitudes and behaviors and to measure changes over time as well as to assess process aspects, tools, output, and impacts.
- Two surveys among local organizers and citizen participation experts, one at the beginning and one at the end of the process, focused on local experiences, expectations, and assessments of impacts (see Chap. 14). Results allowed the assessments to be compared from a managerial and a citizens' perspective.

Additionally, information on local processes and backgrounds was gathered through complementary qualitative interviews with organizers, document analysis, and participant observation. Data on the average energy consumption trends of local households as a reference point was provided via the local project organizers in Austria and via the national head of the research project in Spain. Secondary data analysis provided figures on the wider context, for example, on climate change awareness, energy consumption, and local temperatures over time. A special drop-out survey was carried out among 126 citizens who left ahead of schedule in order to understand the high rate of panel mortality encountered. It is a well-known fact that panel surveys spanning a long time period suffer from high attrition rates. Providing data for the CO_{2e} monitoring bimonthly over up to 2 years certainly required a high level of effort, but was not the only reason for leaving the participation process. We observed the highest attrition between registration for the process

and baseline measurement; throughout the rest of the process, dropout rates were comparatively lower (see Chap. 13).

7.9 Summary and Conclusions

The general evaluation gap complained about repeatedly in the literature on public participation applies even more to collaborative (e-)participation processes, especially when these require active engagement over a longer period. Existing evaluation practice has also been largely confined to individual case studies varying in terms of the subjects of participation, process characteristics, and contexts. The e2democracy project offered the opportunity to contribute to reducing these deficits because it permitted the evaluation of a collaborative type of citizen participation by a quasi-experimental field study of a whole set of (e-)participation processes with largely identical design in different contexts. Moreover, it included the advantage of quantitatively measurable tangible impacts in the form of CO_{2e} emissions.

This chapter outlined the evaluation approach based on the input–activities–output–outcome–impacts evaluation framework introduced in Chap. 2, and presented the research design which made it possible to apply the framework and undertake comparative assessments. Core subjects were seven participation processes with common aims and formats, based on citizen panels collaborating with governments on climate protection at local level in three countries. All citizens had a free choice as to the type of participation, in that they could opt to use either electronic or traditional media for communication. Based on an outline of hypothesized effects of the common participation format and special features of the online and offline sub-variants, it was argued that influences from individual, process and context level factors need to be considered as explanations of differences in outcome and impacts. Checks for the attribution of impacts to the (e-)participation exercises and potential biases caused by research participation effects (Hawthorne effect) were addressed as integral parts of the evaluation design but also showed the practical problems in providing adequate data for such controls. Finally, in describing the empirical setting and the methods and tools employed for data gathering, we pointed out the problem of high-panel attrition as an implication of a participation format that demands a high effort from panelists. Despite these issues and practical difficulties in measuring CO_{2e} profiles, the evaluation approach presented was exemplified in practice and proved its potential to contribute to accumulating suitable toolsets and increasing sound knowledge in evaluating public (e-)participation.

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Chapter 8
Impact Measurement via Carbon Calculators

Ralf Cimander, Ana Yetano and Sonia Royo

Abstract Intervention studies have shown that eco-feedback is a useful measure leading to a reduction in energy consumption. Eco-feedback is most powerful if it is combined with goal setting, action-relevant information, and social comparison and if it is behaviorally relevant. Carbon dioxide equivalent (CO_{2e}) calculators are eco-feedback systems that are suitable for measuring the carbon balance of individuals and households. They also make it possible to measure the impact of activities aiming to reduce the carbon emissions of individuals by influencing behavior and changes in everyday life routines. Citizens participating in the e2democracy (e2d) project used such a tool over a period of up to 2 years. This chapter reviews the criteria followed to select the CO_{2e} calculator and to adjust it for continuous measurement with various feedback functionalities. The different categories of CO_{2e} measurement are presented, and how consumption, such as kilowatt hours (kWh), is converted into CO_{2e} emissions is explained. The chapter also describes the actual functioning of the calculator, how participants interacted with it and the feedback provided to them. Finally, some challenges, such as the lack of data about emission factors (EFs), interpolation, validation, and comparability, are also discussed.

8.1 Introduction

Reviews of studies evaluating the effects of feedback information on energy consumption report savings of up to 15 % (see, for example, Darby 2006; Ehrhardt-Martinez et al.2010; Fischer 2008; Intelliekon 2011). There are different forms

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of feedback information, such as direct feedback (self-meter-reading) and indirect feedback (energy bills). The high potential for energy savings and behavioral changes is acknowledged for long-term feedback, for example, historical feedback on energy consumption provided in short time periods. If feedback is combined with other types of information, like tips for activities stimulating further savings, or allows for comparison with other persons nearby (social comparison), valuable impact may be generated. Thaler and Sunstein (2008) report on energy reductions in field experiments due to the fact that consumers were informed in regular time intervals on their energy consumption and of the consumption of their neighbors. Citizens participating in the e2democracy (e2d) project committed to saving 2% CO_2 equivalents (CO_{2e}) and energy per year and used a carbon calculator to measure their savings' success and to learn from the feedback provided by that tool. Moreover, collected data were analyzed over a period of up to 2 years by a research team in order to find out whether participation in a citizen panel on climate protection generally may have an impact on climate protection and whether any differences exist between online and offline forms of participation. CO_2 calculators measure the CO_2 emissions of individuals or households and allow for the comparison of the results of several individuals in different contexts (e.g., different household sizes, different cities, and different countries) over long time periods. The e2d panel participants received bimonthly feedback on their consumption figures and corresponding carbon emissions, as well as action-relevant information, and were able to compare their results with those of others. So, the carbon calculator allowed for the impact measurement of different activities, that is, their impact on behavioral changes.

A variety of CO_2 calculators are available on the Internet, ranging from simple versions, which only consider carbon emissions from household energy use, to the more elaborate ones, which cover a comprehensive array of emission aspects. While online calculators abound, there is no standard concerning how personal CO_2 emissions should be determined (Birnik 2013). Comprehensive CO_2 calculators consider practically all aspects of everyday life: consumption of electricity and heating energy, the distances covered using public or private transport, nutrition habits, as well as the purchase and consumption of goods. All consumption-related values are transformed into the corresponding CO_2 emissions. For example, the electricity spent (kWh) is converted by the CO_2 calculator into kg CO_2 by using a specific emission factor. Given that the emission factor for electricity in Spain is 0.263, the consumption of 1 kWh of electricity is responsible for the generation of 0.263 kg CO_2 (1 kWh × 0.263 kg CO_2/kWh = 0.263 kg CO_2). For the production of electricity, the upstream chain generally is well known and traceable (emission factors (EFs) for excavation and combustion of coal, oil, nuclear energy, etc., are very well developed), but this is not the case for many consumer goods or nutrition habits. For example, calculating the CO_2 emissions of an apple that has been harvested in Argentina or a puppet that has been manufactured in China and brought

to a supermarket in Austria is very difficult.[1] Because of delocalization and the internationally interwoven, often nontransparent production and trade flows, it is obvious that the calculation of CO_2 emissions caused by a person is not a trivial task. More developed carbon calculators consider these problems by carefully selecting appropriate questions with an even-tempered balance between accuracy and measurability.

In general, the measurement timescale used in CO_2 calculators is 1 year. This period is considered necessary as there is "natural" variance in the level of carbon emissions during the different seasons of a year, for example, higher emissions from heating in winter. Additionally, there are practical reasons, as users generally receive their bills for electricity, heating energy, or water from the utilities only once a year. Spain is an exception as, generally, citizens are provided with consumption figures on a monthly or bimonthly basis.

Apart from CO_2, other important greenhouse gases are also generated through everyday consumption, like methane (CH_4) and laughing gas (N_2O). The impact of 1 kg of methane on the climate is about 25 times greater than that of CO_2 and the impact of laughing gas is 298 times greater (Forster et al. 2007). CO_2 calculators generally consider these greenhouse gases with their equivalent impact on the climate (measurement unit: CO_2 equivalents = CO_{2e}). Thus, in the following, we discuss CO_{2e} calculators.

8.2 Selection of a CO_{2e} Calculator

For the e2d project, it was essential to find an appropriate carbon calculator best fitting its requirements. The tool to be used within the e2d research had to fulfill the following conditions:

- It should cover the most relevant areas responsible for CO_{2e} generation.
- It should be precise enough to reflect small changes in citizen behavior.
- CO_{2e} calculation should be possible for the three e2d research countries (Austria, Germany, and Spain), on a comparable level.
- An "average user" should be able to handle data collection and answer the questions on his/her own.
- An "average user" should not be overstrained by data entry; users should be able to handle data entry within an acceptable timeframe.
- The CO_{2e} calculator should allow for data entry on a bimonthly rhythm (monthly reporting would have been preferable but was considered too demanding).
- It should be possible to integrate the CO_{2e} calculator data into the e2d website (http://www.e2democracy.eu), for carrying out analyses for research purposes.

[1] For a good illustration of the different aspects that can or should be considered when assessing the climate balance of an apple, see "Bioäpfel vom Ende der Welt", in the German news magazine *Stern*, 30, 2007, 102–108. http://www.stern.de/wirtschaft/news/argentinien-import-bioaepfel-vom-ende-der-welt-3273950.html. Accessed 18 November 2015.

The relevant literature at the time the project started in 2009 comprised the reviews of Darby (2006), Bottrill (2007), Schächtele and Hertle (2007), and Padgett et al. (2008). Except for Schächtele and Hertle, the carbon calculators considered in these studies were in English and from countries other than Austria, Germany, and Spain. As indicated by Bottrill (2007, p. 1), available calculators by that time fell short of "(i) giving people the ability to accurately monitor their energy use, (ii) providing them with meaningful feedback and guidance for altering their energy use, (iii) connecting them with other users also going through the same learning process of saving energy and conserving carbon". More recent reviews of online carbon calculators have also concluded that carbon calculators lag behind scholarly prescriptions (Birnik 2013). Desktop research, by consulting the websites of NGOs active in the field of climate protection and by using the keywords "CO_2 calculator" in English, German, and Spanish in online search engines, retrieved only a few valuable results by 2009. Even though there were hundreds of matches, there were very few CO_2 calculators, relevant for the European market, which enabled comprehensive emission calculations. It seemed that CO_2 calculation on the Internet was not very common at that time. Greater attention to such tools in Europe, if ever, started with the preparation of the Copenhagen climate summit in December 2009. CO_2 calculators that were for individual use and were publicly available on the Internet were still more or less pilot applications in 2009. Looking on the Internet in 2015, CO_2 calculators have proliferated (see Birnik 2013) and improved.

Popular and well-known calculators (at least to experts in the field) by mid-2009 were the CO_2 calculators of the Global Footprint Network[2] and the World Wildlife Fund (WWF).[3,4] Applications with particular EFs for Austria, Germany, or Spain were not available at that time. Some existing applications were adapted to the conditions in North America, Australia, or even Switzerland, but not for any of the three e2d countries. Moreover, special focus on these two calculators was placed on the calculation of the ecological footprint that measures the demand that human activity puts on the biosphere. "More precisely, it measures the amount of biologically productive land and water area required to produce all the resources an individual, population, or activity consumes, and to absorb the waste they generate, given prevailing technology and resource management practices" (Global Footprint Network 2010, p. 8). Together with the vision of the WWF's global One Planet Living initiative, the focus of footprint calculation goes one step beyond the pure CO_{2e} calculation envisaged in the e2d research, as it takes a global approach to equality, humanity, and equitableness concerning a fair contribution of the Earth's resources (WWF 2012).

[2] See http://www.footprintnetwork.org. Accessed July 27, 2015.

[3] See, e.g., http://footprint.wwf.org.uk/ or http://www.wwf.ch. Accessed July 27, 2015.

[4] Available carbon calculators under these URLs have meanwhile improved. To avoid publication of outdated weblinks, only the home URL is given. Carbon calculators can be found by using the keyword "CO_2 calculator" for the search.

Also, by 2009, the well-known CO_2 calculators were those of the UK Department of Energy and Climate Change[5] and the Canadian national environmental charity Earth Day Canada (Ecoaction).[6] In 2009, they were already two leading countries in the footprint calculation domain. However, these calculators were developed to fit national peculiarities, legislation, and habits. In addition, the Canadian tool was very exhaustive and combined calculation with more or less useful tips for a more sustainable lifestyle, but the usability was rather poor. By 2012, the calculator was no longer operational. The calculator from the UK was one of the first that tried to attract users by packaging the calculator questions into a computer simulated environment. Other prominent examples were the calculators by Greenpeace,[7] the State Office for Environment in Bavaria, Germany (LfU)[8], and the German Federal Environment Agency (UBA).[9] The LfU calculator dates back to 2004 and was the predecessor of the Greenpeace and UBA calculators. By 2009, the technical functionalities of all three calculators were almost identical and all were provided by KlimAktiv,[10] a German nonprofit organization for the advancement of climate protection. The CO_{2e} calculation methodology was developed by the Institute for Energy and Environmental Research in Heidelberg (IFEU), on behalf of the German Federal Environment Agency, based on research of available CO_{2e} calculators in German-speaking countries. It combines into one comprehensive CO_{2e} calculator the most appropriate and useful elements relevant for one's CO_{2e} calculation found in the observed calculators (Schächtele and Hertle 2007). All areas of CO_{2e} balancing are covered, with EFs included for the peculiarities in Austria and Germany (but not for Spain). By 2013, this calculator had continually been improved and is still the most commonly used by local authorities in German-speaking countries, which makes it the quasi-standard for CO_{2e} calculation in Austria and Germany.

Besides these comprehensive calculators, there were also calculators either concentrating on subareas of CO_{2e} calculation, like aviation or car traffic,[11] often combined with carbon offsetting functions, or rather focusing on energy reduction than on CO_{2e}.[12] Although interesting and more detailed in their special domain, these balancing tools did not meet the e2d research requirement of providing a complete CO_{2e} calculation. Due to the specific foci of the Canadian and UK calculators on national peculiarities and of the WWF and Global Footprint Network calculators

[5] See http://webarchive.nationalarchives.gov.uk/20121015120517/ http://carboncalculator.direct.gov.uk/carboncalc/html/index.aspx. Accessed July 27, 2015.

[6] See http://www.earthday.ca. Accessed July 27, 2015.

[7] See http://greenpeace-energy.klima-aktiv.de. Accessed June 26, 2014 (removed from website by end 2014).

[8] See http://lfu.klimaktiv-co2-rechner.de/de_DE/page/. Accessed July 27, 2015.

[9] See http://uba.klimaktiv-co2-rechner.de/de_DE/page/. Accessed July 27, 2015.

[10] See http://www.klimaktiv.de. Accessed July 27, 2015.

[11] For example, www.climatecare.org for several subareas or www.atmosfair.com for flight emissions or http://comcar.co.uk/ or http://www.co2-calculator.eu/ for car traffic CO_{2e} emissions. Accessed July 27, 2015.

[12] For example, http://www.nspower.ca/en/home/energysavings/Energy_Calculator.aspx; http://www.co2online.de/ or http://www.stromeffizienz.de/. Accessed July 27, 2015.

on the global approach of footprint calculation, the CO_{2e} calculator of the German nonprofit KlimAktiv best met the e2d research requirements. This CO_{2e} calculator covered the most important aspects of the everyday human CO_{2e} balance, based on a rather handy set of questions to be answered by users. However, a number of important e2d requirements were missing. Thus, the KlimAktiv calculator had to be adapted as shown in the next section.

8.3 The KlimAktiv CO_{2e} Calculator

For the specific purpose of the e2d project, the KlimAktiv calculator was adapted with some important functionalities and amendments:

- For the purpose of bimonthly feedback, the calculator was adapted so that a baseline measurement and up to 12 periodic measurements could be entered. This enabled progress to be monitored on a bimonthly basis.
- A new field for entering water consumption was added. Water consumption, even though not a main carbon emission source,[13] can be gathered based on meter reading and hence provides a good control source for saving tendencies (it has to be assumed that someone who saves energy also saves water).
- Log-in functionalities allowing for repeated access of the already entered and saved data were not available. Hence, log-in functionalities with database access were integrated for the e2d project.
- Advanced assessment functionalities allowing for assessments over time and for comparison with others were not available. Thus, the calculator was embedded into an appropriate database and website structure.
- The terminology used in the calculator in some cases was very specific and guiding information was minimal. An average citizen without appropriate prior knowledge could get lost on the way through the more than 60 questions. In order to ensure comparability among all panelists, questions, help texts, and guiding information were reformulated unambiguously.

The changes made and the additional functionalities were something new compared to most common calculators. These improvements have allowed for a better capture of the real CO_{2e} emissions of the participants, higher levels of comparability, and improved assessment functionalities of user data. However, the KlimAktiv calculator also had some limitations. It required a sophisticated user with a high degree of knowledge and experience regarding online tools. There was also the risk that users would not answer all questions, as they could accidentally overlook questions or did not reach the end of the calculator with saving their entries.

With regard to the calculation of CO_{2e} balances, the reference points for the measurements in the e2d research are the emissions of individuals, not households.

[13] Only cold water is meant here, the emissions caused by heating water are already covered by the energy consumption section of the CO_{2e} calculator.

But much consumption data is only available on a household level (e.g. electricity, heating energy, and water). The CO_{2e} calculator automatically divides these figures by the number of household members, as entered in the calculator beforehand.

As indicated at the beginning of this chapter, EFs are quite important for the CO_{2e} calculation. EFs are dependent on the energy mix consumed in order to produce electricity, heating, or any other consumer goods. Due to different production cycles and import and export streams for energy and consumer goods, EFs are different among countries/regions and different periods of time (Birnik 2013). Therefore, differences for the Austrian and German calculator exist regarding EFs, even though the technical functionalities, design, and questions to users are identical. The Austro–German calculator was developed by the above-mentioned nonprofit KlimAktiv in collaboration with the IFEU, LfU, and German Federal Environment Agency. As no comparable CO_{2e} calculator existed for Spain, a Spanish CO_{2e} calculator was developed based on the Austro–German one. It was developed by the Research Centre for Energy Resources and Consumption (CIRCE),[14] a research center founded in 1993, with the support of the University of Saragossa, to create and develop innovative solutions and scientific/technical knowledge and transfer them to the business sector in the field of energy.

There were two types of data provided by citizens. On the one hand, there were questions to obtain data to calculate the CO_{2e} emissions, such as kWh of electricity consumed or kilometer travelled. This type of question is similar in both the Austro–German and Spanish CO_{2e} calculators. On the other hand, there were questions about the characteristics of participants' houses, electrical appliances, and so on. The aim of this second set of questions was twofold: to identify changes of settings/appliances in the household (e.g., exchange of energy wasting devices, heating systems, or tap aerators), and in the behavior (e.g., turning down living temperature, eating less meat, and cycling instead of taking the car), during the 2-year duration of the panels, and to help citizens to ascertain the possibilities to reduce their CO_{2e} emissions. Some minor differences exist in the second type of question between the Austro–German and Spanish CO_{2e} calculators because of the different contexts in these countries, the peculiarities of the cities participating in the study and a specific request from the local governments involved in Spain.

8.4 Different Categories of CO_{2e} Calculation

The CO_{2e} calculator covers all energy relevant aspects of everyday life: living at home, mobility, nutrition, and general consumption. Activities that are primarily part of one's employment, such as business trips, are not considered. As an example, Fig. 8.1 presents the CO_{2e} emission pillars for an average 2-month period of the citizen panel in Bremen after 2 years of monitoring, compared to the average emissions of a German citizen.

[14] See http://fcirce.es. Accessed July 27, 2015.

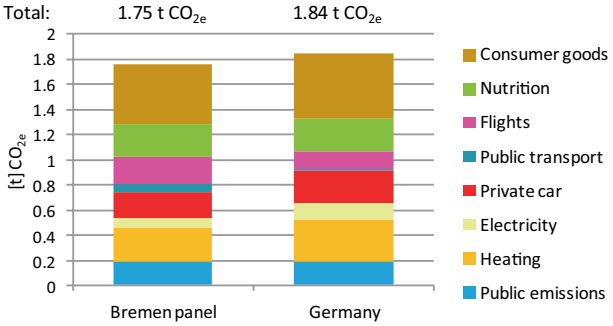

Fig. 8.1 CO_{2e} emission pillars for citizen panel in Bremen and German average (tons per 2-month period, arithmetic means)

Table 8.1 Overview of average CO_{2e} emissions per category and country (tons per 2-month period, arithmetic means)

Category	Austria	Germany	Pamplona	Zaragoza
Heating	0.37	0.33	0.18	0.10
Electricity	0.05	0.13	0.06	0.06
Private traffic	0.29	0.26	0.50	0.12
Public transport	0.01	0.02	0.01	0.01
Flights	0.14	0.14	0.02	0.01
Nutrition	0.28	0.26	0.19	0.19
Consumer goods	0.46	0.51	0.23	0.23
Public emissions	0.13	0.19	0.11	0.11
Total	1.72	1.84	1.30	0.83

Table 8.1 shows the mean CO_{2e} emissions in the different categories of the CO_{2e} calculator for each country. The mean emissions serve for comparability of the results achieved in the local panels with the country/city[15] average.

As can be seen in Table 8.1, emission levels are lower in Spain, mainly due to the heating, flight, and consumption figures. Another reason is that climate conditions are considerably different in Austria, Germany, and Spain. As explained below, the lack of data regarding public emissions in Spain created some difficulties for comparisons.[16] For an extended discussion of these differences and their implications, see Chap. 12.

[15] For Pamplona and Saragossa, the mean emission shares for heating, electricity, and mobility have been estimated by CIRCE with input data provided by the local governments or national statistics (in the case of electricity). For Austria and Germany, they have been developed by IFEU.

[16] Furthermore, in Spain, neither nutrition nor consumption had been previously included in other CO_{2e} calculators; so the EFs for nutrition and consumer goods were not available in Spain. CIRCE indicated that the conversion factors used in the Austro–German calculator were not viable because the emissions from the nutrition and consumption categories were going to be disproportionally higher than those for transport, heating and electricity. So, the EFs in the Austro–German

Heating Heating encompasses the energy needed to warm apartments and houses and also to heat water in the event that the respective appliances exist. Otherwise, water can be heated by electricity or based on renewable energy, like thermo-solar power or wood. Emissions from heating are dependent on the technology used and contribute to about 20 % of all individual CO_{2e} emissions. First, citizens were asked if they have an individual or collective heating system. Second, they were asked about the energy source used: natural gas, butane gas, fuel oil, coal, electricity, wood, and so forth. Depending on these sources, they were finally asked if the consumption was measured in m^3, kWh, liters, or kg and had to enter their respective consumption. As consumption is usually measured on a household level (corresponding to the availability of respective meters), the share is calculated according to the number of household members.

In order to obtain additional information about the factors affecting heating energy consumption, citizens were asked about the type of house they live in (apartment building, terraced house, one-family house, etc.), ownership (e.g., owner/tenant), living space in m^2, year of construction, subsequent thermal insulation, the age of the heating system, the use of renewable energy, the average room temperature, and airing habits. There were also some questions about hot water generation, water consumption, personal hot water consumption habits, and water saving devices.

Electricity The emissions related to electricity were based on the kWh used. In the Austro–German calculator, users were asked whether they obtain green electricity (from renewable resources) or general electricity mix (electricity gained from different fossil resources like coal, oil, gas, or nuclear sources and from renewable resources). This has an important effect on the generation of CO_{2e} emissions. In Spain, there is only one type of electricity mix offered to citizens. Hence, the calculator does not provide for different options. Another difference concerns the meter reading. In the Austro–German case, citizens were asked to obtain the data directly from the electricity meter. In Spain, since citizens usually do not have easy access to electricity meters, data were obtained from the electricity bills. In Spain, electricity bills as well as heating energy bills are usually issued every 2 months. As for the heating energy above, the per capita share is calculated by dividing the consumption value by the number of household members.

In addition to the kWh consumed, citizens were also asked about the share of energy-saving bulbs at home, the age and energy efficiency grades of their electrical appliances (such as washing machines, ovens, and dishwashers), the quantity of small electrical appliances they have (such as digital video disk (DVD) players, games consoles, and toasters), the appliances usually left on standby, and air-conditioning units.

Private Car In order for the data to be comparable among participants, only private trips have been considered, including commuting to the workplace. Therefore,

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calculator were modified in the Spanish case in order to maintain the percentages that these categories should represent in the total emissions (20 % of the emissions due to nutrition and 30 % of the emissions due to consumer goods, approximately).

business trips or kilometers travelled during work are not considered. The same applies to the public transport and air traffic categories. In this way, the emissions due to travelling should be comparable among participants independent of their occupations.

With regard to private transport, participants were asked about the number of vehicles they possess, type of vehicle (e.g., compact/medium-sized/luxury class car, motorbike, and scooter), type of fuel used, mean consumption of fuel, and kilometers driven by the participant in the vehicle. They were also asked about the amount of kilometers traveled sharing cars with other persons, to obtain their individual consumption value.

Public Transport This category distinguishes between the use of public transport on regularly covered routes and on holidays or further trips. Participants were asked about the number of kilometers and the means of transport used. Depending on the means of transport, different EFs apply.

Flights Participants were asked about the air trips made in the reporting period in order to obtain the number of kilometers flown. Besides basic trip information, participants had to indicate if they used economy, business, or first class. The functionality of the Austro–German calculator follows the design of common flight search engines with additional information on kilometers traveled, including the corresponding CO_{2e} emissions. In the Spanish calculator, citizens had to provide the kilometers travelled themselves (two web links were provided to online distance calculators between two cities).[17]

Air traffic, generally, has the highest impact on the CO_{2e} balance of an individual. Due to the high emissions that can be generated within one single trip, air traffic may be decisive in the improvement or deterioration of the CO_{2e} balance.

Nutrition This section questioned participants about their age, sex, weight, level of physical activity required in their job, and sport intensity. Nutrition habits (vegan, vegetarian, meat-reduced, mixed, much meat, etc.), and consumption of regional, seasonal, frozen, and organic products, were also reported here. Similar to the heating section, nutrition contributes up to about 20 % of an individual's CO_{2e} balance.

Consumer Goods Even though consumer goods contribute to about 30 % of an individual's CO_{2e} balance, there were only three questions in the CO_{2e} calculator on this area. Participants were asked about their general shopping behavior (economical, average, or generous), their main shopping criteria (long life cycle, functionality, or low price), and the number of nights staying in a hotel. Considering the distributed production of goods, the complexity of internationally interwoven trade flows and the lack of transparency of production processes, it seems understandable that accurate calculation is hardly possible. The introduction of further questions would have only contributed to making the surveys longer without ensuring better results. Instead, some aforementioned answer categories have an indirect impact on the calculation of the CO_{2e} emissions in the general consumption area, like the

[17] See http://www.daftlogic.com/projects-google-maps-distance-calculator.htm and http://www.tutiempo.net/p/distancias/calcular_distancias_html. Accessed July 27, 2015.

user's wealth. Wealth is measured by the size of the apartment or house a user is living in, the type of car(s) owned, and the number of long-distance flights (e.g., in the first class category) that have been taken. The assumption behind this evaluation is that the more luxurious the lifestyle is, the more likely that a person consumes more goods and, hence, provokes more CO_{2e} emissions than others.

Water Water consumption is not an original part of the CO_{2e} calculation, as water per se does not emit CO_{2e}. The heating of water or water preparation generates emissions. However, these emissions are already covered either in the heating or electricity section above or within public emissions (see below). Water consumption has been used as an additional indicator of the participants' savings behavior. The assumption is that if participants save electricity or energy in general over time, they will also be more likely to save water. And the consumption of water is—in contrast to more difficult estimations, such as the covered distances in public transport within the last 2 months—a more reliable value, as it is measured by meters. Moreover, the saving of water is a hot topic, particularly in some parts of Spain, as it is a scarce resource, especially during the summer.

Public Emissions It is not only the individual citizens of a country who are responsible for greenhouse gases, but the state also causes emissions. These are equally distributed among all inhabitants of a country and should also be included in the personal emissions balance. However, as indicated by Birnik (2013), public emissions are not commonly included in online carbon calculators. Public emissions are caused by the administration and organization of social affairs, infrastructure, or education. Besides the official tasks of the state, the emissions of water supply, as well as water and waste disposal, are also included, as these services are available to all citizens. The capacity of the individual citizen to influence or change public emission is very low or almost null.

In Austria, the share of public emissions per citizen is about 0.78 t per annum (i.e., 8% of an average individual's balance). In Germany, the share of public emissions per citizen is about 1.11 t per annum (i.e., 10% of an average individual's balance). There are no available data in Spain about the emissions from the operations of the public infrastructure (only data about waste management and disposal are available). Hence, the Spanish carbon calculator did not cover public emissions.

So, when analyzing and comparing Spanish emissions to Austrian and German emissions, public emissions should be added to the Spanish totals. It was seen as reasonable to add a share of public emissions that is between the Austrian and German averages, that is, at 9%. The average CO_{2e} balance for a 2-month period of a Spanish citizen is 1.28 t (European Environmental Agency 2013). This means a share of public emissions of 0.11 t CO_{2e} was added to the balances of the participants in the Pamplona and Saragossa panels.

Exceptional Influences and Adjustments for Special Weather Conditions To control for exceptional influences, citizens were asked, at the beginning of each measurement, whether any special event had taken place during the reporting period which led to an unusual consumption (e.g., long absence from home, modification of building, water damage, and change in household size). Such information helped

the panelists as well as the research team to interpret deviances in individual consumption from the general trend.

Naturally, there are weather variations over periods of time. There may be several cold and long winters in succession. But there may also be a change from cold to warm winters from one year to the next. Hence, a longer and colder winter in the first year of measurement compared to a rather mild winter in the second year will certainly influence heating consumption figures. However, weather adjustments have not been conducted in the panels in order not to increase the complexity of monitoring.

8.5 How to Transform Consumption Data into CO_{2e} Emissions

As said before, the transformation of reported data by citizens into corresponding CO_{2e} emissions is not a trivial task. Here, differences arise between the calculators used in Austria, Germany, and Spain because of the varying EFs for the different categories of CO_{2e} balancing presented in the previous section. We will not go into the last detail of the calculation of EFs. In this respect, we refer to the nationally approved expertise of the research institutes that are in charge of the EFs used in the CO_{2e} calculators—IFEU in Germany and Austria and CIRCE in Spain. In the cases where no comparable values or EFs existed, assumptions were made by the experts of CIRCE to provide for comparability. To give an impression of the different aspects that have to be considered when transforming consumption data into CO_{2e} emissions, we will present some details exemplified for the provision of electricity and air traffic (flights).

Electricity The EFs for electricity depend on the energy mix of each country. The energy mix covers the primary energy sources used to obtain electricity. They can be coal, oil, gas, nuclear sources, and also renewable energy sources, like solar power, wind, or water. The electricity mix in Spain and the corresponding EFs of each source are presented in Table 8.2. Table 8.3 presents the total EFs for electric energy in the three countries.

Flights Air traffic plays a special role in the emissions balance. The critical substances of air traffic, besides CO_2, are nitrogen oxides, steam, and particles. As the pollutants get directly into the higher layers of the atmosphere, emissions from medium- and long-distance flights are weighted with a 2.7 times higher factor. This so-called radiative forcing index (RFI) describes the relation of the overall warming potential of all emissions to the warming potential of CO_2 alone (Atmosfair, 2008, cf. step 5 of the KlimAktiv calculator).[18] The calculator includes the RFI for all flights of more than 400 km. For such flights, high and, therefore, critical altitudes

[18] See http://klimaktiv.klimaktiv-co2-rechner.de/de_DE/popup/ or www.klimaktiv.de. Accessed July 27, 2015.

Table 8.2 Electricity mix and emission factors (EFs) for electricity in Spain

	% of each source (weight)	Kg CO_2/kWh (EFs)	Weight x EFs
Coal	12	0.95	0.114
Fuel/gas	1	0.7	0.007
Combined cycle	29	0.37	0.107
Hydraulic	9	0	0
Nuclear	19	0	0
Wind/eolian	13	0	0
Solar	3	0	0
Rest	14	0.25	0.035
Total	100	–	0.263

Table 8.3 Emission factors for electricity in Austria, Germany, and Spain

	Austria		Germany		Spain
Type	Electricity mix	Green electricity	Electricity mix	Green electricity	Electricity mix[a]
EFs (kg CO_2/kWh)[b]	0.223	0.040	0.620	0.040	0.263

[a] As said before, no particular green electricity type exists in Spain
[b] Sources: Austria: E-Control (2009), Germany: AvantTime (2007), Spain: IDAE (2005)

are very likely. Moreover, passengers travelling business or first class are responsible for higher emissions as they claim more space due to bigger seats.

For the emissions produced by air traffic, the data from the IFEU Institute (scientific partner of CO_{2e} calculator vendor in Austria and Germany (KlimAktiv)) have also been used in the Spanish calculator. The CO_{2e} emissions (in gram CO_{2e}) per different flight type and kilometer are presented in Table 8.4.

8.6 How Calculators Are Used

At the start of the citizen panels, participants could choose whether they wanted to take part by using electronic media (onliners) or by using traditional means without using online facilities (offliners). In Austria and Germany, onliners received log-in

Table 8.4 Emission factors for air traffic

	Gram CO_{2e} (per passenger and km)
Domestic flights (economy)	254
Domestic flights (business or first class)	346
European flights (economy)	327
European flights (business or first class)	457
Intercontinental flights (economy)	327
Intercontinental flights (business or first class)	457

data for their local project website, where they were provided with access to the online CO_{2e} calculator. In Spain, onliners were sent a personalized link by e-mail, with access to the CO_{2e} calculator, whenever a new reporting period started. Offliners received a CO_{2e} household book (basically, a printed version of the online calculator). Participants received additional information, such as a handbook for the use of the calculator and first practical tips for climate protection. Offliners were called by support staff, organized by the research team, who entered the data of the offliners into the same online CO_{2e} calculator used by onliners.

The first task required from the citizens was to complete a survey about their habits and average consumption in the above-mentioned categories (electricity, heating, traffic, etc.) for the period covering the previous 12 months to be used as a baseline measurement. This baseline represents the starting position from which the future CO_{2e} savings were calculated. Completing this first data entry was a demanding task, as participants had to collect all the relevant information beforehand. Not all participants were so well organized as to be able to provide this information ad hoc. Moreover, in accordance with the logic of the CO_{2e} monitoring (that is based on a regular monitoring every 2 months), the collected data for the basic measurement had to be recalculated by participants to an average 2-month period. This means that yearly consumption figures had to be divided by six. Some onliners were not so experienced in using (interactive) online tools and sometimes did not find the relevant guiding information on the website or struggled with the usability of the CO_{2e} calculator. Hence, for some participants, the first contact with the monitoring tool was very time-consuming. Moreover, there was an exemption for the air traffic section in the basic measurement in the Austro–German calculator. For technical reasons, the calculator was unable to recalculate the kilometers covered by flights to an average 2-month period. In order not to ignore this important emission in the baseline measurement, every panelist in Austria and Germany was automatically entered a standard share of 0.14 t CO_{2e} in the flights section in the basic measurement instead (0.14 t CO_{2e} is the individual average share drawn from figures for Germany). In the Spanish calculator, users were able to enter the actual number of kilometers travelled by type of flight in the baseline period, directly adjusted for a 2-month period.[19]

After the participants had completed their baseline measurements, the periodic measurements started. Every 2 months, participants were requested to enter their consumption data and change of habits that had occurred within the last 2 months into the CO_{2e} calculator (or household book, for offliners). Compared to the baseline measurement, this task was rather easy, as only changes had to be reported while the basic settings usually remained the same. After a few periodic measurements had been entered, this became a routine process for most panelists. The citizen panels

[19] As indicated above, the Austro–German calculator automatically calculated the CO_{2e} emissions on entering place of departure and final destination, and, therefore, calculating the 2-month share of flights undertaken during 1 year was not possible. However, in the Spanish calculator, citizens had to enter the kilometers travelled themselves, so they were able to divide by six the total kilometers travelled in the previous year.

in Bregenz, Mariazeller Land, Bremen, Pamplona, and Saragossa filed 12 periodic measurements, covering a period of 2 years. Due to the late start of the citizen panels in Bremerhaven and Wennigsen, only nine and six periodic measurements could be achieved, respectively. In any case, in both cities, data covering at least 1 year were collected.

Interpolation In a few cases, panelists failed to collect certain data or had no access at all to a consumption meter (e.g., the electricity meter was in a room where only the caretaker had access, or they owned an oil tank that was not equipped with a meter). If this occurred, the research team calculated the missing values by interpolation using the closest available data around this missing data. Generally, there was much existing data available that could be used for the interpolation, which allowed for a rather precise calculation.[20] If there were no such values available, the panel average was entered in their individual balance in order not to impact the calculation of the overall balances in either direction.

Validation The data provided by the citizens are self-reported. However, there were some possibilities to control the correctness and validity of these data by direct inquiry and plausibility checks. The data obtained from citizens were also cross checked by the research teams. Data reported by offliners had to pass through the "filter" of the telephone team and possible errors were detected and corrected straightaway. When strange values (much higher or lower than the average, or than the figures reported in previous periods) were entered in the calculators by onliners, these panelists were contacted in order to confirm or to correct the data. Onliners that did not respond with appropriate data entries were reminded to do so several times. In the very few cases where onliners did not reply to the plausibility checks or did not correct their data, the research team had to decide which data could be used and which not. In the latter case, parts of the data that were obviously incorrect were disabled for the CO_{2e} calculation.

Another type of data validation inherent to this project was delivered by the feedback functionality that allowed panelists to control their delivered consumption data and the, respectively, calculated CO_{2e} balances.

8.7 Feedback Functionality

After panelists reported their changes in a bimonthly rhythm, they were provided with their results. Onliners were informed of their CO_{2e} emissions in real time after entering data into the subcategories of the CO_{2e} calculator. Figure 8.2 presents a screenshot of the German calculator for a sample 2-month period:

[20] For example, if a panelist failed to read the meter on time, (e.g., 10 days late), consumption was recalculated based on the daily average in the reporting period (2 months plus 10 days). The result was a value for a theoretical consumption within a 2-month duration.

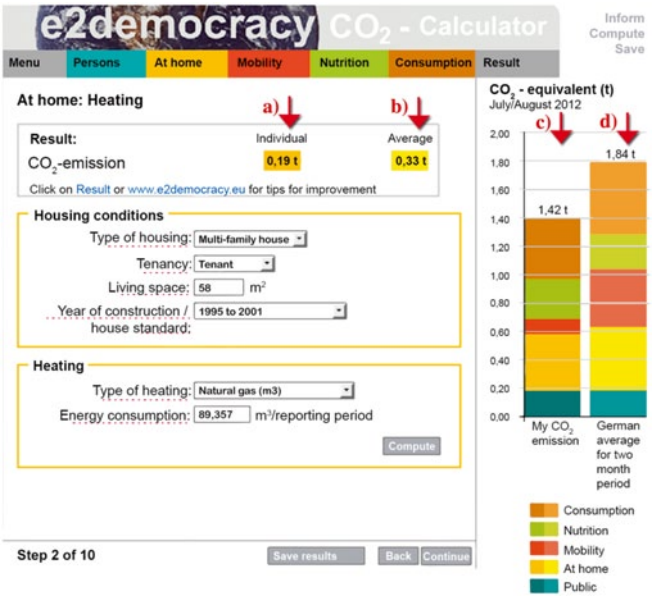


Fig. 8.2 Screenshot of the Austro–German calculator. (Translated, original in German)

a) Marks the participant's CO_{2e} emissions calculated from his/her entry in the area of heating
b) Marks the individual German average value for this area
c) Marks the participant's accumulated CO_{2e} emission pillar covering all areas
d) Marks the individual average total CO_{2e} emission pillar for Germany

Besides the feedback directly provided by the CO_{2e} calculator, onliners in Austria and Germany were also provided with a detailed analysis of their CO_{2e} balance on their personal web space on the e2d website. This includes, among others, not only the development of carbon emissions in the different subcategories (at home, mobility, nutrition, and consumer goods), but also the development of their consumption values entered for electricity, heating energy, and water and comparison possibilities with other panelists. Offliners received their detailed CO_{2e} balance, color printed, by post, together with the regular newsletter. This detailed analysis allowed for a better identification of energy savings than a rather abstract CO_{2e} balance can provide. Moreover, onliners had the advantage of adapting their entries at any time and could carry out advanced assessment functionalities. These technical provisions only existed for the Austrian and German sites and not for those in Spain. The functionalities of the Spanish calculator are explained further below.

The following screenshot (Fig. 8.3) is an example of the feedback about the development of an individual's CO_{2e} emissions over 2 years that was provided to onliners and offliners in Austria and Germany.

The lower dashed curve represents the development of an individual's CO_{2e} balance over a 2-year period. The solid blue line marks the average development of all panelists, and the dotted green line represents the development of citizens with the

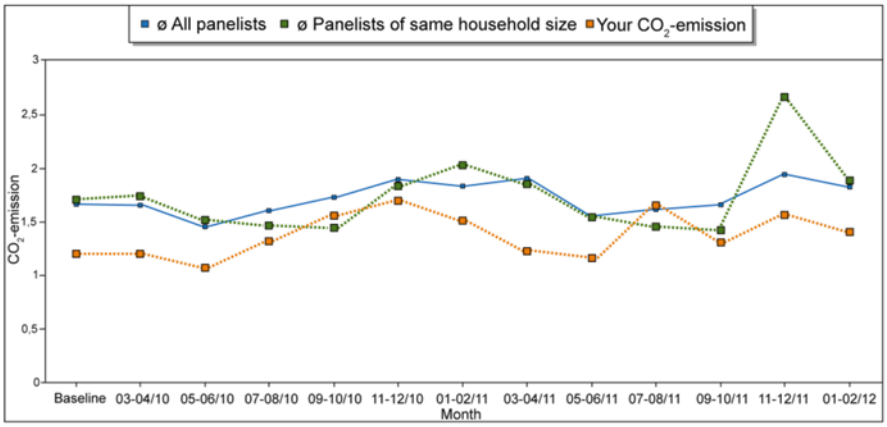


Fig. 8.3 Screenshot of a feedback example in the Austro–German calculator (part 1)

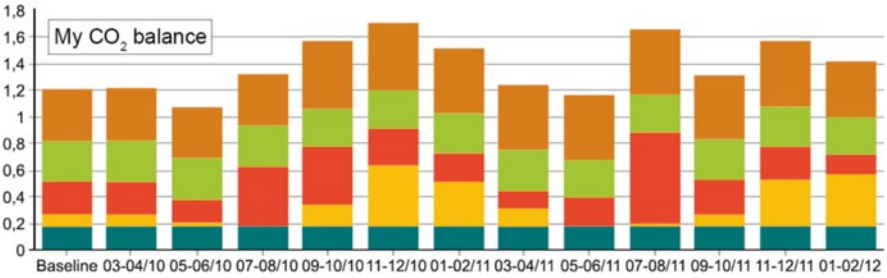


Fig. 8.4 Screenshot of a feedback example in the Austro–German calculator (part 2)

same number of persons living in the household. Based on the number of household members, there are general differences in the average emission levels. The more members a household has, the lower is the emission level because the share for commonly used resources declines. Based on the three curves, the participant has a good impression of his/her status concerning his/her saving efforts compared to the other panelists.

The following screenshot (Fig. 8.4) is an example of the development of the individual CO_{2e} emissions over time, with a focus on the different categories of the CO_{2e} balance.

Figure 8.5 is a screenshot presenting the CO_{2e} emissions for the different categories over time and a quick assessment by emoticons (provided in different colors in the online tool). The emoticons indicate whether the participant has improved (smiling) or worsened (sad) his/her CO_{2e} balance in the various categories, compared to the previous monitoring period. The neutral emoticon means the CO_{2e} emissions have not changed. Hence, the panelist gains an insight into the categories in which he/she has improved/worsened compared to the previous period. Studies have shown that visual feedback, such as by use of emoticons, can support users' efforts in saving energy (see, e.g., Schultz et al. 2007).

	Base-line	03-04 2010	05-06 2010	07-08 2010	09-10 2010	11-12 2010	01-02 2011	Total	Mean
Consumer goods	0.506	0.481	0.534	0.481	0.481	0.481	0.481	2.939 t	0.490 t
Nutrition	0.341	0.332	0.308	0.308	0.308	0.305	0.301	1.862 t	0.310 t
Mobility	0.486	0.177	0.209	0.18	0.12	0.186	0.1	0.972 t	0.162 t
Private car	0.33	0.16	0.192	0.14	0.103	0.169	0.079	0.844 t	0.141 t
Public traffic	0.018	0.018	0.018	0.04	0.018	0.018	0.023	0.134 t	0.022 t
Flights	0.14	0	0	0	0	0	0	0.000 t	0.000 t
At home	0.311	0.297	0.135	0.021	0.138	0.537	0.414	1.542 t	0.257 t
Electricity	0.112	0.106	0.085	0.005	0.006	0.008	0.007	0.217 t	0.036 t
Heating	0.199	0.191	0.05	0.016	0.131	0.529	0.406	1.323 t	0.221 t
Public emissions	0.19	0.19	0.19	0.19	0.19	0.19	0.19	1.140 t	0.190 t
Total	1.829	1.472	1.371	1.175	1.232	1.694	1.481	8.425 t	1.404 t
Water per person (m^3)	5.5	4.7	5.128	5.215	3.974	3.918	3.379	26.314 m^3	4.386 m^3

Fig. 8.5 Screenshot of a feedback example in the Austro–German calculator (part 3)

Besides these illustrations, users were provided with some other reporting and analysis functionalities, for example, the development of the CO_{2e} balances for the different subareas and the consumption figures (electricity in kWh, water in m^3, etc.). To improve usability of the functionalities and to alleviate the plausibility check, onliners in Austria and Germany received their comprehensive balance sheets by e-mail for the last three measurements. This had the additional effect that onliners could be asked to check whether their data were correct. Missing values were marked in red and suspect data were indicated in a personal e-mail. This helped to improve the validity of data entries.

In Spain, the feedback for onliners was provided in a different format and only for the last two reporting periods. Once panelists in Pamplona or Saragossa had finished their entries, they could see their individual balances of CO_{2e} emissions (for the different categories and the total emissions); a comparison with the previous measurement period and a comparison with the group of online citizens in their city (see Fig. 8.6). Onliners were advised to save their graphs or print them out as, once they had completed their surveys, they could not access their data until the following reporting period. If they wanted to correct some of the data reported, they had to contact the Spanish research team who would correct the figures for them. In contrast to the Austro–German cases, in Spain there was no problem with missing values, as the graph was only obtained once all relevant data had been provided and only the data of panelists completing all the questions were considered.

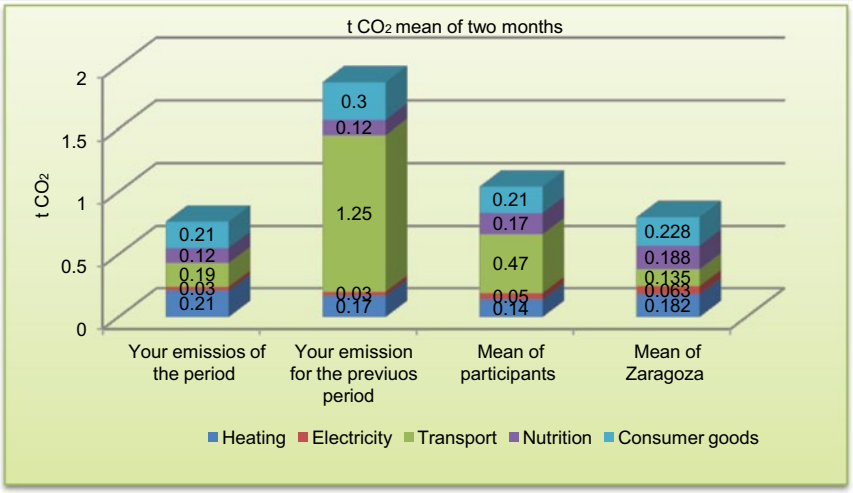
So, as can be seen, the Austro–German and the Spanish calculators provided panelists with some different features, mainly concerning the level of interactivity with the CO_{2e} calculator, the level of detail in the CO_{2e} balances over time, and the comparison with other panelists.

CO_2 Calculator

Your balance:

Your emissions of this period have changed a -59.36% in comparison with the previous period

tCO_2 /2 months	Heating	Electricity	Transport	Nutrition	Consumer goods	Total
Your emissions of the period	0.21	0.03	0.19	0.12	0.21	0.76
Your emission for the previous period	0.17	0.03	1.25	0.12	0.3	1.87



Don´t forget to print this page if you want to save the data

Print

Fig. 8.6 Output of the CO_{2e} calculator provided to participants in Spain. (Translated, original in Spanish)

8.8 Conclusions and Consequences for the Comparisons

Calculating the individual CO_{2e} balance is not a trivial task and developing a comprehensive tool, capable of estimating an initial baseline figure for comparison with individual periodic measurements, in three different countries, has been a big challenge, as discussed throughout this chapter. Own research and the review of CO_{2e} calculators by Bottrill (2007) and Schächtele and Hertle (2007) had shown that suitable calculators for the purposes of the e2d research project were not available. The maturity of such calculators, at the time of starting the research in 2009, was rather low and functionalities did not meet some of the important requirements of the

research, for example, the bimonthly reporting or the feedback functionalities. But finally, a mature solution was found with the German KlimAktiv calculator, which was amended with additional functionalities by the research team. This calculator was also available for Austrian sites with their specific EFs and could be transferred to the Spanish cases.

The calculators used in the e2d research project enabled detailed carbon balances of panelists in a bimonthly rhythm and allowed for a reasonable impact measurement of the feedback functionalities and climate protection activities carried out throughout the project. Because of the differences among the Austro–German and Spanish CO_{2e} calculators, there are some limitations for international comparability of the CO_{2e} balances in absolute figures. The figures for Austria and Germany are fully comparable, but the comparison with the Spanish panels would need some adjustments. However, comparing emissions is not the goal of this research; rather, it aims to analyze whether citizen participation has a positive effect in achieving reductions during one or two consecutive years (2 % in the total CO_{2e} emissions and energy consumption each year) and whether any differences exist between online and offline forms of participation. Reductions in CO_{2e} emissions and energy consumption are fully comparable among participants. Hence, the differences reported throughout the chapter have no influence on the international comparison.

Therefore, in the chapters that follow, the objective is not so much to provide comparative data about total emissions in the local panels, but to measure changes over time, individually as well as for local panels as a whole (including reports about the percentage of panelists that have achieved the reduction target in each of the local panels).

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Chapter 9
Comparing Output and Outcome of Citizen—Government Collaboration on Local Climate Targets

Georg Aichholzer, Doris Allhutter and Stefan Strauß

Abstract The e2democracy project applies an integrative framework including an assessment of process, outcome and impacts for a longitudinal evaluation of citizen—government collaboration on local climate targets. This chapter analyzes the relation between project outputs, that is, the supply side of the process such as the quantity and quality of devices and products offered to citizens for information, communication and engagement, and the project outcomes, that is, the immediate effects of the output such as the number and activities of participants and their contributions. The paper first sketches the evaluation framework and specifies the inputs and activities that provided the basic setup for seven local (e-)participation processes before it describes the process output. Against this background eventually the outcome of the citizen—government collaborations including the final evaluation of output and process are presented.

9.1 Introduction

A recurrent feature in the literature on the evaluation of public participation is the distinction between process and outcome evaluation (Abelson and Gauvin 2006, p. iii; Rowe and Frewer 2004). By and large, a focus on process asks how a participation exercise has been implemented and conducted whereas an outcome evaluation is interested in its results, that is, what it has accomplished, what change it has brought, and whether targets have been achieved. While most studies focus on either process or outcome evaluation, it seems clear that the quality of the process

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most likely will influence the quality of the outcome. This calls for evaluation approaches which link the view on the implementation of the process to the assessment of its outcomes. In the environmental governance literature there are various examples of such conceptions; special emphasis is put on developing appropriate process and outcome criteria (e.g., Blackstock et al. 2012). Also the e2democracy (e2d) project applied an integrative framework for a longitudinal evaluation of a specific form of public participation, that is, citizen panels collaborating with local governments on climate protection; it integrates the assessment of process, outcome, and impact (see Chap. 7).

The e2d project studied (e-)participation processes based on citizen panels collaborating with local governments in seven locations in three countries: Bregenz and Mariazell in Austria; Bremen, Bremerhaven, and Wennigsen in Germany; and Pamplona and Saragossa in Spain. Seven very similarly organized (e-)participation processes, each targeting a reduction of CO_{2e}[1] emissions at local level by at least 2% p. a., provided a quasi-experimental field study of the impacts of this special participatory design combining individual and collective activities. Panelists documented their consumption behavior bimonthly over up to 2 years (online using a CO_{2e} calculator or offline using paper, telephone, and mail) and received individual CO_{2e} balances with historical and comparative information in return. Meetings and various events offered opportunities for exchange and additional information was also provided (see Chap. 7). A basic hypothesis was that participation in a collective local climate initiative in combination with individual information feedback would promote pro-climate sensitization and behavior change to curtail greenhouse gas emissions, and that e-participation would facilitate this. To measure and analyze the effects of these long-term participation exercises, the components that determine their implementation and setup need to be identified, since these also represent a major basis for their impacts.

This chapter is structured as follows: Sect. 9.2 explains the basic building blocks of the evaluation framework. Section 9.3 focuses on the first two components, input and activities, and Sect. 9.4 continues with describing the various categories of output of the (e-)participation processes under study. Section 9.5 presents the outcome analyzing core characteristics and representativeness of the participants, usage of participation process output, and the overall evaluation of the citizen—government collaboration by the participants. Section 9.6 sums up the results and draws some conclusions on the relation between output and outcome.

9.2 Output and Outcome as Evaluation Framework Components

The Input-Activities-Output-Outcome-Impact evaluation framework introduced in Chap. 2 and described in Chap. 7 as part of the e2d project's study design integrates basic building blocks linking the (e-)participation process to its outcome and

[1] CO_{2e} stands for CO_2 (carbon dioxide) equivalents.

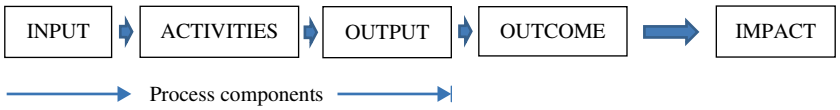

Fig. 9.1 Basic building blocks of the evaluation framework

impact. Referring to these building blocks, the focus in this chapter is on the relation between output and outcome of the participation processes studied. As important preconditions for these two components, two further ones—input and activities—will be pointed out first. The contents and interplay between the single elements displayed in Fig. 9.1 affect the degree of success of citizen participation.

- *Input* refers to financial and human resources including the immaterial preconditions on which the specific activities can and have to build upon: management, organizational and administrative procedures as well as political commitments of relevant political and administrative bodies.
- *Activities* which are necessary to organize an effective participation process not only include those for the provision of appropriate technical tools and contents but also the required communication and information measures to raise awareness among and provide feedback to participants.
- *Output* of a participation process includes different devices and products providing for information and communication and refers to all kinds of media, in particular online and offline channels (e.g., polls, meetings, focus groups, newsletters, online forums, monitoring tools/services). Basically, output stands for the supply side of the process in terms of quantity and quality, including the appropriateness of the products for different target groups, their usability and accessibility.
- *Outcome,* refers to immediate effects of the output, that is, seen from a demand-side perspective how what is offered is made use of. It covers number and activities of participants, the participants' composition as compared to the target population, and characteristics of the participants' contributions.
- *Impact* represents the final and most important part in the evaluation of (e-)participation processes. In the case of the e2d project this includes above all the extent of pro-climate changes of awareness, attitudes, and behaviors and measurable changes of CO_{2e} emissions (see Chaps. 10, 11, 12).

While most (e-)participation processes have a relatively short duration of just a few weeks or months, the collaboration of citizen panels with local governments in the e2d project lasted over a period of up to 2 years. This longer time span was necessary to accommodate the bimonthly monitoring of the panelists' CO_{2e} emissions across different seasons and allowed to gather extended insights into the relation between output and outcome. Before focusing on the output, we will first provide a comparative account of the nature of the input and activities spent to implement and carry out the participation processes at the different locations of the seven citizen panels.

9.3 Input and Activities

The seven collaborative (e-)participation processes on climate protection studied in the e2d project were conducted between March 2010 and August 2012. The concrete local configuration of the citizen panels in Bregenz and the Mariazell region (Austria); Bremen, Bremerhaven, and Wennigsen (Germany); Saragossa and Pamplona (Spain) differed depending on regional peculiarities. Table 9.1 gives an overview of major features characterizing the establishment and management of the participation processes.

The institutional background of local organizers of the participation processes differed in the seven locations and included: (a) municipal departments for citizen participation and environmental affairs, (b) a local grassroots organization in the field of sustainable development, and (c) a nongovernmental climate agency. The projects that were directly organized and conducted by municipal departments (Bregenz, Pamplona, Saragossa) enjoyed a significantly higher commitment by local administration and politicians than the other cases. The involvement of companies in the local setting was relatively low in most regions with the exception of the two German cities, Bremen and Bremerhaven.

Following a common approach in principle, the implementation of the seven participation projects varied according to financial and organizational inputs and activities. The level of personnel and monetary resources can be seen as a correlate to the amount of time and care devoted to a participation process.

As Table 9.1 shows, financial and personnel inputs were above average especially in Bregenz and Bremen and below average in the Mariazell case; the five municipalities constituting this region could hardly provide any money for the project; however, members of a local grassroots organization with support from a regional development agency conducted the process with strong personal commitment. The amount of financial and personnel input in the regions is not directly related to the number of participants but is reflected in the output of the process (see Sect. 9.4). The technical implementation mainly differed between the processes in Austria and Germany on the one side and Spain on the other, that is, the licensed KlimAktiv CO_{2e} calculator as the main tool versus an emulated Spanish CO_{2e} calculator with slightly reduced interactive functionality (see Chap. 8). As far as the participant help desk and offliner support is concerned, the differences were less pronounced.

Measures to raise awareness tended to be similar whereas recruitment strategies for citizen panels varied. A core of multimedia-based communication measures and standardized telephone surveys among the local populations were practiced everywhere. Recruitment measures by personal invitation letters were most extensively conducted in the Mariazell region, Bregenz and Bremen. In Saragossa, the city council made use of direct contacts to citizens who had volunteered for participation in regional matters in previous projects whereas Pamplona mainly relied on interested citizens identified during the telephone survey.

Furthermore, differing levels of experience with (e-)participation and participation culture influenced the execution of the participation exercises. The range spans from Bremen as highly experienced, followed by Bregenz, to Mariazell as least acquainted with participation on the other end.

Table 9.1 Overview of major input and activities components of the participation processes

	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
Local organizer/ management	Municipality department	Local grassroots organization	Local nongovernmental climate agency	Local nongovernmental climate agency	Local nongovernmental climate agency	Municipality department	Municipality department
Political commitment[a]	Rather high	Rather low	Rather low	Rather low	Medium	Medium	Medium
Company involvement[a]	Rather low	Low	Medium	Medium	Rather low	None	None
Financial input[a]	Rather high	Low	Medium	Medium	Medium	Medium	Medium
Personnel input (pm)	9	2	16	9	12	6	6
Technical input	Local project website; KlimAktiv CO_{2e} calculator (license)	Local project website; KlimAktiv CO_{2e} calculator (license)	Local project website; KlimAktiv CO_{2e} calculator (license)	Local project website; KlimAktiv CO_{2e} calculator (license)	Local project website; KlimAktiv CO_{2e} calculator (license)	Spanish local website; emulated domestic CO_{2e} calculator	Spanish local website; emulated domestic CO_{2e} calculator
Participant helpdesk	Local organizers and national research team	Local organizers and national research team	National research team	National research team	National research team	National research team	National research team
Offliner support	Support staff outsourced by local organizer and national research team	Support staff outsourced by national research team	Support staff/ national research team	Support staff/ national research team	Support staff/ national research team	National research team	National research team
Awareness raising	Press releases, newspaper articles, posters, flyers, local population telephone survey	Newspaper articles, posters, flyers, local population telephone survey	Radio interview, press releases, newspaper articles, posters, flyers, local website, local population telephone survey	Press releases, newspaper articles, posters, flyers, local website, local population telephone survey	Press releases, newspaper articles, posters, flyers, word-of-mouth by local activists, local population telephone survey	Press releases, local population telephone survey	Press releases, radio interview, daily university e-bulletin, local population telephone survey

Table 9.1 (continued)

	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
Participant recruitment	Direct mail to 400 households, local kickoff events	Direct mail to 2400 households, (e-)mail to members of associations, personal recruiting, local kickoff events	Direct mail to 4000 representatively selected inhabitants, local kick-off events, radio interview, press releases, newspaper articles, posters, flyers, project website	Press releases, newspaper articles, posters, flyers, project website, local kickoff events	Word of mouth, press releases, newspaper articles, posters, flyers, project website, local kickoff events	Interested citizens identified in population telephone survey	Registered volunteer group (via phone) and interested citizens identified in population telephone survey
Participation experience[a]	Rather high	Low	High	Medium	Medium	Medium	Medium

[a] Scale: (none), low, rather low, medium, rather high, high

Pm person months local organizers

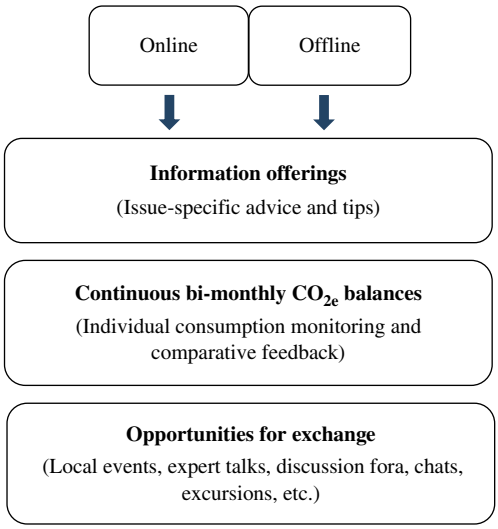

Fig. 9.2 Overview of the main categories of output of the participation processes

9.4 Output

Figure 9.2 shows the main contents of the output of the collaborative (e-)participation processes in the e2d project (see Chap. 7 for more details). As participants were free to choose the mode of participation, that is, between online and offline communication channels, process output was provided in both modes.

9.4.1 Three Basic Categories of Output

Three categories constituted the main products of the participation process: (1) *information* offering guidance on CO_{2e} reduction and climate-friendly behavior (via the project website, CO_{2e} calculator, regular newsletters, and various events), (2) bimonthly *individual CO_{2e} balances* based on consumption monitoring (via an online carbon calculator or a "CO_{2e} household accounts book" on paper), (3) various forms of issue-specific *meetings and exchange* (e.g., group meetings with expert talks, group excursions, chats with experts, discussion platforms).

In accordance with the project's focus on environmental democracy, individual bimonthly *CO_{2e} balances* played a key role. For this purpose, a carbon calculator was employed (for details see Chap. 8). Although this tool was provided online, panelists had free choice between an online and an offline mode of usage in all regions. Onliners (i.e., participants preferring to communicate online) used the tool directly via a web interface and were supported via e-mail. Offliners (i.e., panelists who preferred traditional media) had an identical paper version, a so-called CO_{2e} household accounts book for periodically reporting their consumption and

were regularly contacted by support staff via telephone who entered the data, produced the CO_{2e} balances, and returned them via mail. The CO_{2e} calculator had been adapted to meet the requirements of bimonthly monitoring and feedback which allowed to enter baseline measurement and up to 12 periodic measurements saved in the joint database. Features of the calculator included visualizing the progress of one's CO_{2e} balance over time and comparing it to those of other participants. The Spanish calculator provided the identical content but did not include line-charts and emoticons and had somewhat limited interactive capabilities: Panelists received the carbon balance as a feedback only immediately after each bimonthly data entry and could not access it until the next time they entered their data while in Austria and Germany this was possible at any time. Apart from these differences, the common tool delivered individual, comparative feedback on CO_{2e} effects (over time and compared to the group average) plus supporting information and learning opportunities to all citizen panels in the same way.

As a basic output component, *issue-specific information* sources were offered in various forms in all regions. The online calculator as well as its paper version included condensed advice on energy saving and CO_{2e} reduction on each of its sections: heating, electricity, mobility (private car, public traffic, and flights), nutrition, and consumer goods. Additional information offering tips and guidance on climate-friendly behavior was available on local project websites. As these were linked to on the central e2d project website,[2] contents were mutually accessible for organizers and panelists from all regions. In Bregenz, Pamplona, and Saragossa local organizers also offered information via links to local websites. Other kinds of information provided in the regions involved were regular newsletters, media articles, movie clips, brochures, and training material.

Opportunities for exchange among panelists and with local partners were an important output with potentials for mutual learning, community building, organizing support measures and the like. These included theme-oriented meetings, excursions to local sites relevant for sustainability issues (e.g., energy-saving buildings), discussion talks and online chats with experts, and other events. Each region held public kick-off, midterm and final events where participants received advice on CO_{2e} balancing and saving, information on the local project's progress and (interim) results as well as on results in the other regions and could discuss these among each other. However, range and number of such occasions varied to some extent from region to region.

Table 9.2 gives an overview of process outputs in the regions and shows that some differed in variety, quantity, and execution. As mentioned in the previous section, factors such as the institutional backing of the local participation process, the extent of company involvement as well as participation experience and other available resources had some influence on the information and support provided to the participants. Depending on local circumstances, periods of CO_{2e} monitoring varied in starting point and length: Bremerhaven and Wennigsen provided measurements for 18 and 12 months, respectively whereas all other locations provided data for 24 months.

[2] www.e2democracy.eu

Table 9.2 Overview of different categories of process output

	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
Bimonthly CO_{2e} monitoring	July 2010 to June 2012	May 2010 to April 2012	March 2010 to Feb. 2012	Nov. 2010 to April 2012	May 2011 to April 2012	July 2010 to June 2012[b]	July 2010 to June 2012[b]
Helpdesk for panelists	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of newsletters	15	4	11	11[a]	8[a]	13	13
No. of events	9	6	5	4[a]	6[a]	3	2
Online forum	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional offers of information	Local project website, additional local website Videoclip Learning tool Film screenings	Local project website	Local project website Online chat Catalog of measures for companies Regular round table	Local project website Online chat Regular round table	Local project website Online chat Regular round table	Local project website and local website in Spanish	Local project website and local website in Spanish

[a] Due to the shorter duration of the panels in Bremerhaven and Wennigsen numbers have to be weighted when comparing across regions by a factor of 1.33 and 2, respectively

[b] Final data available in August 2012

Major differences between the regions are to be noted regarding the output categories newsletters and events. The number of newsletters provided to participants ranges between four in Mariazell and 15 in Bregenz. The newsletters contained different forms of supporting information related to the core topics of the CO_{2e} calculator (heating, power, mobility, nutrition, consumption) such as sustainable living, energy efficiency, hints for energy saving in the household, and e-mobility. As it concerns events, in Spain both the number and range was low, as these were practically limited to a kick-off, a midterm, and a final event. In Bregenz, the number of events held in addition to this minimum number of three core events was especially high, which also holds true for Wennigsen and Bremerhaven when considering the shorter period of operation. In two regions, additional information channels for citizens were set up by the local institutions: In Bregenz, the department for environmental issues created their own website as a hub for local information such as event invitations and announcements, local news on sustainable development etc., and also stands out with the variety of additional information offered, and in Wennigsen an online chat with a local environmental expert was offered. The climate agency in Bremen prepared a catalog of environmental measures for companies and managed, in contrast to most other regions, to achieve at least some joint activities of local companies.

9.4.2 *Usability of CO_{2e} Calculator and Household Accounts Book*

For a comprehensive assessment of the usability of the CO_{2e} calculator and the practicality of the household accounts book citizens were asked to evaluate both tools in detail. To assess aspects specific to the usability of the online calculator an index was built summing up the ease of use with regard to login, comparable applications, data entry, suitability to the users' type of household, conversion of meter data, and the intelligibility of the resulting CO_{2e} balance.

As shown in Table 9.3, the overall usability assessment for the online tool was quite positive in all regions. The results for the Spanish CO_{2e} calculator were slightly better than the results for the Austro—German tool which might reflect a trade-off between reduced interactivity and increased simplicity of operation.

Two of the aspects used in the usability index were also relevant for the users of the CO_{2e} household accounts book: the first is household fit (considering different types of households such as rented apartments or detached houses) and the intelligibility of the CO_{2e} balance. In both cases, differences in the assessments of tools were minor since they basically met the same requirements. A closer comparison of the online and the offline tools shows a slightly better overall assessment of the household accounts book (see also Sect. 9.5.4). While 87% of the users of the CO_{2e} calculator said they completed all tasks successfully, among the users of the CO_{2e} household accounts book 92% felt successful to a very great or great extent in task completion. Eighty-five percent found the menu items of the calculator well

Table 9.3 Usability index of the CO_{2e} calculator—regional level. (Source: panel survey 2; Scale: 1 = very difficult to handle, 4 = very easy to handle; Kruskal-Wallis equality-of-populations rank test; chi-squared with ties = 29.010**; df = 6)

Region	*N*	Min	Max	Mean	Median	Std. dev.
Bregenz	10	1.5	3.8	3.0	3.0	0.7
Mariazell	7	1.8	4.0	3.3	3.6	0.7
Bremen	40	2.0	4.0	2.9	2.9	0.5
Bremerhaven	13	2.0	4.0	3.0	2.8	0.7
Wennigsen	21	2.5	3.7	2.9	2.7	0.4
Pamplona	30	2.3	4.0	3.2	3.0	0.4
Saragossa	96	2.0	4.0	3.3	3.1	0.4
Total	217	1.5	4.0	3.1	3.0	0.5

Additive index built on six usability indicators related to: (1) login, (2) usability compared to similar apps, (3) data entry, (4) household fit, (5) conversion of meter data, (6) intelligibility of results

organized and the functions easy to find; among the offliners a slightly higher percentage (89 %) said the book was easy to handle. Online help texts and explanations in the book were assessed equally positively—among each group 90 % agreed to a very great and great extent. For 87 % of the online users entering data via the input mask was easy, while even more, namely 91 %, answered questions in the household book without difficulties, and 95 % found transmitting consumption data via the telephone uncomplicated. This is particularly interesting as the necessary steps for collecting data is the same in both cases. As concerns difficulties in data preparation, both groups gave a similar response: 10 % of the onliners and 8 % of the offliners encountered some troubles in this regard. Being asked about particular difficulties, practical problems with meter-reading, calculating and recording the consumption data were mentioned most often, however, more frequently among the offliners (62 %) than among onliners (44 %). This indicates the high value of the support offered: 93 % of the onliners found the optional e-mail support helpful (49 % to a great, 44 % to a very great extent) and offliners could discuss problems immediately when reporting their data via the telephone.

9.5 Outcome

The relation between output and outcome is not causal in a sense that the former determines the latter. The outcome is affected by a variety of external factors such as levels of awareness and salience of climate change, the role of climate policies among political key issues, and, last but not least, governance and participation cultures at national and regional levels (see Chap. 7). The response to the widespread invitation by the various local organizers and governments to take part in citizen panels to collaborate in the reduction of CO_{2e} emissions is reflected in the amount of participation displayed in Table 9.4.

The registration numbers reached a total of 1159 participants but were far below what could be expected from the level of interest expressed in local population

Table 9.4 Participation in citizen panels and CO_{2e} monitoring over time

City/Region	Start date	Registered citizens at start *n*	Baseline measurement *n*	1st periodic measurement *n*	Final measurement *n*	Dropout since start %
Bregenz	07/2010	64	40	32	21	67.2
Mariazell	05/2010	62	38	27	22	64.5
AUSTRIA		126	78	59	43	65.9
Bremen	03/2010	213	136	90	60	71.8
Bremerhaven	11/2010	48	35	32	29	39.6
Wennigsen	05/2011	114	78	67	43	62.3
GERMANY		375	249	189	132	64.8
Pamplona	05/2010	260	121	111	73	71.9
Saragossa	07/2010	398	290	255	181	54.5
SPAIN		658	411	366	254	61.4
Total		1159	738	614	429	63.0

surveys at the start of the initiatives (see Chap. 7). Compared to the targeted population potential, the smallest municipalities (Mariazell region, Bregenz, Wennigsen) yielded the highest participation rates.

9.5.1 Representativeness and Inclusiveness of Participation in the Citizen Panels

Output and outcome are characterized by a certain dynamic over the long duration of the participation process. This implies changes of the contents offered as well as of panel composition and usage patterns over time. Dropout rates were highest in the initial process stages (during first and second measurement) whereas the panels remained more stable in the later measurement periods.

The basic characteristics of the citizen panels participating in the local climate initiatives in e2d show some commonalities but differ in certain respects from country to country. As Table 9.5 shows for the two Austrian panels, a fairly representative composition is given with regard to gender, but not for the distribution by age and still less by education. The age group below 30 is significantly underrepresented whereas older citizens (aged 50 years and above) are significantly overrepresented. The most significant difference, however, is observable with regard to the composition by education: in both panels citizens with compulsory education level only are underrepresented, those with university education are overrepresented. This mismatch is especially pronounced in the Bregenz panel where 40.7% of the panelists have a University degree compared to 9.6% in the population.

As concerns Germany, the overall pattern is similar. The citizen panels in Bremen, Bremerhaven, and Wennigsen also show a rather equal participation of men and women corresponding to their shares in the population; therefore Table 9.6 only presents the composition by age and education since in these cases the deviation is significant. In all three panels the youngest age-group is underrepresented. With nearly three quarters of the participants being aged 50 years and older, the age structure is especially skewed in the Wennigsen panel. Also the educational mix is highly imbalanced in all German panels, more than in all other panels, and most extremely in Bremen: 71.6% of the participants have a University degree in contrast to 18.7% in the local population.

In the citizen panels in Spain we find the same overall pattern again, including a representative share of men and women, however, with some noticeable variation as regards the panelists' age and education. The deviation from the age structure in the population is somewhat less pronounced than in Austria and Germany, though the youngest as well as the oldest age group is underrepresented. Also, the composition by education is less imbalanced than in the panels on the two other countries.

To sum up, the overall pattern reflects a configuration which is well-known from research on political participation and invites explanations by the so-called "SES model," i.e. socio-economic status (education, income, occupation) and resource factors (e.g., time, money, civic skills; cf. Brady et al. 1995): people with higher

Table 9.5 Representativeness of panel composition in Austria compared to target population. (Source: Panel survey 1; national census data)

	Bregenz				Mariazell			
	n	%	*Sr*	*c* %	*n*	%	sr	c %
Gender								
Female	14	50.0	−0.2	52.4	9	39.1	−0.9	52.4
Male	14	50.0	0.2	47.6	14	60.9	0.9	47.6
Total	28	100.0		100.0	23	100.0		100.0
Chi-square	0.07				1.63			
Cohen's w	0.05				0.27			
Age								
15–29	1	3.7	−2.0	22.2	2	8.7	−1.1	18.1
30–49	8	29.6	−0.4	34.7	3	13.0	−1.4	28.5
50–64	11	40.7	1.9	23.2	10	43.5	1.9	24.2
65+	7	25.9	0.7	20.0	8	34.8	0.5	29.2
Total	27	100.0		100.0	23	100.0		100.0
Chi-square	8.42*				6.84			
Cohen's w	0.56				0.55			
Education								
Compulsory	1	3.7	−2.8	36.3	8	36.4	0.9	26.4
Secondary	15	55.6	0.1	54.0	11	50.0	−1.1	70.2
University	11	40.7	5.2	9.6	3	13.6	2.6	3.5
Total	27	100.0		100.0	22	100.0		100.0
Chi-square	35.01**				8.70*			
Cohen's w	1.14				0.63			

Cohen's w is a measure for the difference between expected and observed values independent from sample size. As a rule of thumb, values around 0.10 indicate 'small', 0.30 'medium', and 0.50 'large' differences (Cohen 1992)

sr standardized residual (positive values indicate extent of overrepresentation in the panel), *c* census (population aged 15 years and above)

*$p<0.05$; **$p<0.01$

Table 9.6 Representativeness of panel composition in Germany compared to target population. (Source: panel survey 1; national census data)

	Bremen				Bremerhaven				Wennigsen			
	n	%	sr	c %	*n*	%	sr	c %	*n*	%	sr	c %
Age												
15–29	8	9.6	−2.4	21.8	1	3.6	−2.0	20.4	1	2.3	−2.2	15.6
30–49	39	47.0	2.3	32.4	9	32.1	0.3	29.5	11	25.6	−0.8	32.4
50–64	17	20.5	−0.3	21.9	11	39.3	1.6	24.2	20	46.5	2.8	25.0
65+	19	22.9	−0.2	23.9	7	25.0	−0.1	25.8	11	25.6	−0.2	26.9
Total	83	100.0		100.0	28	100.0		100.0	43	100.0		100.0
Chi-square	11.23*				6.60				13.48**			
Cohen's w	0.37*				0.49				0.56			
Education												
Compulsory	3	3.7	−4.9	37.1	1	3.7	−3.4	51.0	4	9.5	−2.8	35.4
Secondary	20	24.7	−2.6	44.2	15	55.6	1.2	40.7	13	31.0	−1.5	47.0
University	58	71.6	11.0	18.7	11	40.7	5.9	8.2	25	59.5	6.5	17.6
Total	81	100.0		100.0	27	100.0		100.0	42	100.0		100.0
Chi-square	152.80**				47.90**				52.30**			
Cohen's w	1.37				1.33				1.12			

sr standardized residual (positive values indicate extent of overrepresentation in the panel), *c* census (population aged 15 years and above)
*$p<0.05$; **$p<0.01$

education, corresponding civic skills and time resources are more likely to make use of participation offers. Despite purposefully inclusive recruitment strategies and invitations that were distributed very broadly at all seven locations to participate in local citizen panels on climate targets, it was not possible to break this traditional pattern. The obvious failure in adequately attracting young participants has to do with the required 'long breath' for a quite demanding participation over the quite long time of 2 years and with important fields of intervention addressed concerning decisions at household level which are to a large extent beyond the decision space of the youth. Apart from that, local differences within the general pattern outlined are largely owed to special local conditions and network effects in the recruitment of panelists (Table 9.7).

9.5.2 Issue-Specific Core Characteristics of the Panels

Further crucial aspects in characterizing the basic profile of the panelists concern core issues of climate change and citizen participation: the participants' interest in, attitudes towards and knowledge of climate change. In order to determine this profile, we carried out a cluster analysis as an exploratory approach to detect certain groups according to their homogeneity with respect to a number of relevant variables. The following eight variables were used for the analysis[3]: information about climate change; satisfaction with measures against climate change; interest in politics; interest in climate policies; satisfaction with local participation opportunities; information on local actions against climate change; motivation by environmental concerns, motivation by energy cost savings. The analysis revealed three clusters showing a good fit to the data[4] and can be interpreted as follows (see Fig. 9.3):

- *Cluster one* shows above average values in all but two variables which represents the vanguard to be labeled *'environmentalists'*.
- *Cluster two* largely shows values oscillating around the mean and can be labeled *'mainstream'*.
- *Cluster three*, finally, shows below average values on all variables, most pronounced on information about climate change, which can be addressed as *'less informed'* compared to the rest.

[3] All variables are measured by four-point scales: 1 = "not at all," 4 = "very much." The scales of the variables were z-transformed first. Values deviating from of a scale mean which is set to zero then indicate positive or negative values. The analysis is carried out using the software Stata 12, applying hierarchical Ward-Clustering using squared Euclidian distances (StataCorp 2011).

[4] Stata usually applies the criteria of Calinski-Harabasz pseudo-F (Calinski and Harabasz 1974) and the Duda-Hart pseudo-T-squared values (Duda et al. 2001) whereas distinct clustering is characterized by large Calinski-Harabasz pseudo-F values, large Duda-Hart [Je(2)/Je(1)] values, and small Duda-Hart pseudo-T-squared values. The parameters of the three cluster solution are: pseudo-F: 53.4; Je(2)/Je(1): 0.8281; pseudo-T-squared: 36.33.

Table 9.7 Representativeness of panel composition in Spain compared to target population. (Source: panel survey 1; national census data. Figures for education taken from representative population surveys in Pamplona and Saragossa.)

	Pamplona				Saragossa			
	n	%	sr	c %	*n*	%	sr	c %
Age								
15–29	5	6.7	−2.4	18.8	12	6.4	−3.8	18.5
30–49	34	45.3	1.3	36.0	77	41.2	0.8	37.6
50–64	24	32.0	1.9	21.9	55	29.4	2.1	22.1
65+	12	16.0	−1.3	23.2	43	23.0	0.4	21.8
Total	75	100.0		100.0	187	100.0		100.0
Chi-square	12.86**				19.95**			
Cohen's w	0.41				0.33			
Education								
Compulsory	11	14.7	−2.3	30.1	36	19.1	−2.9	33.8
Secondary	23	30.7	−0.6	35.4	76	40.4	1.1	34.6
University	41	54.7	2.7	34.5	76	40.4	1.7	31.6
Total	75	100.0		100.0	188	100.0		100.0
Chi-square	13.82**				15.45**			
Cohen's w	0.13				0.13			

sr standardized residual (positive values indicate extent of overrepresentation in the panel), *c* census (population aged 15 years and above)
*$p<0.05$; **$p<0.01$

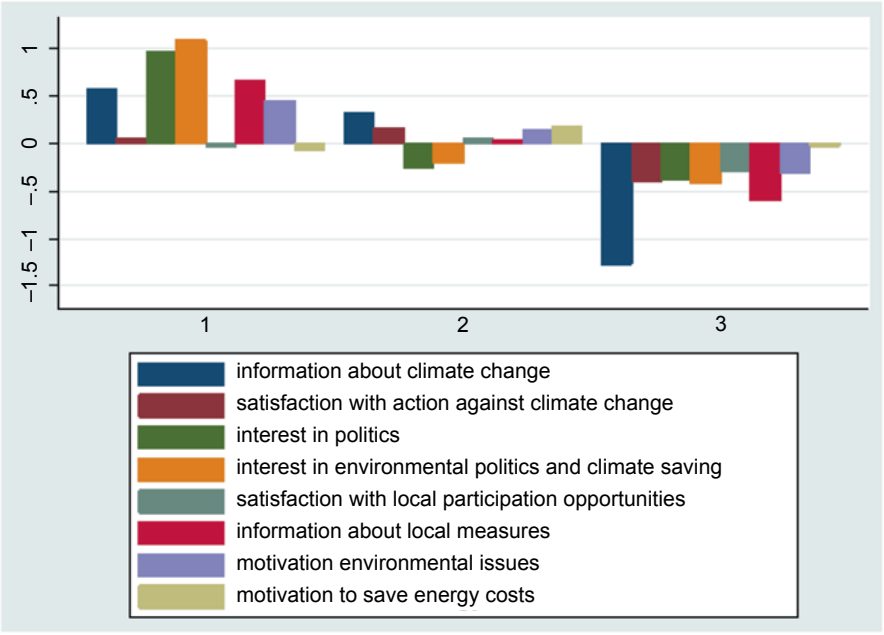

Fig. 9.3 Three cluster model of issue-specific characteristics of the citizen panels. (Source: panel survey 1)

The distribution across the three clusters in quantitative terms is displayed in Table 9.8. As the row total shows, the cluster labeled 'mainstream' is the largest one comprising half of the total; 27.8 % fall into the category of 'environmentalists', and 21.4 % belong to a cluster of comparatively 'less informed' participants. However, when looking at the local level, there are big differences in this general pattern.

The share of 'environmentalists' predominates by far in Bregenz (73.3 %), followed by Wennigsen and Mariazell. The panels in the two Spanish cities have the highest percentage of participants characterized as 'mainstream' (60 %) and the lowest percentage of 'environmentalists'. In all other locations the 'mainstream' clusters are the minority. Among the three German cities, Bremen sets itself apart from Wennigsen and Bremerhaven with just around one third of the panelists being 'environmentalists' and showing a higher percentage in the category of 'underinformed' related to climate change.

With this composition of the citizen panels we have to accept the fact that the participants in these climate initiatives demanding long-term commitments and continuous input show a special profile: they are characterised by significantly higher levels of interest in fighting climate change, of sensitisation, issue knowledge, civic engagement and beliefs in efficacy of targeted action. In other words, they show attributes of 'sustainable citizenship' (Micheletti and Stolle 2012) to a much higher extent than those that are to be found in the population at large. The skewness towards people with such a profile is most pronounced in the panels in Austria and Wennigsen in Germany, whereas the composition of the Spanish panels more closely resembles that of the general population.

Table 9.8 Distribution of panelists across three basic clusters

	Environmentalists		Mainstream		Less informed		Total	
	N	%	*n*	%	*n*	%	*n*	%
Bregenz	11	73.3	4	26.7	0	0.0	15	100
Mariazell	8	50.0	5	31.3	3	18.8	16	100
Bremen	22	34.9	26	41.3	15	23.8	63	100
Bremerhaven	10	41.7	11	45.8	3	12.5	24	100
Wennigsen	19	59.4	12	37.5	1	3.1	32	100
Pamplona	10	19.6	31	60.8	10	19.6	51	100
Saragossa	16	11.0	87	60.0	42	29.0	145	100
Total	96	27.8	176	50.9	74	21.4	346	100

Source: panel survey 1

9.5.3 Usage of Participation Offerings

A further important element of the demand-side effects is the usage of process outputs such as the CO_{2e} balance and the information offered during participation as well as the attendance of events that have taken place as part of the citizens' participation or other electronically mediated forms of exchange between participants.

CO_{2e} Monitoring Tools

As described above, CO_{2e} balances were available to the participants either online immediately after they entered their households' consumption data in the CO_{2e} calculator or, for those participants who used the household accounts books, a paper print was sent via postal services. Asking the citizens how often they actually had a look at their CO_{2e} balances, a big difference between panelists who used online and offline communication as well as big regional differences became apparent: while, in total, 42 % of all online panelists took a look at their CO_{2e} balances after every data entry, considerably more, namely 80 % of the offline panelists looked at their CO_{2e} balances every time they got a print of their results. This result was especially influenced by three regions in which the number of offline panelists who checked their paper balances regularly was considerably higher than the number of participants who looked at them online: In the Spanish regions hardly one fourth of the online panelists (Pamplona: 22 %; Saragossa 25 %) checked their CO_{2e} balances on a regular basis. This might be due to the limitation of the Spanish calculator regarding the presentation of how the CO_{2e} results progressed over time as was mentioned above. Also in the Austrian city of Bregenz, the majority stated that they seldomly (42 %) or never (25 %) took a look at the online results. In this case the information seems to have been of less importance because the panel largely consisted of environmentalists who already knew about their consumption related CO_{2e} emissions very well.

While some forms of citizen participation such as consultations rely on the relevance of knowledge and opinions shared by citizens, a collaborative activity such as the e2d project depends much more on the quality of data provided by the participants. Important measures in this respect are the accuracy levels of reported data (see Chap. 15) and their validity in terms of plausibility and consistency (see Chap. 8). Comparing accuracy levels shows that data collection via telephone interviews provided support for valid measurement from the beginning, whereas online reporting in general delivered less valid results initially but improved during the project.

In spite of the overall lower numbers of online participants who took notice of their CO_{2e} balances on a regular basis, in total, with nearly 90 %, an equal percentage of online and offline participants felt that observing their results over time has shown them the relevance of their personal consumption behavior. Likewise more than 80 % of all participants said that the CO_{2e} results in the various areas of consumption such as heating, mobility or nutrition gave them helpful hints for improvement in those areas.

Information Offerings

The two major ways of offering information on climate issues to the participants were the bimonthly newsletters and the local project websites (with excerpts as printed versions in the CO_{2e} household accounts book). The newsletters were sent via email or postal services. The paper version received more attention in all regions: 91 % of the offline participants and 69 % of the online participants read the newsletter often or every time. In general, the information provided on saving energy was found equally valuable by both groups throughout the regions. When being asked if the information was useful for reducing their personal energy consumption, participants were also positive in general, but participants in the German and Austrian regions were more critical than their Spanish counterparts. Some participants also shared the information on climate saving with friends and family. Interestingly, more offline participants (31 %) than online participants (24 %) handed the newsletters on to others.

Both groups could access the local project websites. Online participants visited the project website on a regular basis; less surprisingly the majority did this in accordance with the measurement intervals on a bimonthly basis and another 28 % once or several times a month. The website did have some relevance for those who preferred the offline version for their bimonthly CO_{2e} measurements; 25 % of them visited the website regularly. In addition, three quarters of all participants used further information on climate protection on the Internet or in other media.

Events and Online Exchange

In most regions a number of events were organized to provide opportunities for advice, discussion and exchange on climate issues and sustainable living among

participants. In total, more than 50 % of the panelists took part in the events offered, especially in the start-up, midterm and final meetings and workshops. At some locations various additional events were organized, such as excursions (visited by 6 % of the panelists), lectures (2 %), festivities (2 %) and individual advice-giving (1 %). In Austria and Germany[5], the majority of those who participated in events stated that they had an active exchange with others at the events and that this showed the importance of climate friendly behavior. More than three quarters of the attendees discussed open questions with other participants, not always in mere uniformity of views, since 20 % also noted that their statements had not been very openly received.

In addition to the events described, opportunities for exchange via online fora have been offered in all regions. However, 95 % of the panelists never or hardly ever used the local forum. The majority felt no need to use the fora and a quarter of the participants did not use them due to time restrictions. It seems that the regularly required contributions to CO_{2e} measurements over a long time absorbed practically the entire time budget participants were willing to devote to the climate collaboration. Of those who used a forum, most participants only read posts of others and only a quarter of them actively posted a statement. In effect, the local fora were primarily used for procedural and tool-related topics, however, they were in general assessed very positively with a large majority saying that organizers and participants reacted in a supportive way in fora discussions. A large number of users in Bregenz, Wennigsen, Pamplona and Saragossa also felt that they have learnt from fora contributions on CO_{2e} saving, whereas this was much less the case among users in Mariazell, Bremen and Bremerhaven.

9.5.4 Evaluation of the (e-)Participation Processes

After an active engagement in the project over a period of 2 years at most locations, participants were asked to evaluate the output and different aspects related to the setup of the (e-)participation process and to give an overall assessment of the collaborative exercise.

As Fig. 9.4 shows, between roughly 60 and 75 % of the participants at the seven locations assessed the project as ‘very good’ and ‘good’.

Overall, participants highly appreciated the regular calculation of personal CO_{2e} balances and possibility to compare their results over time and with others in the region, the information, newsletters and advice on energy saving, the personal supervision and friendly support as well as the collective effort. The most critical overall assessments were given in Wennigsen and Pamplona. In particular, participants in Wennigsen suggested improving and simplifying the CO_{2e} calculator and in

[5] The results in this section refer to the panels in Austria and Germany, except for statements explicitly including panels in Spain. Panelists in Saragossa were partly recruited from a registered volunteer group who used to participate in more than one participation activity. Thus, in order not to overburden active citizens with long research questionnaires the Spanish research team cancelled some of the questions in order to limit the length of the survey questionnaire.

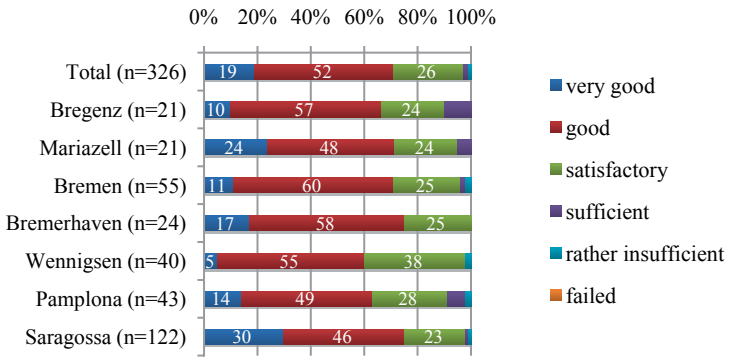

Fig. 9.4 Overall assessment of the (e-)participation project

Pamplona citizens wished for more events for community building and exchange. In addition, when asked what should be done differently, the most prominent suggestions across the regions were to recruit more participants by providing additional incentives and by raising the media coverage of the initiative, and furthermore, to offer even more personal advice and information events.

For evaluating the offers at each location in detail panelists assessed the quality of the information material, the website, the CO_{2e} tools and the support in using the tools. Moreover, panelists gave their opinion on how trustful their data have been handled as well as on the events and opportunities for exchange offered.

As Table 9.9 shows, all items offered during the climate initiatives received positive assessments. The data protection standards of the exercise were especially highly appreciated throughout the seven panels, with particularly high values in Bregenz and Mariazell. In Austria and Germany also the information material and events were assessed as being of rather high quality by the panelists, whereas the results in Spain differ: there the panelists' ratings on information material were especially high, but on events especially low. Overall, the websites got comparatively modest ratings and the exchange opportunities got the lowest ratings compared to the other items, which was especially pronounced in Spain.

Comparing the assessment of the CO_{2e} calculator and the CO_{2e} household accounts book shows that the household accounts book tended to be evaluated better than the online calculator, with the exception of Bremerhaven and Pamplona, where there was no significant difference. Likewise, the support for using the CO_{2e} household accounts book adequately was mostly assessed as better than the support for the online calculator—in this case except for Bremen and Pamplona where the ratings for both were essentially equal.

For the panelists' evaluation of the citizen—government collaboration some further aspects are crucial, in particular their perception of the commitment of other actors involved such as local administrations and businesses, and the transparency of the process. As shown earlier, the general setup of the participation processes at the seven locations differed somewhat, e.g. regarding the organizational and executive support, the commitment of local administrations and the involvement of local companies.

Table 9.9 Evaluation by the panelists of various items offered during the local climate initiatives. (Source: panel survey 3; means based on a 4-point scale: 1 = not good, 4 = very good)

Region	Stats*	Information material	Website	CO_{2e} calculator/book**	Support on CO_{2e} calculator/book	Trustful data handling	Events	Exchange opportunities
Bregenz	Mean	3.3	2.9	2.8/3.1	2.8/3.3	3.6	3.3	2.8
	N	21	14	10/8	10/6	14	20	17
Mariazell	Mean	3.2	2.9	3.1/3.7	3.1/3.6	3.7	3.1	2.5
	N	20	9	10/6	10/5	14	20	17
Bremen	Mean	3.1	2.9	2.9/3.3	3.2/3.2	3.4	3.0	2.5
	N	54	44	40/14	39/13	37	52	41
Bremerhaven	Mean	3.0	3.0	3.0/2.9	3.2/3.3	3.4	3.1	2.5
	N	23	18	15/7	15/7	13	23	17
Wennigsen	Mean	3.0	2.9	2.6/3.2	3.0/3.4	3.5	3.0	2.8
	N	40	30	25/13	24/14	29	39	35
Pamplona	Mean	3.4	3.2	3.3/3.3	3.4/3.3	3.5	2.7	2.3
	N	46	25	19/17	22/17	37	33	29
Saragossa	Mean	3.4	3.1	3.2/3.5	3.4/3.5	3.3	2.8	2.4
	N	123	90	70/37	79/36	111	108	95

*For reasons of visual clarity this table does not display median and standard deviation since the values for standard deviation are lower than 1 (with the exception of three negligibly higher values in Mariazell)

**Values represent the overall evaluation of the CO_{2e} calculator collected as part of panel survey 3 (final). They slightly differ from the values in the usability index in Table 9.3 for which data were gathered in the panel survey 2 (midterm); the general pattern corresponds to the results in Sect. 9.4.1 though

As Table 9.10 shows, throughout all locations panelists assessed the organization and execution of the (e-)participation process with slight variations as good to very good. In comparison to this positive result, the participants[6] found the commitment of local administrations rather meager.

The only exception to this can be found in the Austrian city of Bregenz where the corresponding ratings were relatively high. When it comes to the involvement of local businesses in the collaborative effort we find similar results: apart from a slightly better result in Bregenz, the panelists at the other locations tended to assess company involvement as rather not so good. Eventually, we see more positive ratings regarding the transparency of the exercise: Austrian and German panelists were rather satisfied to very satisfied with the communication on interim results of the collective CO_{2e} saving effort. By contrast, they felt less well informed on the activities and results of the partner projects going on in parallel in the other local communities. Apart from the few deviations noted, the results of the process evaluation appear rather consistent throughout all regions and with the patterns of results presented above on input and activities.

9.6 Summary and Conclusions

According to the building blocks of the evaluation framework depicted in Fig. 9.1, inputs in terms of resources as well as activities to organize an effective participation process provide the basic components to produce adequate process outputs and outcomes. Comparing the inputs and activities in seven citizen—government collaboration processes on local climate targets showed differing organizational settings in terms of institutional backgrounds, financial and personnel input and levels of experience in citizen participation. Information measures on the local projects started out in a similar fashion in all seven regions, whereas recruitment strategies eventually differed according to pilot experiences and local circumstances. For example, the city of Saragossa could partly count on a registered volunteer group of prospective participants; in the city of Bremen a representative selection of inhabitants was invited to participate; and in the rural region of Mariazell local organizers recruited participants with a mix of invitations via postal delivery to local households, public announcements and personal networks.

Interestingly, these different recruitment strategies resulted in partly similar characteristics of the citizen panels though, showing an overrepresentation of citizens with higher education and of the age group of 50–64 years. In the Spanish panels the distribution was a bit less skewed in this respect and represented a wider reach into mainstream strata of the local population. This holds also true with regard to the core characteristics of the panelists regarding their initial information status and interest in environmental issues; both were rather high to start within the other regions, especially in the Bregenz panel in Austria.

[6] For the reason stated in footnote 5 this and the following statements do not include results on the panels in Spain.

Table 9.10 Evaluation of regional processes by panelists. (Source: panel survey 3; Means based on a 4-point scale: 1 = not good, 4 = very good)

Region	Stats	Organizational conduct	Administrative commitment	Involvement of local businesses	Transparency of interim results	Transparency of partner projects
Bregenz	Mean	3.2	2.9	2.5	3.3	2.3
	N	21	21	19	21	21
Mariazell	Mean	3.4	2.1	2.2	3.4	2.6
	N	18	17	14	21	14
Bremen	Mean	3.3	2.1	2.2	3.4	2.6
	N	56	45	49	56	51
Bremerhaven	Mean	3.4	2.2	2.0	3.4	2.6
	N	21	21	22	24	22
Wennigsen	Mean	3.2	2.3	2.0	3.2	2.4
	N	40	38	37	38	38
Pamplona	Mean	3.4	–	–	–	–
	N	45	–	–	–	–
Saragossa	Mean	3.4	–	–	–	–
	N	121	–	–	–	–

For reasons of visual clarity this table does not display median and standard deviation since the values for standard deviation are lower than 1 (with the exception of two negligibly higher values in Mariazell and one in Bregenz)

In addition to the commitment of local administrations to the objectives of the (e-)participation processes and the availability of adequate technical means for information, communication and data monitoring, also the financial and personnel input as well as experience of the local organizers with (e-)participation were important foundations for providing adequate project outputs. In Bregenz, financial input, personnel input as well as the organizers' participation experience were rather high, whereas in Mariazell all three factors were assessed comparatively low. In Bremen, the financial input was medium while personnel input as well as experience were roughly on a level with Bregenz. In all other cases the three input factors were more or less provided on a medium level.

Within the varying organizational setups some categories of output were offered in a rather equal fashion in all regions. This included local project websites, an online CO_{2e} calculator together with an equivalent CO_{2e} household accounts book for consumption monitoring at individual level, online helpdesks as well as support by telephone and online fora. The Spanish CO_{2e} calculator had identical content but less interactive functions than the Austro-German device. It was perceived as easier to handle which is reflected in a better overall evaluation of the tool. However, due to limited interactivity the calculator's results, i.e. the CO_{2e} balances, received less attention by the panelists in Spain. Panelists in all regions particularly appreciated the trustful handling of the data they provided as part of their participation in the local projects.

Other output categories noticeably differed between the seven locations in quantity and variety, especially the number of newsletters and the events offered to the citizens. The number of newsletters was highest in the Austrian city of Bregenz and in the two Spanish cities. Bregenz together with Wennigsen also had the highest number of events, whereas the two Spanish locations stand out from the rest with the lowest number. These differences are clearly reflected in the outcome patterns. In the final evaluation, the information material received the best ratings in the Spanish locations and in Bregenz, whereas the events and exchange opportunities were assessed least favorably in Spain, but again best in Bregenz and the German region of Wennigsen. The online fora played a rather marginal role and were not so well appreciated; it seems that the panelists' time budgets were too much absorbed by regular reporting of their consumption data so that there was not much time and motivation left for other kinds of input.

The overall evaluation of the collaborative climate initiatives at the seven locations yielded a very positive result: between 60 and 70 % of the participants rated them as good or rather good. In view of the long duration and amount of regular active contributions demanded this is an encouraging result. It underlines that the participation format studied in the e2democracy project proofed worthwhile in principle, also from the participants' perspective. The local level and community-oriented approach, combined with the learning effects of individual CO_{2e} monitoring and a strong role of e-participation, provide a promising route to engage citizens with climate protection. Appropriately adapted, lowering the demand from participants by a shorter duration of consumption monitoring and feedback, and adding flexible advice packages according to individual needs, the approach could also be tried on a broader scale.

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Chapter 10
Attitude and Behavior Changes Through (e-)Participation in Citizen Panels on Climate Targets

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Abstract This chapter investigates attitudinal and behavioral impacts of (e-)participation in citizen panels collaborating with local governments in joint efforts to reduce CO_{2e} emissions. The e2democracy (e2d) project studied seven participation exercises with largely identical objectives and organization (a combination of long-term individual CO_{2e} footprint monitoring by the panelists, issue-specific information and events, and other opportunities for exchange over up to 2 years) in Austria, Germany, and Spain. In all panels, pro-climate awareness, attitude and behavior changes associated with the participation processes were observed, although to different degrees. In all but one region, the results showed a relatively strong positive link between attitude and behavior change. Attitudinal changes were greater than behavioral changes, which can partly be explained by the difficulties of changing social practices (e.g., nutritional habits) and local context conditions (e.g., transport options). An investigation of the causal mechanisms and mediating factors revealed moderate "gentle nudge" type effects from CO_{2e} footprint monitoring among panelists in all three countries. While a direct effect of community feeling on behavior change was not confirmed, a number of community-related factors, such as social learning and the removal of personal barriers through community support were positively related to behavior change. One conclusion is that attempts to change individual behavior towards pro-climate lifestyles through individual information feedback are more effective when they are embedded in a participatory community context.

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10.1 Introduction

Across disciplines, behavior change plays an important role in debates on climate change mitigation strategies (cf. Warde and Southerton 2012; IPCC 2007, p. 59). Although an exclusive emphasis on individual behavior is hotly disputed, mainly with reference to limitations by factors beyond individual control (cf. Shove 2010) and uneven attribution of responsibility (cf. Grunwald 2010), there is no doubt that established patterns of consumption contribute to climate change and hence cannot be neglected. The spectrum of strategies applied to change individual behaviors into sustainable consumption and climate-friendly practices includes education and awareness raising, appeals to values and ethical principles, regulations, incentives, social support, and the supply of climate-friendly products and services, all together constituting both informational and structural approaches (Steg and Vlek 2009).

Information-based instruments, in particular individual feedback on consumption records over time and in comparison to others, have become widespread in recent years, especially in the household energy consumption domain. According to Thaler and Sunstein (2008), offering a suitable "choice architecture" is a means of providing a "gentle nudge" towards energy-saving behavior. However, descriptive normative information can also have the unintended consequence of inducing individuals with consumption records below the norm to stop their saving efforts or even spend more. The extent to which this "boomerang" effect can be mitigated by special feedback designs (e.g., positive emoticons for CO_{2e}[1] emissions below average) is disputed. Existing evidence on the effectiveness of the attempts to change individual behaviors through feedback with the aim of reducing energy consumption is mixed (Rasul and Hollywood 2012). In a broad review of international experience, Fischer (2008) finds energy savings ranging from zero to over 20 % (most of them between 5 and 12 %); however, none of the 12 studies dealing with normative comparison could demonstrate an effect on consumption. Some of the gains in energy efficiency are also lost by various kinds of "rebound" effects (e.g., increased energy consumption due to savings from efficiency gains). According to a literature review, direct rebound effects in the residential sector are estimated to range between 0 and 60 % of the gains in energy efficiency, but there is very little evidence that direct and indirect rebound effects together exceed 100 % (IRGC 2013, p. 5; Santarius 2014, p. 117).

While in the past intervention programs primarily targeted individuals as consumers, recent literature has suggested placing more focus on the community level and engaging individuals in the role of citizens (Peters et al. 2010). Heiskanen et al. (2010) argue that communities are a more appropriate context to deal with crucial constraints of individual behavior change. In their study of four types of communities (place-based, sectoral, interest-based, virtual) they show that these are able to tackle, each to a different extent, four types of constraints: social dilemmas (encouraging individual efforts through visible contributions by others), social conventions

[1] CO_{2e} stands for carbon dioxide equivalents.

(challenging existing, deeply rooted social practices), lack of infrastructure (influence on creation of supporting infrastructure), and helplessness (empowerment by community resources).

Public participation is included among the key intervention strategies for encouraging pro-environmental behavior (Steg and Vlek 2009) and offers potentials which overlap with those identified for communities. The e2democracy (e2d) project (see Chap. 7) investigated the effects of community-level climate initiatives with a specific participation design. It combines (e-)participation of citizen panels with long-term individual and collective CO_{2e} monitoring in collaboration with local governments targeting a reduction of CO_{2e} emissions. Such participation processes were studied in seven municipalities in three countries: Bregenz and Mariazell region in Austria; Bremen, Bremerhaven, and Wennigsen in Germany; and Saragossa and Pamplona in Spain. Local governments or local partners organized, staffed, and managed these processes in contact with the e2d research team. Citizens could choose freely between the use of electronic media for participation ("onliners") and traditional media ("offliners"). Of 1159 participants in total at the time of registration, 73.9 % were onliners; by the time of the final periodic measurement their share had fallen to 50.3 %. The rationale behind this (e-)participation design was to provide for a collective process with specific features to create an awareness for climate-relevant effects and to turn individual commitments into effective climate protection. Individual carbon footprint monitoring by the panelists over up to 2 years was expected to enhance the understanding of the impacts of behavior in various spheres of life and provide guidance for changing behaviors into low-carbon practices in everyday life, supported by the experience of joint effort, social learning, and collective capacity building.[2]

Based on a special evaluation design (described in Chap. 7) for assessing the impacts of citizen panel participation in local climate initiatives, this chapter presents and discusses the results related to individual pro-climate behavioral change. Section 10.2 investigates the extent to which citizen participation in collaboration with local governments based on individual CO_{2e} monitoring and feedback led to behavior change. The evaluation approach proceeds from the assumption that behavior changes are triggered by an interplay of factors such as participation process effects and attitude changes as well as external influences from the local context to global level (such as the nuclear disaster in Fukushima or the financial crisis). Thus, Sect. 10.3 on attitude change and Sect. 10.4 on preconditions and causal explanations complete the picture on the impact of (e-)participation in citizen panels. Section 10.5 draws some conclusions. The data comes from the seven citizen panels in three countries and is mainly based on three waves of panel surveys. This allows an analysis of individual perceptions and changes at multiple points in time (at the beginning, midway through, and at the end of the process). For information on the changes with respect to CO_{2e} emissions we refer to Chaps. 11 and 12 as well as to Aichholzer et al. (2013).

[2] Cf. Gudowsky and Bechtold (2013) on the role of information and of learning processes in public participation processes.

10.2 Change of Climate-Relevant Behavior

The e2d project highlighted six relevant areas, which contribute to the individual effect on climate change: electricity (power consumption), water consumption, heating, mobility, nutrition, and consumer goods. Information provision and guidance on climate-friendly behavior in these areas supported by joint community action are expected to lead to "sustainable behavior." This basically means that individuals will act more climate friendly by changing their everyday behavior, for example, by choosing transport modes which cause less CO_{2e} emissions.

The causal mechanisms outlined in Chap. 7 may lead to individual behavioral changes and a decrease of personal CO_{2e} emissions. The main aim of this chapter is the analysis of *attitudinal* and *behavioral changes*. It should be noted that an increase of climate-friendly behavior does not necessarily lead to a decrease of individual CO_{2e} emissions. As we have seen in Sect. 10.1, the literature points out that various mechanisms (e.g., "rebound effects") may lead to an overall increase of CO_{2e} emissions, even when participants showed an increase of climate-friendly behavior in certain areas or activities. Moreover, behavioral changes vary with respect to potential CO_{2e} savings (reducing the number of flights would lead to by far greater savings compared to adjusting the refrigerator temperature). Furthermore, some behavioral changes are more likely than others. From an individual perspective, changing long-established practices such as nutritional habits is more difficult to achieve than, for example, switching the lights off. Therefore, CO_{2e} savings are analyzed separately in Chaps. 11 (individual level) and 12 (collective level).[3]

10.2.1 Range of Behavior Change in Individual Areas

In the third wave of panel surveys at the end of the participation processes (see Chap. 7, Sect. 7.8 for details), participants were asked on each of the six areas if they had made lasting pro-climate changes to their behavior. For each category, the survey provided between three (nutrition) and five (electricity, heating, consumer goods) items and participants could choose whether they had made no changes, whether they had already made changes before participating in the project or since then. Since the main point of interest is how the (e-)participation process changed individual behavior, a change in behavior before participation cannot be linked to the effects of the process. At the same time, a high level of environmental awareness and pro-environmental behavior before participation implies that some of the suggested changes had already been made and thus the number of changes since par-

[3] Important methodological differences between the data on CO_{2e} effects (via carbon calculator) and behavior change (via panel survey) need to be born in mind. They concern the nature of questions, level of measurement, and sample size: carbon calculator data are based on quantitative consumption measurements of 419 cases in total; relevant survey data contain qualitative measurements of extent and type of behavior changes from 316 to 333 respondents in total.

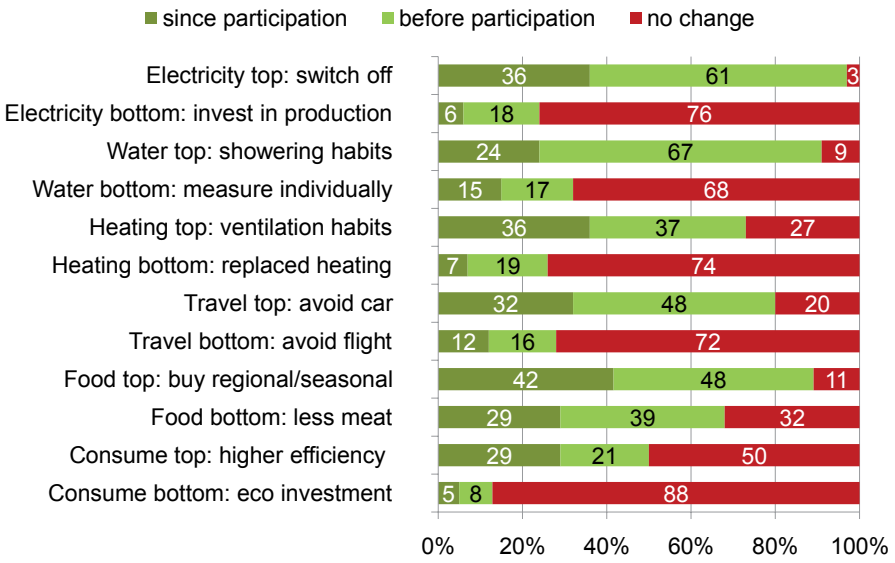

Fig. 10.1 Top and bottom items of behavior changes (in %; $n = 316–333$). (Source: Third survey of citizen panels)

ticipation is smaller for these participants (see Chap. 9, Sect. 9.5.2 on the composition of the panels with regard to their initial environmental awareness). Figure 10.1 shows the top and bottom items of behavior changes in each area.

In all areas we find both changes of individual behavior and a continuation of existing practices. While most citizens changed their behavior in activities that are within their decision-making scope and that are not too costly (e.g., switching off lights or consuming less water when showering), we see fewer changes to the status quo that involve higher costs (e.g., investment in new heating system with lower emissions) or of general social practices (e.g., avoiding flights for holiday-making). In the light of theories on the relationship between attitude and behavior and on the constraints of behavior change, this finding comes as no surprise. Generally speaking, behavioral changes are strongly linked to spheres of influence, costs of change, and lifestyle choices. According to the so-called low-cost hypothesis (Diekmann and Preisendörfer 1992) consistency between pro-environmental attitude and behavior depends on the material and immaterial costs of behavior change, measured in money, time, effort, and inconvenience. Similarly, lifestyle choices such as consuming meat or a (mainly) vegetarian diet are deeply rooted and therefore hard to change.

We see different patterns with respect to the areas mentioned. In areas relating to everyday routines, such as switching off appliances, improving ventilation habits, or buying regional and seasonal food, the magnitude of change during the participation is higher (costly, time consuming or more complex) than in one-off measures such as investing in clean energy or replacing flights by other means of transport.

10.2.2 Behavioral Change Across Areas

To give a condensed overview of behavioral changes in all six relevant areas, we created an additive index based upon the 26 items.[4] For each item we generated a dichotomous variable (0 for no change before participation, 1 for behavior change during the project). Since some activities and practices are more complex or costly to change than others (see above), each item was weighted by the effort needed to make the change as assessed by three members of the research team.[5] The higher the index, the higher the extent of overall individual changes made across all areas during panel participation (the maximum index value is 60).

Before we address the individual changes it is important to emphasize that two areas—food and consumer goods—particularly differ with respect to measurement precision in comparison to the other areas (electricity, water, heating, travel). Since quantitative measures in both areas (e.g., quantity of meat or duration of product use) are practically impossible, the design of questions in the surveys as well as in the CO_{2e} calculator followed a qualitative approach.

The key statistics for the additive index on the aggregate national level are represented in Table 10.1. As regards the *total change,* we see a rather similar pattern in all three countries.[6] Since participating in the panels, individuals changed their daily routines in roughly only a fifth of the change potential represented by the 26 weighted items. The mean value of behavioral changes ranges between 11.5 (Germany) and 12.8 (Austria). Since the standard deviation—the variation within each country—is rather similar for all three states, we can argue that we do not see different behaviors on an aggregate level. Both the means as well as the standard deviations are sensitive to extreme values, and therefore, the median is used to check for representativeness. In only two of the 21 cases (six different areas and the total change), namely the total change and traveling behavior in Spain, do we see relevant differences between the mean and the median, which indicates that extreme cases do not influence the presented statistical key figures to a relevant extent.

As indicated in Fig. 10.1, behavioral *changes* vary with respect to the areas of interest. However, the figures cannot be compared between areas since the number of items and maximum possible index values per area vary. In addition, when account is taken of the different levels of effort behind change by weighting the indices, we see that individuals changed their daily routines during the project more in some

[4] Citizens could also name other behavioral changes in the different areas. Between 8 and 12 % of all panelists mentioned additional changes (e.g., replacing windows, selling their car, handing on unused things to others).

[5] Weight factor 1: measuring water and electricity consumption of individual activities and easy changes (e.g., ventilation habits); weight factor 2: rather inexpensive changes in everyday routines (e.g., turn off standby appliances or buy seasonal or organic food); weight factor 3: rather costly changes and changes in life-style choices (replace energy guzzlers or eat less meat); weight factor 4: very costly, complex or inconvenient changes (e.g., replace heating system or avoid a flight).

[6] We decided not to use significance values as a criterion for interpreting differences as this does not seem meaningful with low case numbers in some cells. Instead we point out tendencies and note the significance of differences when the number of cases is sufficient and $p < 0.01$ or < 0.05.

Table 10.1 Index of pro-climate behavioral change since participation in citizen panels—national level. (Source: Third survey of citizen panels)

Country	Stats	Total change	Electricity	Water	Heating	Travel	Food	Consumption
Max. value		60	11	7	14	10	7	11
Austria	*Mean*	12.8	*2.5*	*1.0*	*1.8*	*2.1*	*3.0*	*2.4*
	Median	12.0	2.5	0.0	1.0	2.0	2.5	3.0
	SD	7.8	2.3	1.4	2.9	2.4	2.8	2.3
	N	42	42	42	42	42	42	42
Germany	*Mean*	11.5	*2.8*	*1.1*	*2.2*	*1.5*	*2.6*	*1.9*
	Median	11.0	1.0	0.0	1.0	0.0	2.0	2.0
	SD	7.5	2.2	1.6	2.8	2.0	2.6	2.0
	N	122	121	122	122	122	122	122
Spain	*Mean*	12.0	*2.8*	*1.6*	*2.4*	*1.4*	*2.0*	*1.8*
	Median	10.5	3.0	1.0	1.0	0.0	2.0	1.0
	SD	9.3	2.4	1.9	2.9	2.0	2.3	2.1
	N	170	170	170	170	168	169	169

Additive index of item scores and weight factors (see footnotes 2 and 3 for explanation)
SD standard deviation

areas than in others. Overall the index values indicate a higher degree of change in the fields of power consumption and nutrition while water consumption and transport habits changed less during the participation period. With respect to heating and general consumption, we find a medium-sized effect. However, it seems that the respondents tended to overestimate their perceived changes especially in the nutrition area, as these were measured by three items which tempted the participants to count even minor steps as changes made.

While the overall extent of changes does not differ between Austria, Germany, and Spain, the changes in the specific areas do. In Spain the extent of changes in the field of water consumption is significantly higher than in Austria and Germany. Water shortages had been an issue of concern in Spain during the years preceding the project, which very likely contributed to the participants' higher degree of efforts in this area. Austrian and German panelists had already practiced water saving to a larger extent before their participation. In mobility, nutrition, and consumer goods, panels in Austria show a higher degree of change than those in Spain and Germany. Austrians, however, did not change their heating habits during the project to a high degree as compared with Spain and Germany. Longer periods of lower temperatures in Alpine regions, particularly in winter, are part of the explanation. In the field of power consumption we do not see noteworthy variations within the three countries.

Table 10.2 shows how the different citizen panels at *regional level* changed their behavior during the participation process.

This analysis complements and confirms the general findings at national level. In six out of seven regions the overall mean of behavioral change during the participation process ranges between 10.1 (Mariazell) and 12.6 (Saragossa); only the index value for Bregenz is higher. This difference does not stem from a specific area of behavior change. Rather, we see the general trend that panelists in Bregenz changed their behavior during the process time frame in almost all areas to a greater extent than panelists of the other regions.

Within the countries we see the least differences between the regions in Germany, whereas in Austria the difference is striking. In contrast to Bregenz, Mariazell shows the lowest score (closely followed by Bremerhaven and Pamplona). The low level of changes in Mariazell can partly be explained by a more limited choice especially regarding heating and transport due to the geographical characteristics of the rural mountainous region with long, cold winters and insufficient public transport options. The age structure of participants also adds to the explanation: With roughly 62 % of participants aged 60 years or older, Mariazell started from rather low consumption levels in areas such as flights or general consumption, which means a lower potential for further reduction as a result of participation.

Like the findings at national level, Table 10.3 shows that mean and standard deviation are not biased by extreme values. In most cases the median is rather close to the mean, which indicates a non-skewed distribution. Only in Pamplona and Saragossa do we see a greater difference between mean and median in a few areas such as travel, which explains the slightly higher values of the standard deviation in comparison to the other regions.

While the differences in total change between the six areas of behavior change are rather small across the regions (with the exception of Bregenz), we see differences in behavioral changes between the regions in individual areas. *Power consumption*

Table 10.2 Index of pro-climate behavioral change since participation in citizen panels—regional level. (Source: Third survey of citizen panels)

Region	Stats	Total change	Electricity	Water	Heating	Travel	Food	Consumption
Bregenz	*Mean*	*15.5*	*3.1*	*1.2*	*1.5*	*3.2*	*3.3*	*3.0*
	Median	15.0	4.0	0.0	0.0	4.0	3.0	3.0
	SD	7.7	2.3	1.6	3.1	2.5	3.1	2.5
	N	21	21	21	21	21	21	21
Mariazell	*Mean*	*10.1*	*1.9*	*0.8*	*2.0*	*1.1*	*2.6*	*1.7*
	Median	10.0	1.0	0.0	1.0	0.0	2.0	0.0
	SD	7.1	2.2	1.3	2.9	1.9	2.5	2.0
	N	21	21	21	21	21	21	21
Bremen	*Mean*	*12.1*	*2.4*	*1.0*	*2.3*	*1.3*	*2.8*	*2.2*
	Median	12.5	2.0	0.0	2.0	0.0	2.5	3.0
	SD	7.4	2.3	1.6	2.8	1.9	2.7	2.0
	N	58	58	58	58	58	58	58
Bremerhaven	*Mean*	*10.3*	*1.8*	*1.2*	*2.6*	*1.5*	*1.8*	*1.5*
	Median	9.5	1.0	0.0	2.0	0.0	1.0	0.0
	SD	7.9	1.8	1.6	2.8	2.2	2.1	1.9
	N	24	23	24	24	24	24	24
Wennigsen	*Mean*	*11.4*	*2.1*	*1.1*	*1.9*	*1.8*	*2.8*	*1.7*
	Median	11.0	1.5	0.0	0.5	2.0	2.0	1.0
	SD	7.5	2.3	1.7	2.5	2.0	2.6	2.0
	N	40	40	40	40	40	40	40
Pamplona	*Mean*	*10.6*	*3.0*	*1.7*	*1.9*	*1.1*	*1.4*	*1.4*
	Median	9.0	3.0	1.0	1.0	0.0	0.0	1.0
	SD	8.0	2.3	2.0	2.5	1.6	1.8	1.8
	N	46	46	46	46	46	46	46

Table 10.2 (continued)

Region	Stats	Total change	Electricity	Water	Heating	Travel	Food	Consumption
Saragossa	*Mean*	*12.6*	*2.7*	*1.6*	*2.5*	*1.6*	*2.2*	*1.9*
	Median	11.0	3.0	1.0	1.0	0.0	2.0	2.0
	SD	9.8	2.5	2.0	3.1	2.2	2.5	2.2
	N	124	124	124	124	122	123	123

Additive index of item scores and weight factors (see footnotes 2 and 3 for explanation)
SD standard deviation

behavior changed to a greater extent among panelists in Bregenz, Pamplona, and Saragossa; the smallest changes were observed in Bremerhaven (1.8) and Mariazell (1.9), which corresponds to these panels' position regarding total change. A somewhat similar pattern can be observed in *water consumption*. A higher number of individual changes were made in both Spanish cities, while all other panels show a similar, low-sized effect. In Bremen, Bremerhaven, and Saragossa we find a high degree of behavioral change in the field of *heating* habits compared to the other panels. In the areas of *traveling* and *general consumption,* we see a greater behavioral change in Bregenz (significantly higher in the case of mobility), while all other regions have rather similar values. Higher differences between the regions are observed in the *food* sector. While in four regions (Bregenz, Bremen, Wennigsen, Mariazell) panelists changed several nutrition-related habits during their participation, we observe a noticeably lower effect in the other three panels.

One major advantage of panel data compared to one-time surveys is that it enables validity measures. When constructing the panel surveys, the inclusion of validity measures was a major objective. All data presented so far originated from survey 3 (at the end of the process). To check the validity of the individual behavior changes, we compare the weighted index from survey 3 to statements about behavior changes from survey 2 (during the process). In survey 2, one question was asked about individual behavioral changes in different fields. Unlike survey 3 which broke the six areas down into specific activities, in survey 2 respondents gave an overall answer on changes in five areas of interest (electricity, heating, mobility, nutrition, and general consumption). We can correlate these variables from both surveys,[7] expecting a higher validity if the correlation between both sets of variables is high. However, one has to keep three caveats in mind: Firstly, since a behavioral change between the second and the third survey cannot be ruled out, one should not expect a perfectly positive correlation. Secondly, the number of citizens varies considerably between the countries and panels, which is why the correlation figures refer to the national levels. Finally, from a statistical point of view, the number of cases is linked to the significance levels. The lower the number of cases, the greater the effect (in our case the correlation) must be to be significant. Since the number of panelists is rather low in Austria, we only find tendencies towards behavioral change in some areas as opposed to statistically significant results. Table 10.3 shows the correlation matrix for the areas mentioned.

Table 10.3 Validity scores for behavior changes—national level. (Source: Second and third survey of citizen panels)

Country	*N*	Power	Heating	Travel	Consumption	Food
Austria	35	0.40*	0.20	0.34*	0.24	0.53**
Germany	102–103	0.26**	0.38**	0.40**	0.07	0.29**
Spain	292–294	0.32**	0.43**	0.23**	0.21**	0.14

Spearman's rank correlation (between measurements over time) in $*p<0.05$; $**p<0.01$

[7] Except for water consumption since survey 2 did not contain information on this variable.

In 11 out of 15 cases we see a statistically significant correlation between the reported behavioral changes. If we consider the low number of cases in Austria, the number of cases in which we find a rather high correlation, and therefore a high validity, is 13. Only the general consumption habits in Germany and the changes with respect to nutrition in Spain do not show a significant positive correlation. Overall, these findings indicate that the identified behavioral changes associated with the participation process are valid.

10.3 Change of Climate-Relevant Attitudes

An important reference for explaining behavioral habits is the inclusion of attitudes. As stressed by political psychology (e.g., Krosnick 2002), attitudes are fundamental factors for the motivation, selection and prioritization of individual actions, although they are far from determining them. On the contrary, the existence of a value-action gap is also well known (Blake 1999). The panel surveys contain a variety of information on views about the relevance of climate change policies, on how individuals can act to minimize or prevent climate change, and detailed questions about issue knowledge and (possible) learning effects.

As outlined in the analytical framework in Chap. 7, providing information, guidance and individual and collective learning processes is expected to have an impact on awareness, attitude, and (under certain circumstances) on behavioral changes. Therefore, the following paragraphs give an insight into the magnitude of pro-climate attitude changes in the fields of relevance of the issue, the importance of climate-friendly behavior and possible impacts of collective efforts such as the collaborative participation exercises studied.

Individual behavior is based upon a complex setting of several factors. For a first insight we start with a selection of (possible) changes in some relevant fields. The third panel survey included items measuring change of attitudes and awareness such as the participants' attention to climate issues, interest in climate policy, comprehension of CO_{2e} effects, willingness to continue consumption monitoring beyond the end of the project, or their view on whether local climate initiatives such as in the e2d project have also strengthened participants' civic involvement. Respondents answered on a 4-point scale ("strongly agree," "tend to agree," "tend to disagree," "strongly disagree").

Figure 10.2 gives an overview of awareness and attitude changes. It shows that attitude-related changes were witnessed with regard to several of the dimensions in question to a rather high extent. Especially in the fields of issue saliency and awareness of individual actions—for example, as expressed by the motivation to continue energy consumption monitoring, a better understanding of CO_{2e} effects as a result of monitoring one's own behavior or by feelings of increased personal efficacy and interest in climate policies—a considerable percentage of respondents changed their attitudes over time. However, the magnitude of attitude changes varies. While

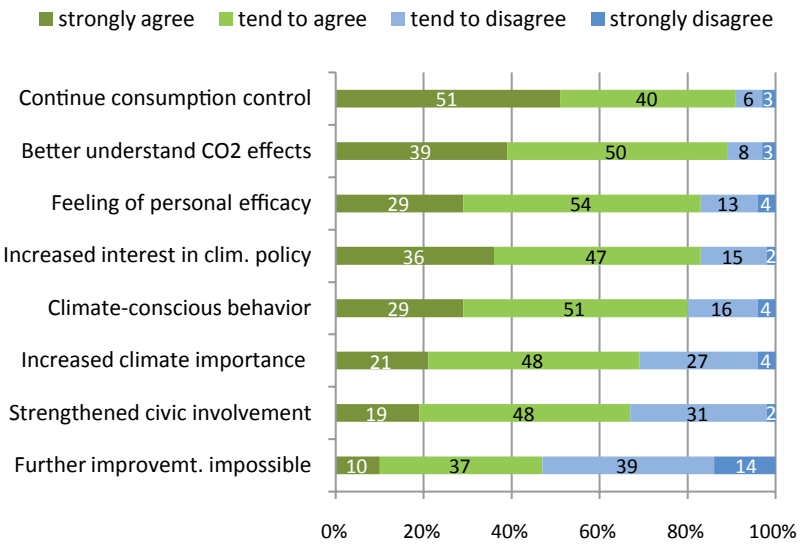

Fig. 10.2 Overview of awareness and attitude changes (in %; *N* = 323–333). (Source: Third survey of citizen panels)

nearly 90 % of all panelists now have a better understanding of the impact of their daily behavior on CO_{2e} emissions, for one out of three respondents the importance they attribute to climate change or civic involvement in this field did not increase. This is partly explained by the relatively high share of environmentalists among the participants, who already started with a high level of awareness at the outset. Furthermore, nearly every second participant saw hardly any possibility for further improvement of their personal carbon footprint. This might partly indicate a "boomerang" effect, that is, if participants achieve higher CO_{2e} reductions than the average or see a high decrease of emissions compared to other participants in one of the areas (as shown together with their individual CO_{2e} balance), their stance on the importance of climate change and future behavioral changes might lead them to a reduction of their efforts. However, partly it may also be due to reaching real limits to the further conservation of energy at the individual level.

What is of interest in addition to the overview of some fields of attitude change is its overall magnitude. For this purpose we again created an additive index based upon four key attitudes that reflect the versatile factors relevant to climate change. Survey 3 includes information on whether climate protection has become more important for panelists compared to other issues *(issue saliency),* whether the interest in environmental and climate policies has been strengthened *(interest in problem solutions),* whether panelists have a better idea about the dimension of CO_2 emissions caused by different behaviors (*awareness of effects*—relevant for the selection of possible actions), and whether they are attuned to act more climate-friendly since their participation *(motivation for sustained pro-climate behavior)*. With these

Table 10.4 Index of pro-climate attitude and awareness changes—regional level. (Source: Third survey of citizen panels)

Region	*N*	Mean	Median	SD
Bregenz	21	3.0	4	1.5
Mariazell	21	3.1	3	1.0
Bremen	56	2.9	3	1.3
Bremerhaven	24	2.9	3	1.3
Wennigsen	40	3.0	3.5	1.2
Pamplona	46	3.1	4	1.4
Saragossa	124	3.5	4	1.0

Additive index of attitudinal item scores (see explanation above)
SD standard deviation

four factors the index represents major components relevant to individual behavior in climate issues. For each question we built a dichotomous variable where 1 represents a positive change (i.e., higher relevance of climate protection) and 0 represents no changes (or negative changes if applicable) in individual attitudes. Given the diversity of the items, a higher value of this "attitude/awareness" index should be a good proxy for the general awareness and attitude change of panelists. Table 10.4 represents the key statistical figures for all seven regions.

Since the value for each panelist could range between zero and four, the degree of attitude and awareness change in all regions is relatively high; it is clearly above the level of behavioral changes. What also stands out is that the average level is more or less similar in all panels, except for Saragossa which shows a significantly higher degree of attitude change (a mean value of 3.5 and a remarkably small standard deviation). These results can be compared with those on the extent of behavioral change, where the Saragossa panel ranked second highest. There is a plausible explanation for this which speaks for the effectiveness of the exercise: The Spanish panelists and Saragossa in particular had shown significantly lower levels of information and interest in climate issues at the start and hence had a corresponding higher scope for change. However, the results on the extent of change in both criteria do not match for all panels. For example, in the case of Bregenz, Sect. 10.2 showed a significantly higher degree of individual behavioral changes among the panelists than in all other regions. The degree of attitude change is high but not as outstanding as in that of behavioral change.

Thus, the following interim conclusion can be made: Firstly, collaboration in climate initiatives leads to a high degree of attitude changes in a broad range of fields—from issue awareness to motivation for sustained behavior. Since these changes depend on characteristics of the participants and the local processes, the relatively low variation within the regions is actually remarkable. Secondly, a change in climate-related attitudes often precedes a pro-climate change in behavior. However, in the field of climate issues, too, attitude changes are not the only factor for behavioral changes, and attitude change does not necessarily translate into behavioral change to the same extent.

Table 10.5 Correlation between attitude index and different assessments of the climate project. (Source: Third survey of citizen panels)

Country	*N*	Overall assessment	Ineffectiveness	Meetings and events
Austria	38–40	0.49**	−0.52**	0.53**
Germany	114–117	0.53**	−0.26**	0.24*
Spain	141–170	0.35**	−0.17*	0.17*

Spearman's rank correlation coefficients
*$p < 0.05$; **$p < 0.01$

Again, checking the validation of the results on attitude change should substantiate these findings. All the questions used for the additive index are aimed at measuring whether the attitudes in certain areas have changed due to participation in the local climate initiatives. Therefore, we checked the view of the climate initiative as a whole, of its effectiveness and of the various events offered. Survey 3 includes corresponding questions. Since we would expect attitude changes to be based upon participation in the climate panels, panelists who have a high degree of attitude change should also have a positive *overall assessment* of the climate initiative as well as of its *effectiveness* and of its various *events*. Thus, we would expect significant correlations between the attitude change index and these variables. In the case of the effectiveness assessment—for reasons of questionnaire design—the statement used in a battery of items asked whether the participants agreed or disagreed with the statement that the initiative was ineffective, hence we expect a negative correlation. Table 10.5 shows the correlation between the attitude index and the validation variables.

In all three countries we observe the same tendency: The significant correlations indicate that citizens' attitude changes are linked to the participation process. With regard to the overall assessment we see that citizens with a higher extent of attitude changes also evaluate the climate initiative more positively. While there are no considerable differences between Austria (0.49) and Germany (0.53), the relationship is somewhat weaker in Spain (0.35). Since the overall assessment is a very general concept, more information could be gathered by comparing the attitude index to the effectiveness of the climate initiative as well as the evaluation of the information events.

Overall we see the same pattern in both aspects: The better the evaluation of the initiative's effectiveness and of its events the higher the number of attitude changes. Nonetheless, compared to the previous finding we see a considerable difference between the three countries. While the relationships are especially strong in Austria, the picture is less clear in Germany and Spain. However, an essential part of the differences between Austria and the other countries is due to statistical reasons. Since the number of panelists in Austria is rather low (the Spanish panel is four times bigger), each panelist in Austria has a higher impact on the correlation score than in Spain or Germany. In conclusion we could say that citizens who have a high degree of attitude change also have a positive view of the climate initiative, its effectiveness, as well as the assessment of the range of events offered, and vice versa.

10.4 Exploring Antecedents of Attitude and Behavior Change

As discussed in more detail in Chap. 7, impacts such as changes in climate-relevant attitudes and behavior are linked to a multitude of effects regarding activities, outputs and outcomes of the participation process. By observing processes over time the e2d evaluation approach makes it possible to investigate causal mechanisms and preconditions necessary for attitude and behavioral change. The aim of this section is to give an explanation for the magnitude of the changes we saw in Sect. 10.2 and 10.3 and proceeds as follows: Since we expect behavior change to be based upon a shift in attitudes or reinforcement of a pro-climate stance, we begin by exploring the relationship between attitude and behavioral change. We then investigate if and to what extent the hypothesized effects of the (e-)participation design rest upon two basic—individual and collective—mechanisms: (a) individual information feedback via the CO_{2e} calculator/book based on monitoring consumption behavior, including the possibility to compare one's own CO_{2e} emissions over time and with others and (b) integration within a collective process that supports the formation of a community, social learning, and capacity building. For this purpose we investigate a series of relationships using correlation figures. To begin with, Table 10.6 shows the relationship between the attitude and behavior indices we used in the previous sections.

As expected, the correlation between the degree of attitude and behavioral change is quite strong. Of seven panels, six show a significant connection between attitude and behavioral change ranging from 0.30 in Saragossa to 0.61 in Mariazell and Pamplona. This shows that a change in attitudes is often—but not necessarily always—followed by a change in individual behavior. It is important to highlight that we see noticeable regional differences in the relationship between both impact factors. While all German cities (Bremen, Bremerhaven, and Wennigsen) have the same degree of correlation, this pattern changes when we look at Spain or Austria. This indicates that local circumstances (i.e., the characteristics of the panel or the overall process; see Chap. 9) might increase or decrease the correlation between attitude and behavioral change. Bregenz is the only case that does not show the expected correlation. This can be explained by a combination of local panel and process characteristics: On the one hand, being the panel with the largest percentage of

Table 10.6 Correlation between attitude and behavioral change indices. (Source: Third survey of citizen panels)

Region	*N*	Rho
Bregenz	21	0.08
Mariazell	20	0.61**
Bremen	53	0.44**
Bremerhaven	24	0.43*
Wennigsen	39	0.43**
Pamplona	46	0.61**
Saragossa	123	0.30**

Rho Spearman's rank correlation coefficients
*$p < 0.05$; **$p < 0.01$

environmentalists, it started with the highest awareness and attitude levels regarding the need for climate protection, which left less scope for further increases; on the other hand, our data suggest that the relatively high extent of behavioral changes can be explained by the significantly higher levels of individual motivation and process support. Interestingly, as the relatively low community feeling among the Bregenz panelists indicates, the impetus for change seems to be largely individually based rather than being driven by collective mechanisms. These explanatory elements are empirically substantiated but not shown here in detail for lack of space.

10.4.1 Information Feedback Effects

As pointed out by Thaler and Sunstein's (2008) notion of the "gentle nudge," providing appropriate individual information feedback on a person's own energy consumption, together with the opportunity to compare personal outcomes with those of others, can serve as a trigger towards energy conservation. In the e2d project we expected that this combination of historical and normative information on a panelist's CO_{2e} emissions would have a similar potential to initiate a learning process and to stimulate a change of behavior towards more climate-friendly practices. Since the "gentle nudge" argument refers to a mixture of possible effects, the panel surveys include measurements on (1) the individual learning effects for climate-friendly behavior *(learning),* (2) whether the data provided has shown the relevance of personal consumption behavior for the individual CO_{2e} balance *(relevance),* (3) whether the data gives helpful hints on concrete starting points for behavioral changes *(guidance),* and (4) whether comparison with others encourages a reduction of CO_{2e} emissions *(comparison)*. Table 10.7 shows the correlation between the behavioral change index and these factors. As becomes clear in Table 10.7, in all three countries behavioral changes are to a certain degree linked to "gentle nudge" type effects. However, again the relationship varies within the countries where the panels were located. Before we move to details, it is advisable to keep in mind that due to the small number of cases we can only expect tendencies rather than significant figures in Austria. Regarding the overall learning effect from the continuous feedback of CO_{2e} data measuring individual behavioral consequences, we see a significant relationship with behavioral change in Germany and Spain. This illustrates that, in general, a higher degree of behavioral change is often accompanied by a

Table 10.7 Correlation between behavior change index and information effects. (Source: Second survey of citizen panels)

Country	*N*	Learning	Relevance	Guidance	Comparison
Austria	34–36	−0.02	0.32	0.25	0.25
Germany	102–103	0.24*	0.34**	0.29**	0.14
Spain	151–156	0.18*	0.09	0.08	0.17*

Rho Spearman's rank correlation coefficients
*$p<0.05$; **$p<0.01$

Table 10.8 Distribution of CO_{2e}-related information feedback index. (Source: Third survey of citizen panels)

Country	Index value	0	1	2	3	4	Total
Austria	*N*	5	13	9	8	6	41
	%	12.2	31.7	22.0	19.5	14.6	100.0
Germany	*N*	9	29	26	25	30	119
	%	7.6	24.4	21.9	21.0	25.2	100.0
Spain	*N*	17	32	44	65	15	173
	%	9.8	18.5	25.4	37.6	8.7	100.0

Additive index of information feedback item scores (see explanation above)

better understanding of its climate-related consequences. In terms of the relevance for personal consumption behavior and as possible starting points for behavioral changes (guidance) and their link to the behavioral change index, we see a convincing effect in Austria and Germany, whereas the Spanish panelists did not change their behavior on the basis of these factors. Finally, a comparison effect, that is, the encouragement of efforts through comparison with others is also present, although also showing rather weak relationships with behavioral changes.

While we have seen moderate relationships between the behavioral change index and general information feedback, the e2d panel data (survey 3) also provides information on the panelists' assessments of more specific aspects of the CO_{2e} footprint measurements: Whether continuous area-specific CO_{2e} footprint information was dispensable as a guide for where to change behavior, whether the possibility of comparing CO_{2e} footprints was important, whether comparative results of other participants led to increased efforts, and whether success in reducing CO_{2e} emissions motivated panelists to continue regular monitoring. For each question we created a dichotomous variable with 1 representing a strong information feedback effect (strongly/rather agree) and 0 representing no effect (rather not/do not agree). Based on these variables we generated an additive index which covers important dimensions of the "gentle nudge" hypothesis (maximum index value is 4). Table 10.8 displays the information index distribution across the three countries.

The pattern observed is similar to the previous findings in Table 10.7: CO_{2e}-related information effects could be detected in the panels in all three countries. The majority of all panelists show a medium or strong gentle-nudge effect (values 3–4). Nevertheless, we see that the figures for Germany and Spain are significantly higher than in Austria. This pattern is in accordance with the previous correlation between behavioral change and general information effects. In both cases the relationship is stronger in Germany and Spain, which suggests a somewhat lower role of information feedback elements overall in the Austrian panels, which can be explained by the comparatively stronger role of intrinsic motivation based on the higher percentage of environmentalists already mentioned above.

Table 10.9 Correlation between community feeling and behavioral change index

	t 1[a]		t 2[b]	
Region	*N*	Rho	*N*	Rho
Bregenz	19	−0.21	19	−0.03
Mariazell	17	0.05	15	0.33
Bremen	52	0.11	50	−0.06
Bremerhaven	22	0.03	22	−0.03
Wennigsen	32	0.15	32	0.28
Pamplona	43	0.30	38	0.10
Saragossa	113	0.04	116	0.09

Rho Spearman's rank correlation coefficients, *t 1* first measurement, *t 2* second measurement
*$p < 0.05$
[a] First survey of citizen panels
[b] Second survey of citizen panels

10.4.2 Social Learning and Community Effects

Since the literature shows that targeting individual consumers and using information-based approaches to change energy-related behavior achieves mixed results, Heiskanen et al. (2010) claim that a focus on the community level and the role of citizens would be more promising. The participation design established in the e2d project takes this into account and builds on collective local climate initiatives as joint efforts of major stakeholder groups. Citizen panels collaborating with local government were expected to provide the basis for community experience, social learning, social capital- and capacity building, which should support and facilitate behavior changes.

As an indicator of the extent of community building taking place, participants were asked twice about the extent to which they felt they were acting as part of a community: shortly after the start (first panel survey) and midway (second survey). Without showing the results in detail, the first measurement showed that between 35 % (Bregenz and Mariazell) and 75 % (Saragossa) of the panelists reported a very great or great extent of community feeling, and a substantial increase was observable in five of the seven panels at the second measurement. Interestingly, in Spain a higher level of community feeling developed with only a low number of face-to-face meetings. Assuming that strengthening social cohesion and that a mutual exchange between local communities would lead to an increase of individual efforts to mitigate climate change and also as a means of enhancing the backing, support and empowerment of individual intentions, we would expect that a higher degree of *community feeling* would also lead to a higher degree of behavioral changes. However, as Table 10.9 shows, at the time of the measurements we did not find a confirmation in terms of direct relationships.

At first glance, this finding might be surprising. The high share of onliners among the panelists (73.9 % at the start and 50.3 % at the end) and the remote nature of electronically mediated participation could be among the factors which work

Table 10.10 Correlation between social learning effects and behavioral change index. (Source: Second survey of citizen panels)

Country	*N*	Common issue learning	Exchange experience	Deliberation	Exchange good practice	Active contribution	Inclusivity
Austria	15–23	0.01	0.48*	0.34	0.32	0.05	0.20
Germany	49–57	0.27	0.13	0.23	0.01	0.26	0.24

Rho Spearman's rank correlation coefficients
*$p < 0.05$

against our expectations, but it seems more likely that community effects do not translate directly into behavioral change but are mediated by other elements. For strengthening the social coherence of a community the experience of face-to-face events and their frequency during the participation period are certainly helpful; however, the translation into pro-climate behavior depends on many more factors such as learning processes, exchange, and the backing of motivations for behavioral change.

In addition to community experience, we therefore take a closer look at social learning effects as another important causal mechanism for stimulating attitude and behavioral change. We assumed that providing opportunities for exchange and deliberation with other participants (e.g., at various events) can play a key role in this respect. To verify this, panelists were asked if (1) they had learned important facts at events *(common issue learning),* (2) if the exchange with others had revealed the importance of their individual behavior to them *(exchange experience),* (3) if they had learned from discussion with others *(deliberation),* (4) if they had learned from examples of climate-friendly behavior at events *(exchange good practice),* (5) if they took an active role in the exchange with others *(active contribution),* and (6) if their statements had been openly received by others *(inclusivity)*. Based on earlier research (see Chap. 7), we would expect a higher degree of behavior changes if the social learning and exchange practices were positively assessed.

The panel survey delivers information for Austria and Germany, but the low number of cases (about 50% less compared to similar analyses on country level in Table 10.7) means that we can only expect tendencies regarding social learning effects. As Table 10.10 shows, there is a statistically significant relationship, or at least a generally positive tendency, between social learning and the likelihood of the panelists' changing their behavior.

However, the results show that the magnitude of different effects varies at country and also at regional level. In Austria we see the tendency towards a higher degree of behavioral change as being linked to exchanging experiences with others, to deliberation, and to exchanging good practices at events. The strongest correlation values with behavioral change in Germany were found with regard to common issue learning and making an active contribution to the exchange with others. However, not all factors vary between Austria and Germany. In both countries deliberation with others seems to have an impact on behavioral change; the same can be said, albeit to a lesser extent, about a climate of inclusivity in the group.

Table 10.11 Correlation between community effects and behavior change index. (Source: Second survey of citizen panels)

Country	*N*	Barriers removed[a]	Efforts strengthened	Further community activities
Austria	31–39	0.20	0.42*	0.31
Germany	102–120	0.31**	0.12	0.21*
Spain	152–168	0.35**	0.14	0.06

Rho Spearman's rank correlation coefficients
*$p<0.05$; **$p<0.01$
[a] Third survey of citizen panels

While data on the social learning variables are missing for the Spanish panels in Table 10.11, we can compare all three countries with respect to one other important social learning aspect. In fact the *exchange on CO_{2e} footprints* with other panelists shows one of the strongest relationships of all the social learning effects to behavior change in all three countries: highly significant correlations[8] in the Spanish (0.33) and German (0.29) panels and also a positive tendency (0.24) in Austria. This finding also shows social learning effects in Spain which are in line with the previous findings for Austria and Germany. It suggests that the effectiveness of attempts to change individual behavior based upon information instruments profits from being embedded in a collective process and crucially depends on the regional and local implementation of the process.

Finally, a further question in the analysis of community effects is whether participation in collective climate initiatives and the strengthening of social cohesion supported the overcoming of barriers on the part of individuals (e.g., lack of transport alternatives, access to advice, financial support, etc.) and whether it strengthened individual and collective activities. If this was the case, we would expect a higher degree of behavioral changes to take place. The panel survey provides information on how participants evaluate the contribution of the collective initiative to alleviate (personal) *barriers* to pro-climate behavior, to strengthen individual *efforts,* and to enforce the importance of *further activities* against climate change.

Before looking at the relationship between community effects and behavioral changes, we provide a short descriptive overview. When asked to evaluate the general potential of a collective effort to alleviate individual barriers in the survey midway through the process, the majority of the panelists in all cities gave very positive assessments. To the same extent, panelists agreed that the common initiatives also strengthened their individual efforts to change climate-relevant habits. In both cases the Spanish panels showed significantly higher percentages of positive replies (around 80%). The question on the need to conduct further common activities for climate protection turned out to differentiate insufficiently (95% of all panelists agreed on its importance). However, the question on barrier-removing effects was taken up again in a more concrete, personal form in the third survey at the end of the participation processes. It asked panelists to assess whether "the joint efforts of the climate initiative have helped (you) to overcome personal barriers to climate-

[8] *Rho* Spearman's rank correlation coefficients; $p<0.01$.

friendly behavior." The extent of positive replies to the question on the participants' own experience was much lower than those received in the previous survey on assessing the general potential to alleviate barriers for individuals: On average 46 % strongly agreed or rather agreed, again to a significantly higher extent in Pamplona (56.5 %) and Saragossa (66.4 %). Nevertheless, this assessment of the community's contribution to reducing barriers on a personal level, after up to two years of collective initiative experience, suggests that it did help to remove barriers to some extent but also clearly shows its limits. We now proceed to inspect the correlation between the community effects described and the behavioral change index (Table 10.11).

The results confirm a positive relationship between behavior change and the three specific community effects for practically all countries involved; some correlations are highly significant. This holds especially for the direct relationship between a contribution in the form of the removal of personal barriers and behavioral changes. In addition, the stimulation of personal effort through the common initiative goes hand in hand with behavioral change, as indicated by the high correlation figure for Austria and the positive though weaker relationships for the two other countries. This finding is noticeable insofar as the small sample size was unlikely to yield significant values. Finally, we also see a positive relationship for the third variable for both Austria (0.31) and Germany (0.21) but not for Spain: Panelists who attach much importance to conducting further community activities for climate protection such as the one experienced show a higher extent of behavioral changes. In sum, this pattern among the findings lends empirical support to the hypothesized positive contribution of community-related effects to pro-climate behavioral change.

10.5 Conclusions

This chapter analyzed the extent to which a particular participation design around citizen panels in the e2d project led to increased awareness of climate-relevant consequences of everyday practices and changed attitudes as well as behaviors so as to support climate protection through low-carbon lifestyles. Seven similarly organized citizen panels in Austria, Germany, and Spain, collaborating over up to 2 years with governments at local level on the target to reduce CO_{2e} emissions by at least 2 % per year, were the centerpieces of collective local initiatives. One common core element was the regular monitoring of individual consumption activities by the panelists and feedback of information on CO_{2e} impacts for each of the five everyday activity categories, which allowed a comparison of the outcomes over time as well as with the panel and the national average. Two further core elements were access to various forms of information supporting steps towards CO_{2e} reduction and the provision of issue-specific local events, meetings, and other opportunities for exchange.

For all these participation activities, panelists could either use traditional media and face-to-face contacts or e-participation. Based on the relevant literature we expected that the unique combination of continuous individual CO_{2e} monitoring with information feedback and community engagement over a sufficiently long pe-

riod would have positive impacts on promoting both climate-relevant attitudes and behavior. The main results from three waves of surveys among the seven citizen panels (at the beginning, middle, and end of the processes) can be summarized as follows:

The empirical analysis shows that pro-climate awareness, attitude, and behavior changes have taken place during the participation processes in all panels although to different degrees. While a high increase of climate awareness and pro-climate attitudes was observable and could be attributed to the participation exercises, changes of behavior did not occur to the same extent. This is partly explained by behavioral changes that already took place before the participation exercises (e.g., in the field of water consumption), partly by the difficulties of changing social practices (e.g., nutritional habits) and local context conditions (e.g., transport options). However, in view of these constraints, an overall change of climate-relevant behavior of about 20% of the change potential on average as measured by the total change index is definitely noteworthy. The pattern of behavior changes largely confirms the existing literature and the "low-cost hypothesis" in particular. While differences in the behavioral changes tend to be related to context conditions in each region, regional differences in attitude changes are more related to panel characteristics at the start of the processes and characteristics of the local processes themselves. For example, the significantly higher attitude change among the panelists in Spain is made plausible by the comparatively lower profile of knowledge and interest in climate change at the start than in all other regions, whereas the characteristics of the panel in Bregenz displayed the opposite pattern.

In almost each region the results showed a relatively strong positive link between attitude and behavior change; however, they also indicated that attitude changes are not the only factor for behavioral changes and attitude change does not necessarily translate into behavioral change to the same extent. Since the changes observed rest on specific assumptions on causal mechanisms and mediating factors, the empirical analysis was also intended to shed light on the role of these. One part concerns the role of individual information feedback effects ("gentle nudge"), another one relates to collective social action aspects (community and social learning effects); the participation exercises rested on a combination of both. Moderate "gentle nudge"-type effects of the participation processes on behavior changes were confirmed for all three countries, although to a lower degree in Austria. In regard to the contribution of community factors, the majority of the panelists reported a community feeling and a substantial increase over time; nevertheless, the data do not substantiate a direct effect of community experience on behavioral change. However, a number of community-related factors were positively related to behavioral change, such as common issue learning, deliberation, exchange of experience, particularly on the topic of CO_{2e} footprints and good practice as well as the personal experience of effort enhancement and the removal of barriers through community support.

The fact that the participation processes lasted up to 2 years and that all seven exercises had identical contents and were similarly organized provide a firm basis for the comparative analysis. The empirical evidence based on longitudinal evaluation leads us to the conclusion that attempts to change individual behavior towards pro-

climate lifestyles through individual information feedback are more effective when they are embedded in a collective process such as joint local initiatives as participatory exercises. However, much depends on the regional and local implementation of the process, the participants' motivational profile, their abilities, and the support and change options available to them on their way from "carbon capability" (cf. Whitmarsh et al. 2011) to a carbon neutral society.

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Chapter 11
Citizen Panels on Climate Targets: Ecological Impact at Individual Level

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Abstract There is hardly any valid empirical evidence on whether citizen participation has an impact on the desired objectives. This chapter provides an answer to this question, taking as example seven citizen panels on local climate targets in Austria, Germany, and Spain within the e2democracy (e2d) research project. The citizen panels were part of collaborative (e-)participation processes of citizens and businesses with local governments aimed at reducing carbon dioxide equivalents (CO_{2e}) by at least 2 % per annum over a period of up to 2 years. After the first year, the majority of panelists in the five Austro-German panels achieved or surpassed the target; in both Spanish panels, less than half did so; after the second year, the percentages of target achievers somewhat declined. So, even though many participants achieved their reduction target, a considerable number of participants did not reach it or reduced their efforts in the second year. Across all seven panels, savings could particularly be achieved in the heating energy and electricity sections. In the fields of nutrition and consumer goods, there were even cases where emissions increased. For the mobility fields of private and public transportation as well as flights, no homogeneous tendencies could be observed among the panels. Overall, even though the size of countable CO_{2e} reductions was not that high, citizen panels were particularly successful in achieving a reconsideration of the panelists' lifestyles and habits and, to some extent, encouraged effective change processes.

11.1 Introduction

One of the objectives of the e2democracy (e2d) research project was to determine whether participation in citizen panels focusing on climate action may have any impact on the development of the participants' CO_{2e} balances.[1] This chapter in-

[1] Further information on this evaluation of collaborative e-participation within the e2d project (e.g. theoretical assumptions, research design, research instruments) is provided in Chap. 7.

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troduces the ecological impacts at *individual* level, that is, how many participants improved their own CO_{2e} balance by at least 2% per annum (p.a.) and the areas of everyday life in which they did so and in which they did not. By contrast, the next chapter in this book (Chap. 12) will present the ecological impacts of the seven citizen panels in terms of changes in the amount of CO_{2e} emissions of each panel and assesses whether the *collective* target of 2% savings of CO_{2e} per panel and year was achieved. The panels were located in the Bregenz and Mariazell regions (Austria), Bremen, Bremerhaven, and Wennigsen (Germany), and Pamplona and Saragossa (Spain). The main data source is the panelists' CO_{2e} balances over time (based on bimonthly individual monitoring); additional information comes from surveys among the panelists. Certainly, the development of a panelist's individual CO_{2e} balance is not only dependent on the marks and nudges set by the panel activities. A citizen panel is not a closed system; rather, panelists are exposed to many influencing factors from outside. Hence, changes in the development of a person's CO_{2e} balance need not necessarily originate from a change of attitude and behavior due to their participation in the panel but also from other factors. Examples include the need to fulfill social norms, cultural characteristics, and systemic and structural constraints like changing weather conditions or the available public traffic infrastructure. Last but not least, individual context conditions such as longer absence from home or changing family or working conditions also have their impact. However, to mitigate such unpredictable and unstable factors, the individual monitoring results have been combined with results of the accompanying regular panel surveys (Chap. 10)[2] and qualitative personal feedback gathered from panelists during up to 2 years of monitoring. This procedure will allow us to attribute behavioral changes to impulses from the citizen panels.

The chapter is structured as follows: Sect. 11.2 outlines theories of individual behavior change which are summarized in Wilber's four-quadrant model (2000) with corresponding empirical results. Section 11.3 presents the main results in cross-regional comparison, that is, the percentage of those panelists who achieved their 2% reduction target after 1–2 years of monitoring. Section 11.4 deals with the question of the areas of everyday life in which it was more likely for panelists to achieve a reduction of CO_{2e} emissions, and in which less and why. The chapter closes with a concluding summary of the impact on individual CO_{2e} balances in the seven citizen panels.

[2] Important differences between measurements by the carbon calculator and panel surveys need to be born in mind. They concern sample size and nature of questions: carbon calculator data are based on 419 cases in total and quantitative measurements of consumption aspects; relevant results of the third panel survey ask for extent and type of behavior changes and go back to 316–333 respondents in total.

11.2 Theoretical Background and Context Information

Citizen participation in environmental issues has experienced increased relevance in the recent past. This is, for instance, indicated by the concept of *environmental democracy* (Aichholzer et al. 2012; Hazen 1997) and the various engagement opportunities around climate change adaptation and mitigation (Edwards et al. 2008; Carson 2010; Höppner and Whitmarsh 2010; Bechtold et al. 2012). However, citizen participation in environmental issues differs from engagement in other fields: In order to achieve sustainable solutions through public participation in climate action issues, long-term changes in individual attitudes and lifestyles have to be achieved (Lorenzoni et al. 2007). Thus, one of the key research questions of the e2d project was whether citizen participation (particularly the form of citizen panels) can help to solidly establish climate action and sustainability in citizens' perception, values, and behaviors. The question is based on the assumption that a profound change which includes attitudes and lifestyles at individual and collective levels and comprises ecological, economic, social, and cultural changes is required. The rationale behind the specific participation design based on citizen panels in e2d builds on a combination of *individual* and *collective* action elements: Together they are expected to induce and support a sustainable change to pro-climate attitudes and behavior, and ultimately a reduction of CO_{2e} emissions. Issue-relevant information and *individual* consumption monitoring with feedback providing for individually tailored information and guidance are meant to encourage behavior reflection and change through "gentle nudges" as postulated by Thaler and Sunstein (2008). Through the citizen panels, these processes are embedded in *collective* local initiatives with opportunities for exchange and community, social capital, and capacity building to take effect (cf. Heiskanen et al. 2010), and to provide for social backing and reinforcement of individual commitments and endeavors to reorient behaviors toward reducing carbon emissions.

Whether and to what extent participation in the citizen panel actually leads to a change to pro-climate behavior and a reduction of CO_{2e} emissions is determined by several factors at different levels, in particular at individual, process, and wider context level. These can be neither described purely technologically, sociologically nor justified solely psychologically. A brief outline of theoretical strands intends to show the different factors that may influence a person's behavior.

Changes in behavior are measured in e2d by evaluating whether panelists have improved their individual carbon balance or not, and if so whether they have achieved the 2% p.a. savings target, improved below the target, or worsened their balance. Moreover, participants were also analyzed on the basis of their changing behavior as regards attitudes and lifestyle (see Chap. 10). However, the participation format not only had to provide the arena to facilitate these changes, it was also dependent on the ecologic, economic, social, and cultural contexts in the participating cities and regions. There are some models and theories in research focusing on explanations of action and behavior change that describe causal determinants

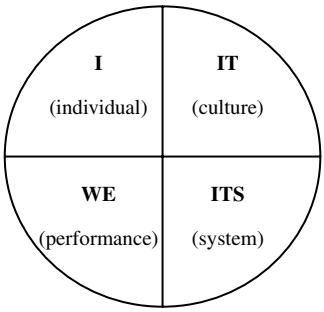

Fig. 11.1 Illustration of the four-quadrant model (adapted from Wilber 2000)

and mechanisms.[3] One of the basic intervention models is the needs-opportunities-abilities (NOA) model of consumer behavior by Vlek et al. (1997), summarized in Darnton (2010): Needs together with opportunities form *motivation,* and opportunities together with abilities form *behavioral control*. Both motivation and behavioral control create the intention that triggers *consumer behavior*. Another fundamental theory used in environmental research is the "theory of planned behavior" of Ajzen and Fishbein (1980). This theory assumes that a behavioral intention is formed depending on three constructs: "(1) the attitude toward the behavior, (2) the subjectively observed social pressure to carry out or to leave the behavior in question (subjective norm), and (3) the subjectively perceived possibilities or difficulties, as the case may be, of carrying out the action in question" (translated from Baumgartner 2004, p. 83). The model of Fietkau and Kessel (1981) adds to this the aspects of concrete behavior options to guide behavior and action incentives as further and most important influencing factors (cf. Hellbrück and Fischer 1999, p. 559; Fliegenschnee and Schelakovsky 1998, p. 46 ff.).

These intervention models and theories contain action motives from within the individual (e.g., attitudes for their own sake) and that are externally influenced (e.g., social norms set by the world outside). The intervention models and theories provide ideas for explaining the empirical findings although in e2d it was not possible to provide data on all the influencing factors mentioned. The four-quadrant model of Wilber (2000) serves as a conceptual frame of reference that integrates the elements and factors highlighted in the different models and theories (Fig. 11.1).

On the basis of Wilber's model, there are four dimensions of change. If behavior change is to be triggered, influencing factors from these four dimensions have to be considered: individual (e.g., skills and expertise, attitudes), performance (e.g., interaction, relations, and behaviors), culture (e.g., collective, common world view, and norms), and systems (e.g., larger environment, stakeholder networks, and structures).[4] The achievement of the 2 % reduction target is subject to influencing factors on all four quadrant levels. Although not all factors could be considered in the analysis of the panels, the basic approach serves as a framework in order to

[3] For further information on such theories particularly relevant for the field of climate action, please consult Chaps. 3, and 13.

[4] Further information can be found in Wilber (2000).

explain whether improvements in the individual carbon balances of panelists have been achieved or not.

11.2.1 Individual Dimension

The individual dimension concerns the internal view on attitude and behavior forming. This mainly includes social, psychological, and economic factors that form the values and attitudes toward climate action. Some of them will be briefly outlined here. First, it can be assumed that citizens interested in participating in e2d find climate change worrying or are convinced that climate change is taking place and at least in part is caused by human activity. According to the e2d panel surveys, their commitment to environmental issues motivated more than 90 % of respondents to actively take part in the project on climate change mitigation. Also more than 90 % found climate change worrying. These findings were made throughout all seven citizen panels without significant regional differences.

When panelists were asked for their opinion of who was responsible for reducing CO_{2e}, a more differentiated picture emerged. Panelists had to allocate nine points in total among the three major societal groups: citizens, businesses, and public authorities/policy makers (state). The more points they assigned to one of these groups, the more responsibility lay with this group, in their opinion. They could split the points between one, two, or all three groups. Table 11.1 shows the mean distribution of points given by panelists.

In four of seven panels and in total, panelists see the state as having most responsibility (3.3 of 9 possible points), followed by businesses (3.0) and citizens (2.7). Thus, even though there is a high commitment to environmental issues among panelists, in Austrian and Spanish panels it was the state that was seen as bearing most responsibility, and often followed by the business sector. The panels in Germany rated this aspect differently. Here, the highest scores were attributed to citizens (Bremerhaven and Wennigsen) or businesses (Bremen). This pattern is con-

Table 11.1 Share of responsibility for achieving CO_{2e} reduction targets attributed by panelists. (Source: First survey of panel members)

Who do you think is responsible to what extent for achieving the CO_{2e} reduction targets? Distribute 0–9 points	*N*	Citizens mean	Businesses mean	State mean
Bregenz	27	2.8	3.0	3.7
Mariazell	23	3.3	2.8	3.4
Bremen	88	2.6	3.3	2.8
Bremerhaven	29	3.5	3.1	3.0
Wennigsen	46	3.2	2.9	2.7
Pamplona	75	2.6	2.8	3.7
Saragossa	186	2.5	2.9	3.5
Total	474	2.7	3.0	3.3

sistent with larger cultural differences: Austria and Spain have a tradition of state dominance and reliance on the state whereas the city-states and regions in Northern Germany are known for a well-developed civic culture and strong civic self-esteem (cf. Kubicek and Croll 2008). The high rating for business responsibility in the Bremen panel, however, seems to be a result of ongoing debates whether the high CO_{2e} emissions caused by the local steel mill are to be included in the city-wide CO_{2e} balance, thus hiding any improvements made by private households, or not. Hence, the basic attitude toward politics of citizens in a country may set the frame, but local conditions can ultimately influence the public opinion of local groups. Here, a typical phenomenon becomes visible as a tendency: Although participants are committed to pro-environmental issues and have climate-friendly attitudes, a considerable percentage sees the state or businesses having prime responsibility to act; that is, *the others* should do their share first (see also European Commission 2014; Kuckartz 2010). For the targets of the e2d project, this meant that much emphasis had to be put on the motivation of panelists to continue participating in the panels.

Socio-demographic Composition of Panels In environmental research, the focus of analysis has increasingly shifted to the field of lifestyle research. Certain attitudes and preferences are more effective in certain milieus and, thus, influence climate-relevant action. In accordance with Höppner and Whitmarsh (2010, p. 48), "human engagement with climate change may be understood as a person's state of connection to climate change, and comprises different though interconnected aspects: cognitive, emotional and behavioral." Lifestyles of panelists as such were not the focus of e2d research. However, basic socio-demographic data were gathered from the survey questionnaires and matched where possible with the monitoring data gathered through the CO_{2e} calculator. Table 11.2 gives an overview of the basic composition of the panels at the time of the baseline measurements. The following characteristics are considered: gender (male, female), age (< 30, 31–50, and 51 + years), parenthood (children vs. no children), education (compulsory school, secondary school, and university degree), and employment status (employed, not

Table 11.2 Composition of the citizen panels—basic socio-demographic characteristics. (Source: First survey of panel members)

	N	Gender % male	Age % 51 and older	Children % yes	Education % university degree	Occupation % employed
Bregenz	29	41.4	65.4	74.1	37.0	66.7
Mariazell	24	58.3	78.3	78.3	9.1	39.1
Bremen	89	53.9	45.5	54.6	75.6	64.0
Bremerhaven	29	62.1	55.2	93.1	35.7	62.1
Wennigsen	52	50.0	66.0	88.0	59.6	54.0
Pamplona	82	39.0	45.0	71.8	55.7	66.3
Saragossa	209	54.1	51.0	63.4	40.5	47.1
Total	514	51.2	52.4	68.6	49.0	55.4

employed). Local deviances from the general trend became apparent, for example, concerning age: in nearly all panels, the largest group of participants is consisted of those who are 51 years and older (only the Pamplona panel deviates from the general trend with the group aged 31–50 dominating). The patterns regarding the other characteristics are quite varied among the seven panels. With few local exceptions, slightly more men took part in the panels. The mean age is somewhat above the average age distribution in the three countries and, partly as a consequence, also the percentage of panelists with children is quite high and above average for many panels. The widest range could be found in education, and with an average of 49 %, the share of academics is well above the corresponding figure in the local populations, except for the Mariazell region. More than half of the participants were in employment while others were already retired, went to school, or stayed at home.

Some of these results were also found in other studies. For example, the Eurobarometer studies (European Commission 2009, 2014) or Kuckartz (2011) underpin the notion that it is the better educated, white-collar workers who regard climate change as more important and who are more often engaged in environmental issues. However, according to the Eurobarometer survey, more females took action toward fighting climate change or seem to be more concerned than men. The age distribution also differs. According to the Eurobarometer surveys (European Commission 2009, 2014) and Kuckartz (2011), older people and people who stay at home are less interested and concerned by environmental issues. In e2d, the age composition varies from a "young" panel in Pamplona where only 45 % are above 50 to the Mariazell region where about 78 % are of this age. Overall, more than half of the panelists are over 50 years old. Thus, at least regarding age and education, the panels are not representative for the national or local population. However, as the development of the CO_{2e} balances at the collective level (Chap. 12) shows and as will be detailed later on, the above-average share of academics and middle agers has not led to significantly higher CO_{2e} reductions or better results.

11.2.2 Behavioral (Performance) Dimension

The relevance of values and attitudes for behavior change is obvious (Ajzen and Fishbein 1980). But as shown in Chap. 10, a considerable percentage of the panelists did not act consistently. One reason is that panelists are different, that is, they have diverse values, opinions, resources, and constraints. They tend to follow their interests in accordance with their current needs. Needless to say, engagement in a citizen panel competes with other preferences in life. Not all interests can be followed by individuals to the required extent, as their time is limited. Compared to many other engagement opportunities, however, engagement in environmental issues has a particular disadvantage. Ecologically sensible ways of action are often both unfamiliar and require increased efforts and, thus, are likely to turn out to be so-called "high-cost activities" (Michelsen 1991, p. 16). In accordance with the low-cost hypothesis by Diekmann and Preisendörfer (1992), high-cost activities require extra endeavors

by individuals to undertake a certain activity or to change their prevailing behavior. "The lower the cost pressure in a situation is, the easier the actors find it to translate their environmental attitudes into the corresponding behavior. Conversely, the importance of the attitudes decreases if the situation involves larger demands on behavior" (translated from Diekmann and Preisendörfer 2001, pp. 117 f.).[5] Many people are prepared to engage in activities that do not cause much cost, but only few go beyond and start activities that require a real change of behavior (Maibach et al. 2009; O'Neill and Hulme 2009; Whitmarsh 2009) and that entail CO_{2e} reductions to a greater extent. This finding can also be observed in the e2d panels. Even though panelists define the transition between low-cost and high-cost activities differently, there are tendencies that allow for such generalization in e2d.

One of the basic instruments employed in e2d that meant to trigger behavior change was monitoring and feedback using a CO_{2e} calculator (for details, see Chaps. 7 and 8). Comparative feedback was meant to inform citizens on the development of their individual carbon balances, of that of the other panelists, and subsequently to inspire behavior change. As to be expected, about 70 % of reporting panelists answered that their individual success in CO_{2e} reduction motivated them to keep on monitoring their own behavior. Moreover, more than 61 % rated the comparison functionalities with the carbon balances of other participants in their panel as being important. In light of these views, one would have expected different results for the Spanish as compared to the Austro-German panels (because of a restriction in the Spanish carbon calculator's functionality). But surprisingly, for both questions (except for the Bregenz panel), no significant differences could be observed among the seven panels. This result is in accordance with the findings of several intervention studies and reviews that in summary determined that feedback—in particular when given frequently—has proven its merits and was successful in reducing energy use, including in the long run. Smart meters that automatically give direct feedback on household energy consumption have achieved reductions in the range of 4–20 % (e.g., Abrahamse et al. 2005; Darby 2006; Ehrhardt-Martinez et al. 2010; Gleerup et al. 2010; Schleich et al. 2011).

11.2.3 Cultural and Systemic Dimensions

To explain differences among the citizen panels in the three countries, alongside reasons from the individual and behavioral dimensions, social context factors are also relevant. According to Wilber's (2000) model introduced above, first and upmost are the social norms that may support or hinder the change of individual behavior. In research as well as in the practitioner community[6], there is a growing

[5] See also the related section on the low-cost hypothesis in Chap. 12.

[6] E.g. grassroots innovations such as the transition towns initiative (Website: http://www.transitionnetwork.org/ [Accessed November 5, 2014]) or the Carbon Reduction Action Groups (c.f. Whitmarsh et al. 2010; Feola and Nunes 2013; Neal 2013).

commitment that it is not only individual attitudes that have to be addressed through activities aimed at behavior change in environmental issues but also the context in which citizens live (e.g., Hornik 1997; Kollmuss and Agyeman 2002; Steg and Vlek 2009). Social and cultural contexts frame and constrain behavioral choices and "are particularly critical for collective resource dilemmas such as climate change" (Rabinovich et al. 2010, p. 67). Social norms describe what people normally do or what behavior is common or desired in a specific cultural or social context (cf. Schultz et al. 2007). "Because people measure the appropriateness of their behavior by how far away they are from the norm, being deviant is being above *or* below the norm" (Schultz et al. 2007, p. 430). Schwartz's norm activation model attributes a key role to the fulfillment of social norms in order to explain altruistic behavior (Schwartz and Howard 1981). The social norm is of a moral quality and, transferred to an ecological context, represents a person's deep conviction that they are making a personal contribution to mitigating climate change (Hunecke et al. 1999, p. 13). For example, panelists in e2d could consider it their civic duty to do something against climate change (cf. Kuckartz 2009, p. 4) or they could take up competition by actively contributing to CO_{2e} reduction in order to become more climate friendly than their neighbors. Even if failures are reported,[7] field experiments that called upon social norms evidenced success in target achievement (Kuckartz 2009, p. 429).

The seven citizen panels were designed to establish compliance with the social norm of sustained pro-climate behavior in their city or region. A first approach was that the citizen panels provided space for information exchange and discussion among participants, at local level as well as to some extent also between the panels in the three countries. Together with the monitoring instrument, this enabled group formation and generated team spirit toward reaching the same goal (see Chap. 10). Moreover, the panels provided the arena for comparing and discussing their own achievements with those of others and set a certain benchmark that offered orientation, that is, a kind of norm for panelists. In accordance with Hinding (2002, p. 58), this allowed knowledge deficits to be compensated for and for support for everyday practices to develop. Thus, appealing to pro-climate social norms had a positive impact on the attitudes and behavior of panelists.

Systemic influences on the participation processes in e2d mainly concern geographic and climate conditions as well as questions of available infrastructure and its use. Another example where national peculiarities become apparent is the salience of the climate issue. When looking for city partners before the start of the e2d project, it soon became apparent that water shortage is a more prominent problem directly facing citizens in Spain than the need for energy savings or CO_{2e} reduction. In accordance with the Kyoto Protocol (Aachener Stiftung Kathy Beys 2014), Spain was allowed to increase its CO_{2e} emissions until the year 2012 (+15 % compared to 1990) while Austria and Germany had to reduce them (−13 and −21 %, respectively). Moreover, due to increasing dry weather particularly in summer, Spain regularly faces water shortages. The need for water saving in Austria and Germany does

[7] As regards the reported failures, the wish for status (recognition) and the belonging to a social milieu can also favor value systems respectively social norms that are harmful to the environment.

not directly result from water shortage but from the principle of the efficient use of resources. Hence, it is not surprising that water saving is more popular in Spain than reducing CO_{2e}. So finally, values and attitudes or behavior changes are influenced by several and diverse context factors that may shape a common understanding and may trigger the wish for compliance with the social norm of sustained pro-climate behavior.

11.3 Individual CO_{2e} Reduction in Cross-Regional Comparison

11.3.1 Extent of Target Achievement

Continuous CO_{2e} monitoring (see Chap. 8) enabled panelists as well as organizers to keep track of changes and to see whether individual balances had improved over time or not. Figure 11.2 presents a first overview of the main results. It shows the share of those who achieved the target to reduce CO_{2e} emissions individually by at least 2 % p.a. (bottom part of the bars) for the first and second year per citizen panel. The middle part of the bars shows those who improved below the 2 % target. The upper part represents those who failed to improve.

Overall, the results are positive, particularly when the developments in the first year in the Austro-German panels are considered. In these panels, the majority achieved or surpassed the 2 % reduction target. The range of target achievers extends from 59 % in Bremen to 74 % in Wennigsen. The results for Pamplona and Saragossa are different; here, about 38 and 46 %, respectively, achieved their goal.

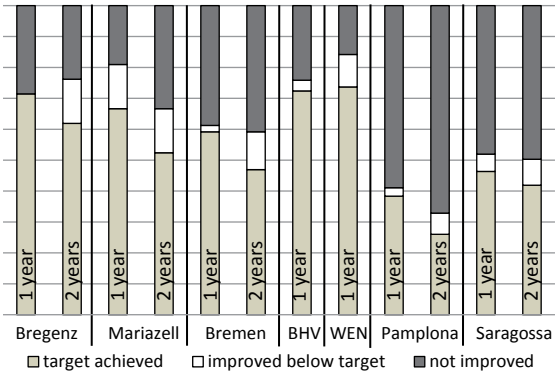

Fig. 11.2 Percentages of panelists who reduced their CO_{2e} emissions by at least 2 % p.a. ("target achievers") per region and monitoring period (due to a late start of the citizen panels in Bremerhaven (BHV) and Wennigsen (WEN), the monitoring periods there were limited to 18 and 12 months, respectively). N Bregenz: 21, Mariazell: 21, Bremen: 49, Bremerhaven: 29, Wennigsen: 38, Pamplona: 73, Saragossa: 179

For the second year of monitoring, however, the shares of target achievers decreased to a range of between 26 % in Pamplona and 62 % in Bregenz, which indicates that it was generally more difficult to achieve further emission reductions or to maintain the efforts in the second year.

This is important for the question of the suitable length of the participation period for achieving sustained impacts. Indeed, one of the research questions in e2d was whether longer participation periods contribute to better results, that is, to a further decrease of CO_{2e} emissions. Longer participation periods are expected to support the establishment of new habits by repetition and, thus, assist the transformation of these habits into daily routines. Recurring engagement in the topic of climate action, whether discussion, taking action, or simply reading the panel newsletter, may prevent relapse into old routines. Besides, longer monitoring periods are needed as it takes some time until habits change or investments in climate action technologies take effect and can be observed through the monitoring and feedback functionalities. Moreover, longer participation periods are also necessary for methodological reasons as the impact of natural seasonal variations may be balanced by several subsequent years.

The outcome for the second year was received with some disillusionment by the organizing public authorities, the research team, and also the panelists. Even though the majority of the Austro-German panels achieved the target in the first and second year, a considerable percentage of the panelists did not improve their balance. Moreover, none of the panels managed to transform the commitment of their participants from the first year into continuous CO_{2e} reductions to the same extent again in the subsequent year. This may have several reasons: *First*, individual attitudes and behaviors are manifested by repetition and by daily routines. Attempts to change one's beliefs and intentions could be less effective if they do not consider the persistency of established habits. Bas Verplanken argues that successful habit-change interventions involve breaking through routines by disrupting contextual factors that automatically cue habit performance (Whitmarsh et al. 2010, p. 8). As mentioned before, attempting to change contextual factors would have overburdened the e2d research project. *Second,* participation periods of up to 2 years are very long and good arguments are needed to keep the participants active that long. Nevertheless, participants understood this length as being necessary to experience seasonal and annual changes, to achieve a valuable feedback, and to trigger behavior changes: more than 84 % rated the duration as adequate. However, it is quite demanding for organizers to keep motivation high over longer time periods, particularly in times when people prefer short-term participation modes expressed, for example, in ad hoc flash-mobs or online petitions and avoid long-term commitments that restrict their individuality. It is only logical that participants were lost over time as not all panelists share the same interests or can take the same time for participation activities. *Third,* it was not possible to exactly meet the individual needs and preferences of all panelists concerning their state of affairs regarding climate action. Anyhow, the nudges set by the participation design were successful in some cases. To some extent, group activities continued even after the panel activities had officially ended: Regular meetings that support the e2d targets were established in

all three German panels; Saragossa still supports its group of volunteers that had already been collaborating on local public issues for years, now on new aspects of climate action; and in the Mariazell region, municipal governments have joined a climate alliance which promises to reinforce the grassroot-level activities of local panel members.

11.3.2 Results per Consumption Area

A closer look at the achievements in individual areas of everyday activity provides a more detailed picture. Concentrating on the first year, Fig. 11.3 presents the results per citizen panel and per consumption area: heating, electricity, mobility (private car, public traffic, and flights), nutrition, and consumer goods. Per citizen panel, for each consumption area, the shares of target achievers, that is, the percentage of those who reduced their CO_{2e} balance by 2% or more, are summed up to one bar. As there are seven consumption areas, the maximum range of the scale for target achievers would be 700% (i.e., if all panelists had achieved a 2% reduction in each area). Individual sections from bottom to top of each bar read as follows, for example, for Bregenz: 71% of all panelists reduced their CO_{2e} emissions in the heating sector by 2% or more, 62% in the electricity sector, 33% in the private car section, and so forth.

Panelists in Wennigsen most frequently achieved the 2% reduction target in the various consumption areas, followed by Bremerhaven, Bremen, Mariazell, Bregenz, Saragossa, and, finally, Pamplona. For the Spanish panels, it has to be noted that the panelists' baseline emissions were much lower in Pamplona and Saragossa than for the Austro-German panels. Obviously, and for logical reasons, the lower the starting emissions are, the more challenging it is to achieve further savings (for details,

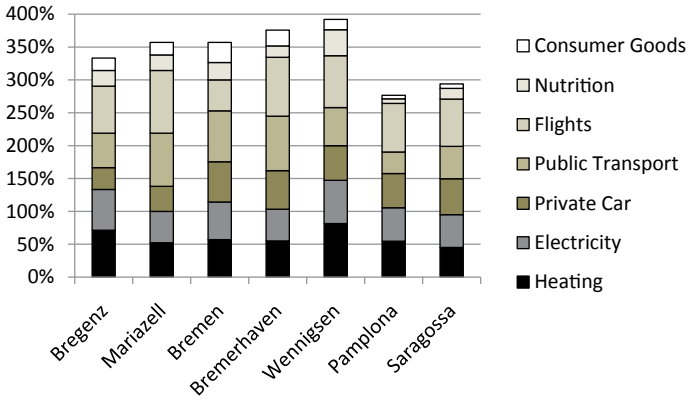

Fig. 11.3 Target achievers (CO_{2e} reduction by 2% or more) per consumption area after 1 year (in %). N Bregenz: 21, Mariazell: 21, Bremen: 49, Bremerhaven: 29, Wennigsen: 38, Pamplona: 73, Saragossa: 179

see Chaps. 8 and 12). Other explanations for the differences have to be sought in the different types of panel organization and panel support. As detailed in Chap. 7, panels were organized and maintained by different organization types and offered different information and exchange opportunities. Particularly, the CO_{2e} calculator and the feedback facilities implemented in the Spanish panels differed from those used in the Austro-German ones (see Chap. 8). Still the answers to survey questions on the general publicity of the climate initiative, the information material provided on energy saving and CO_{2e} reduction, the offers for personal advice on energy saving, etc., did not reveal significant differences between the panels. A small but important exception is the assessment of the range of information events and other meetings. Here, the organizers of the Austrian and German panels provided more opportunities than those in Spain. This is reflected in the high level of satisfaction with the range of events in the Austro-German panels (85 and 81 %, respectively) and lower rates in Pamplona (49 %) and Saragossa (65 %). Another perhaps more relevant difference in the participants' assessments in the Spanish panels concerns the attitude toward the effects of the continuous information about their own carbon balance (individual feedback). Spanish panelists attributed less importance to this aspect. Only 24 % of participants in Saragossa and 26 % in Pamplona found the continuous information about their carbon balance helpful, compared to 65 % in Austria and 71 % in Germany. Presumably, this reflects a disadvantage of the Spanish CO_{2e} feedback as feedback on the participants' own carbon balance was only available while they were entering data. Afterward, it could not be accessed until the next time they entered data, whereas for Austro-German panelists their carbon balance was continuously provided on their personal project web space or was mailed to offliners. Thus, another reason for the considerable differences between the success rates in Figs. 11.2 and 11.3 is to be seen as the lack of continuous access to the individual feedback and the resulting attitude of Spanish panelists that in their view feedback was of less importance. Despite these differences and the broad range of target achievers, there are obvious common features in the characteristics of the seven citizen panels:

- Smaller panels yielded better results.
- Smaller panels were located in smaller cities and regions, or in rural or rather remote geographical areas.

Reasons for these common features are in particular to be seen in socializing effects that can be achieved better in small groups. Mariazell and Wennigsen were the smallest municipalities within the seven regions considered. Many panel participants knew each other before the citizen panel started and were recruited by word of mouth via cultural associations, and particularly in Wennigsen by sharing the same train journey to work. Thus, on the one hand, group effects could be achieved more easily in that activities could be approached together and motivation to compare each other was higher. On the other hand, a kind of pressure was created by social control. To behave in accordance with the target achievement could become an important aim for panelists. By contrast, the panels in the bigger municipalities tended to suffer from potential anonymity. Here, it was easier to lose sight of the climate

saving targets as often there were fewer opportunities to regularly talk about these issues or compare target achievement and efforts with others face to face. It is not by accident that modern group activities striving for change in environmental contexts like the transition town initiative make it their own goal to bring the rural into urban contexts, that is, to transfer well-functioning pro-environmental activities that work well in small groups and that originate in the countryside into cities that were not used to dealing with them before.

11.4 Areas of Improvement and Deterioration

Generally, participants were encouraged to decrease their CO_{2e} emissions in all activities of their daily life, that is, in all of the different consumption areas. In the following, the focus is on the balance of changes in each area, again for the first year. Figure 11.4 presents the results per area, pointing out areas of improvement or deterioration by the majority. This is crucial, since it is not automatically the case that if people save energy in their home, they will also save energy in the mobility sector or that they will live a sustainable lifestyle in general. For a better visualization of which consumption area has developed better and which less, the percentage of those panelists who have improved their carbon balance minus those who have failed to improve is displayed. The share is presented in percent per panel and the shares of all seven panels are totaled to one bar per consumption area (theoretically, this total could again reach a maximum of 700 %). The higher the bars, the more panelists improved in these areas. For example, in the heating area, in Bregenz 18

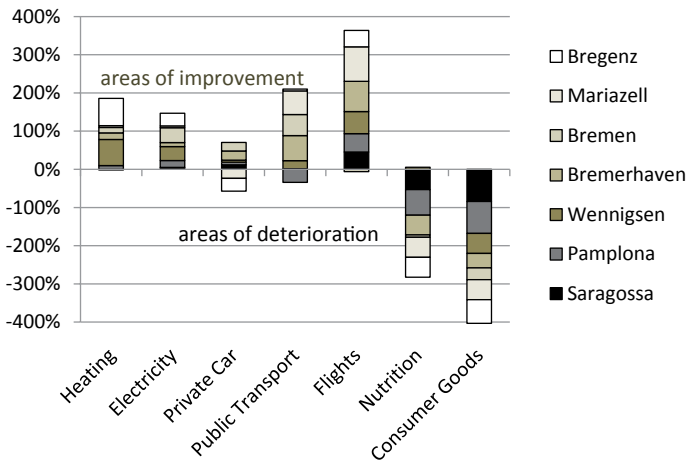

Fig. 11.4 Areas of improvement and deterioration per citizen panel in the first year percentages based on the balance of panelists who reduced CO_{2e} emissions and those who increased them, summed up across regions for each area. N Bregenz: 21, Mariazell: 21, Bremen: 49, Bremerhaven: 29, Wennigsen: 38, Pamplona: 73, Saragossa: 179

panelists reduced and 3 increased their emissions. Hence, on balance, 15 out of 21 panelists (18 − 3 = 15) can be counted as a positive net contribution to the reduction of CO_{2e} emissions in the heating sector. This corresponds to approximately 71 % of the panelists from Bregenz (top section in the bar for heating area). The balance figures have been calculated for the other panels in the same way. Since lower balance figures are depicted by often very small bar sections, Fig. 11.4 visualizes orders of magnitude rather than showing exact percentage differences. Two cautionary notes seem to be appropriate: First, results for the smallest panels (Bregenz and Mariazell) need to be read with special caution because the small *N* tends to produce biased percentage figures; second, CO_{2e} calculations are most complex in the areas of nutrition and general consumption and changes are only captured in rough terms as they suffer from a lack of exact measurability.

As Fig. 11.4 shows, panelists were particularly successful in the fields of heating energy and electricity. The positive bar sections for all panels show that there were more panelists who improved their balance than those who worsened it. More mixed results were achieved for the mobility section. The developments for *private car* are characterized by more improvements in the German and Spanish panels and more deterioration in the Austrian ones. With the exception of the Pamplona panel in the *public transport* domain and the Bremen panel in the *flights* section, the majority of panelists improved their CO_{2e} balances in these areas. The *nutrition* and the general *consumer goods* areas are clearly different from the other areas: Here, in all panels, the cases where the carbon balance deteriorated seem to outnumber those with improved records (except for Bremen in nutrition). But what are the reasons for these different results? The following sets out some reasons for the different sections.

11.4.1 Heating Energy and Electricity

The various forms of nudges set by the panel activities allowed for countable carbon reductions and relate to the areas of heating energy, electricity, and water consumption. These are the areas where (compared to, e.g., mobility or nutrition) data gathering was rather simple and exact. Thus, saving effects could easily be observed by comparing the consumption data with results of recent periods (see Chap. 8). Moreover, panelists' activities in these areas can predominantly be assigned to the low-cost categories. For example, more than one third of panelists indicated in the final assessment survey that they had changed their electricity behavior from standby to switching off their electrical appliances completely when not in use. Even more stated that they had changed their ventilation habits from permanently open hopper window to completely open window for only few minutes. At first sight, this seemed to be a success across the seven panels. However, considering the type of habits and changes, these are clearly no great effort and have to be allocated to low-cost changes. Moreover, such changes are associated with energy savings and hence are also driven by financial benefits.

11.4.2 Mobility

The case of mobility is different. All three types of transport mentioned (private car, public transport, and flights) are connected with each other. Changes in one sector may have impacts on the other. Besides, the most pro-environmental types of mobility, walking or cycling, are not counted in carbon balancing (as they do not emit carbon emissions). But all four sectors have to be considered together when mobility behavior is concerned. Several context factors become important. A survey result on the change of behavior from private car to pro-environmental means of transport will serve as explanation (see Table 11.3):

The answers varied considerably among the seven panels. Differences can again be explained by the low-cost hypothesis in relation to the public mobility infrastructure available in the seven cities and regions. The bigger cities of Bremen, Bremerhaven, Pamplona, and Saragossa offer different and more frequent public transport systems than the smaller ones. Bremen and Saragossa even operate tramway services. Certainly in these cities, a high share had already started using public transportation earlier or changed to public transport due to their participation in the panel. Cycling is also much more attractive in these cities, since they provide special cycle lanes and these areas are rather flat and without steep hills. The Mariazell region, a mountainous rural area, is most different to the others. Public transportation is rather infrequent and less popular. Distances and time required for work-related travel often make going by car the only option. Moreover, the higher age of panel members in Mariazell was an additional barrier to using a bicycle. These characteristics are mirrored in the survey results. Wennigsen, even though also a town in a rather rural area, has a high share of changers and of those who had already used pro-environmental transportation before. The reason is that many citizens of Wennigsen work in Hannover, one of the biggest German cities. A frequent and fast train connects both towns. Moreover, some panelists carpooled. Hence, the available mobility infrastructure can support or limit behavior change. In other words, the less developed the pro-environmental mobility infrastructure is, the higher is the efforts and costs for changing individual behavior. Overall, the numbers of those

Table 11.3 Behavior change in the mobility sector due to panel participation. (Source: Third survey of panel members)

I take the bicycle, bus or train more often instead of going by car. Citizen panel in…	*N*	No, I do not %	Yes, since my participation %	I already started this earlier %
Bregenz	21	0.0	66.7	33.3
Mariazell	21	57.1	23.8	19.1
Bremen	58	12.1	19.0	69.0
Bremerhaven	23	8.7	39.1	52.2
Wennigsen	39	18.0	38.5	43.6
Pamplona	46	19.6	28.3	52.2
Saragossa	122	23.8	32.8	43.4

who changed their behavior following and as a result of their participation in the panel are quite substantial. About one third of all respondents managed the change even if for many it turned out to be a high-cost activity.

As far as the public transport is concerned, it is astonishing that most panelists achieved CO_{2e} reductions in this section. However, of all areas, a decrease of emissions in the public transport area could be more a poor indicator than a good one. In order to be environment-friendly, distances travelled by car or plane will be replaced by public transport or even by bike or just walking. This means that emissions by public transport are supposed to increase as those of motorized individual traffic decrease. But as can be seen in Chap. 12, in the majority of cases, private car and airplane CO_{2e} emissions also increased during the monitoring period. Since merely considering CO_{2e} balances may hide transformation processes from individual traffic to public or pro-environmental means of transport, a closer look has been taken of this issue. However, a correlation test between improvers in the private car section and those who deteriorated in the public transport domain did not reveal the expected or hoped-for results; no significant relationship could be observed between those who reduced their car emissions and those who increased their public transport CO_{2e} emissions and vice versa. Thus, it was not possible to achieve this important aim of the local climate initiatives.

Regarding flights, the Bremen panel is the only one where there was more deterioration of carbon balances. This deviation from the trend may be explained by the fact that Bremen is the only one of the seven cases with a city airport that offers meaningful flight connections. Even though Pamplona and Saragossa also have airports, flight connections are limited to national destinations only (Pamplona) or are only provided by a small number of carriers with limited flight destinations (Saragossa). It is not that convenient for the participants of most panels to take a flight since they have to travel longer distances to reach the nearest airport with meaningful flight activity.

11.4.3 Nutrition and Consumer Goods

As explained in Chap. 8, the calculation of individual CO_{2e} emissions in the nutrition and consumer goods section is much more complex than, for example, in the heating or electricity domain. Hence, calculator questions were less detailed and calculations were based on certain assumptions that finally led to less precise individual results. And, as detailed above, small panel sizes may bias the results. This should be borne in mind when interpreting the results. The results show that nutrition and consumer goods were the fields where the performance was least good. Except for the Bremen panel, more panelists' carbon balance deteriorated here. One reason for the better performance of participants from Bremen is that these—compared to the six other panels—indicated that they were most interested in the food topic in the regular panel surveys. Of respondents, 76 % ranked nutrition as an area of interest in Bremen, compared to an average of 48 % in all seven panels. This high

Table 11.4 Change in nutrition behavior due to panel participation. (Source: Third survey among panel members)

Nutrition: I have reduced my meat consumption. Panels in…	*N*	No, I have not %	Yes, since my participation %	I already started this earlier %
Austria	41	17.1	41.5	41.5
Germany	120	20.8	29.2	50.0
Spain	168	42.9	26.2	31.0

interest may have supported their willingness to change and led to better results in this area. However, anyone who ever started a diet knows that changing nutrition habits is clearly to be counted among the high-cost activities. Moreover, as shown in Table 11.4, the question of meat consumption—compared to many other habits—is to a certain extent related to national peculiarities and cultural traditions.

Bearing in mind the unrepresentative panel composition with an excess of rather well-situated citizens, often academics and ecologically minded persons, a high percentage of panelists in Austria and Germany had already reduced their meat consumption before the panel started and during the monitoring period.

Hence, finally, approximately 80% of Austro-German panelists showed a pro-climate meat consumption behavior before or since the panel started. The situation is different in Spain. Eating meat still seems to be deeper seated in cultural traditions than is the case in Austria and Germany. Changing a common culture or traditions is a longer process and demands regular stimuli. According to the above-mentioned four-quadrant model of Wilber (2000), culture belongs to the interior-collective or the "we" level. Culture and traditions embody social norms and certainly influence individual choices. For Spanish panelists, changes in meat consumption are more to be seen as a high-cost activity than was the case for the Austro-German panelists. The calculation of the emissions through consumer goods in general is to a large part dependent on the entries in the other sections (see Chap. 8) and will not be detailed here. It seems that, within a consumer society, the citizen panels were not successful in changing general consumption values and behavior more thoroughly.

11.4.4 General Findings on Low-Cost and High-Cost Action

In addition to the costs of changing behavior, panelists were also confronted with the costs of data collection for the bimonthly monitoring. A large share of the savings in the areas of electricity, water, and heating energy consumption can be attributed to the monitoring and feedback. Such consumption data can be monitored directly and mostly without problems. More difficult and of a rather high-cost nature, however, are activities in the mobility section. Panelists had to keep records on their daily trips taken by private car and public transportation. Moreover, they had to calculate their individual kilometer share if they travelled with several people in one car. Thus, data gathering, particularly in the mobility section, could turn out to be complicated and hence was high cost for many panelists. Data collection for the

nutrition and consumer goods section is not only time-consuming but also costly. Keeping track of the purchases and everyday meals could be a task for the whole family and required absolute continuity of efforts.

Surprisingly, the areas in which most panelists were able to improve their CO_{2e} reductions and in which they have failed to improve tend to be similar in all seven panels. National peculiarities such as climatic and weather conditions that have a particular influence on the heating and electricity consumption or different participation cultures with, for example, the long-standing group of volunteers among the panel in Saragossa, regular group meetings in the Austro-German panels or community size do not seem to have played the expected key roles. Categories for low-cost and high-cost activities were frequently perceived in the same way independent of the country or municipality of origin. Rather it was the cultural and systemic context factors (see Wilber's four-quadrant model) that made it particularly difficult for panelists to break away from their own routines. External context conditions such as the lack of appropriate pro-climate alternatives, as, for example, in the mobility sector, are one factor that influences the individual assessment of what is a high-cost and what is a low-cost activity. Another factor is the growing necessity to save water rather than to reduce CO_{2e} in Spain, and cultural traditions. A further influence is the intense identification of panelists with the milieu they live in and with its own social norms that do not necessarily need to comply with the social norms of sustained pro-climate behavior.

11.5 Conclusions

According to the American economists Thaler and Sunstein (2008), who adopt the position of libertarian paternalism, it is the task of choice architects to design environments appropriately in order to compensate for perception and motivation deficits as mentioned in this chapter with regard to pro-climate behavior. A specific participation format based on a citizen panel in collaboration with public authorities was meant to fill this gap. Individual feedback to participants in the citizen panels was designed to initiate and monitor pro-climate action and climate-friendly behavior. But as described, a change of behavior is not only dependent on the monitoring of the participant's own consumption but also dependent on the systemic, cultural, and social contexts in which he or she lives, its prevailing individual attitudes and habits, and, finally, its will for change. There is absolutely no general choice architecture that is able to find a pro-climate path through all these prevailing contextual requirements. Even more, the environmental behavior of individuals is heterogeneous and not consistent. The results of the cross-regional comparison of the seven panels and the differences in the performance of the seven consumption areas reflect these complex dependencies. Nevertheless, some common patterns could be found.

Concerning the target achievement of reducing the individual carbon balance by at least 2% p.a., the panels within each country developed rather similarly. There were three clusters, with the German panels performing best, closely followed by

the Austrians, and, finally, those from Spain. Overall, however, the share of those who achieved their reduction target is only slightly higher than that of those who did not, particularly when the second monitoring year is considered. Common patterns could also be found related to size and location of the towns. Citizen panels in small and rural areas developed better than in bigger and urban cities. Similar developments were also found within the consumption areas. The at-home sections of heating energy and electricity developed best. Here, the majority of participants in almost all panels improved their carbon balance. Data collection in these sections was rather simple and permitted a valid carbon calculation using the CO_{2e} calculator. The situation is different in the mobility section with a nonuniform development among the panels and the various transport means. Even though carbon calculation based on distances covered by different means of transport is reliable from a scientific point of view, data collection was costly for panelists and was based on bimonthly estimates rather than on actual distances covered on a daily basis. Moreover, the calculation of the development of the flight emissions was handicapped by the limited monitoring facilities of the Austro-German CO_{2e} calculator that did not allow for exact entries in the baseline measurement. Thus, the results in this area need to be interpreted with care. Further similarities could be found in the nutrition and consumer goods sections. Here, in almost all panels, only a minority achieved a reduction of individual CO_{2e} emissions, and the majority failed. However, here too, methodological constraints need to be considered in the interpretation of the results. From a scientific point of view, CO_{2e} calculation in both areas is most challenging due to the lack of reliable emission factors. Thus, common CO_{2e} calculators can only provide basic indicators that do not allow for exact calculation but only for roughly estimated tendencies. Moreover, the small panel sizes, particularly in Austria, may bias the results as outliers may have an overrepresented effect. Thus, here too, results need to be interpreted with care.

However, it is clear that "there is a need for basic information provision to overcome lack of knowledge about climate change and its implications for individuals. For those willing to mitigate climate change, this will encourage them to channel their energies into appropriate activities" (Lorenzoni et al. 2007, p. 454). In this respect, nudges set by comparative monitoring and other panel activities increased panelists' knowledge, their reflection on their own lifestyle, and in many cases also led to a change of attitudes and behavior. However, as the results also show, it is only a small majority who improved in actual energy savings and CO_{2e} reduction during the up to 2 years of monitoring. Moreover, the implementation of low-cost activities was in the foreground and perhaps only few took significant steps toward a low-carbon lifestyle. This is despite the fact that in the surveys a majority claimed to be interested in the actions individuals can take to address climate change mitigation.

What is also surprising is that in the second year of participation fewer participants achieved a further CO_{2e} reduction than in the first year. Even though longer participation periods may prevent relapse, this also means that either longer participation periods are of no additional value compared to shorter engagement periods or new inspirations must continuously be set to trigger further improvements. We also learned that systemic influences and cultural norms play a key role.

In accordance with Lorenzoni et al. (2007, p. 445), we would argue that "targeted and tailored information provision should be supported by wider structural change to enable citizens and communities to reduce their carbon dependency." The citizen panels were not meant to change external context factors. However, the participation design enabled group formation and the panels were able to foster compliance with environment-friendly norms, a precondition for a transition to sustainable development in a local community.

During the past few years, attention to CO_{2e} and climate change mitigation and adaption has certainly increased. If we want to further develop the awareness and responsibility of citizens, businesses, and municipalities, successful public involvement programs need to address the systemic, cultural, social, as well as individual (cognitive, conative, and affective) requirements of a transition toward sustainable societies (cf. Weber 2008, p. 241). The e2d research design was not oriented toward an in-depth study of socio-ecological and environmental-psychological aspects. The citizen panels certainly may have helped overcome initial resistance at some point, but a more grounded assessment of this must be a task for further research. However, both from survey results and through continuous exchange with panelists during data collection, panel meetings, and the provision of telephone support for any question panelists had, an increased degree of sensitization for climate change mitigation could undoubtedly be observed. Most panelists started by making initial changes; some did more, some less. But all panelists addressed the subject of climate action, and even if no direct activities were initiated, they at least started to reflect on their own behavior. This might be more than the majority of citizens normally do.

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Chapter 12
Citizen Panels on Climate Targets: Ecological Impact at Collective Level

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Abstract The objective of this chapter is to ascertain whether the cooperation of citizens as participants of citizen panels has had a positive impact at collective level by contributing to the achievement of a 2 % annual reduction in the carbon dioxide equivalent (CO_{2e}) emissions in their city or region. This chapter discusses several challenges that emerged in the course of the analysis. These challenges suggest that a combination of different methodological approaches is the best option to assess the ecological impact of the citizen panels on the collective level. Results show that, depending on the kind of calculation, some panels met the reduction targets completely, others partially, and one did not at all. However, reductions in CO_{2e} are the general trend, even in those panels that fail to achieve the target. So, altogether, improvements of the CO_{2e} balances on the collective level have been achieved. An important finding is that the results of the panels (improvements or deteriorations) are the same after 1 year of measuring and after 2 years. So learning results are obtained in a single year and longer climate participation processes do not seem to be suited to achieving further savings, but to preventing relapse.

12.1 Introduction

The main objectives of the e2democracy (e2d) project are to investigate the possibilities for evaluating the impact of citizen participation and to analyze whether there is any difference between traditional and Internet-based forms of participation. As explained in Chap. 7, the instrument employed is citizen panels, set up in seven cities and regions in Austria, Germany, and Spain. The policy field of climate

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change has been chosen because of the assumption that the impacts of participation can be measured more easily and accurately by counting the kg CO_{2e} (carbon dioxide equivalent) emitted by the panels during the participation period of up to 2 years. No comparable measurement scales exist in other areas where participation is common, such as in the field of urban planning or participatory budgets.

In the broad field of climate protection, experiences with feedback functionalities aimed at the reduction of household energy consumption and related goals (e.g., waste reduction and choice of environmental friendly traffic mode) are already available. According to Thaler and Sunstein (2008), carbon reductions can be achieved by small but precise nudges at citizens that steer their household energy consumption in the targeted direction. High expectations are currently placed on feedback mechanisms in the household energy consumption domain. Recent studies arrived at mixed results, depending on the type of feedback used, the duration of the field trials, and the type of information provided, with reduction potentials in the range of 4–20 % (Abrahamse and Steg 2005; Darby 2006; Ehrhardt-Martinez 2010; Fischer 2008). A recent field experiment carried out within the social ecological research on so-called smart meters in about 2000 households in Austrian and German municipalities put the aforementioned findings into perspective, as they only revealed 3.7 % of savings (Schleich et al. 2011). Similar results with about 3 % savings were disclosed in a study carried out in Denmark (Gleerup et al. 2010). According to Darby (2006), the more effective feedback programs targeting the reduction of energy consumption include direct feedback measures such as self-meter reading, frequent interactive feedback (e.g., via PCs). Indirect feedback (e.g., billing) in combination with targeted information tends to be better suited to help households understand the effects of changes. Some kind of competition (e.g., which panel achieves the highest household energy reductions) and the possibility of comparing the results of participants may trigger further savings (Thaler and Sunstein 2008), as evidenced in a field trial by the EcoTeam Program which came very close to the design of the e2d project (Abrahamse and Steg 2005, p. 280; Staats et al. 2004, p. 357). It seems that activities that combine different intervention strategies are promising as regards sustainably reducing energy and changing behavior in several domains (Abrahamse and Steg 2005, p. 280).

However, in the field of climate change, there are also difficulties in how performance is measured and accounted for (Cooper and Pearce 2011). Issues raised by previous research include concerns about measurement, control, and accountability. Comparisons among cities are difficult, mainly for two types of reasons: objective ones (such as different local climate conditions and national energy mix) and different methods used to calculate emissions (CEPS 2010; OECD 2010).

The question to be answered in this chapter is whether the cooperation of citizens as participants of citizen panels has had a positive impact by contributing to their city's or region's objective of reducing CO_{2e} emissions by 2 % per year. To provide an answer to this research question, we will present and discuss the results of the CO_{2e} monitoring in the seven panels on a collective level, that is, as the average of the individual CO_{2e} balances discussed in Chap. 11. As explained in Chap. 8, the data gathered from participants are self-reported by entering figures from meters, by

reporting kilometers for different kinds of mobility, and by choosing among a few categories for nutrition and consumer goods consumption.

In the course of analysis, several challenges emerged concerning the comparability of the results of the seven panels. The main challenges which have to be considered in answering the research question are as follows:

- Different CO_{2e} calculators were employed in Austria and Germany, on the one hand, and Spain, on the other hand (see Chap. 8).
- The panels started at different points in time and were carried out for a different time span (see Chap. 7).
- Because of a high variation of the CO_{2e} emissions within the panels, in some cases the average calculated by the arithmetic means yields different results than the average calculated by the median. Therefore, we will present both calculations in our analysis.
- Individual flights by some of the members of a panel are a main factor that distorts the average of a panel. Therefore, we will present the CO_{2e} emissions and savings with and without emissions caused by individual flights.

The next section presents the data sources used in this chapter. Taking all the aforementioned challenges into account, the research question is answered in two steps. First, the collective CO_{2e} emissions and savings for each of the seven panels over time are presented by considering the reduction achieved by comparing arithmetic means and medians, with and without flights (Sects. 12.3–12.5). We will see that some panels met the reduction targets completely, others partially, and one did not at all, depending on the kind of calculation. These sections are mostly descriptive and illustrate the methodological problems encountered. Then the chapter continues (Sect. 12.6) with the comparative analysis on the level of three consumption areas: *at home* (heating and electricity), *mobility* (private car, public transport, and flights), and *nutrition and consumer goods*. The different achievements in these areas are partly explained by differences in the context of the seven cities and regions in the three countries, as well as by what could be learned from panelists. These explanations are not exclusive, as they also have to be seen in light of other factors known from sociology and environmental psychology as influencing CO_{2e} relevant behavior. The chapter closes with a summary of the impact on CO_{2e} emissions in the seven citizen panels.

12.2 Data

The main foundations of analyses are the CO_{2e} balances per citizen panel over time. As described in Chap. 11, CO_{2e} balances have been calculated for each participant. These individual CO_{2e} balances have been added to a collective CO_{2e} balance, one for each citizen panel. Only the balances that contained complete data over 1 or 2 years were used for the analysis. Otherwise, results would be skewed inadmissibly. CO_{2e} balances are subject to natural variations, mainly depending on changing

energy demands during the four seasons. For example, in the winter months, CO_{2e} emissions caused by heating and electricity contribute to an increase of the balance curve. In the months of summer, CO_{2e} emissions from heating are rather zero, while emissions from (holiday) traffic increase. To compensate for these seasonal variations during the year, only the CO_{2e} emissions of panelists participating for 1 or 2 full years could be considered. In five of the seven panels (Bregenz, Mariazell, Bremen, Pamplona, and Saragossa), we can resort to 12 periodic measurements (2 years of monitoring), whereas in two of the panels (Bremerhaven and Wennigsen) data are only available for six periodic measurements (1 year of monitoring). Comparing 2 years with 1 year of monitoring allows us to determine whether longer participation periods yield better results in terms of CO_{2e} reduction and change of habits than shorter periods.

12.3 Development of Total CO_{2e} Balances over Time in the Seven Citizen Panels (Arithmetic Mean)

The average CO_{2e} balance of a typical citizen is different in each country and year. The level is dependent on, for example, the economic structure, the energy flows, and geographical characteristics. According to KlimAktiv (2013) and the European Environment Agency (2013), the average CO_{2e} balance for a 2-month period of a citizen in Austria was at about 1.72 tons (t) CO_{2e}, 1.84 t in Germany, and 1.28 t in Spain.[1] The balances of the seven panels in the e2d project mirror these general emission levels: The three German sites have the highest balances, followed by the two Austrian and, finally, by both Spanish panels with the lowest emissions. Wennigsen takes the lead with the highest CO_{2e} emission levels closely followed by the panel in Bremerhaven and, with some distance, the Bremen panel. The Austrian sites, Bregenz and Mariazeller Land, show similar emissions levels, which are significantly lower than those of Bremen. Finally, the Spanish sites of Saragossa and Pamplona show comparably low emissions.

A series of underlying and interlinked factors help to account for the different contributions of urban areas to CO_{2e} emissions, both within and across countries (Romero-Lankao 2012, pp. 12–13). The first is the geographic and climatic situation. For instance, latitude determines a city's need for more or less energy to run air-conditioning and heating systems within its buildings. The economic base of a city is the second, with "heavy industrial" cities, having much higher carbon emissions per capita than financial centers. Urban form and density are other determinants. Spatially compact urban developments offer several benefits: reduced costs for heating and cooling result from smaller homes and shared walls in multi-unit dwellings, lesser line losses related to electricity transmission and distribution, and reduced average daily vehicle-kilometers travelled. However, as regards private traffic use, urban density is not the only explanatory factor: transport accessibility

[1] For context factors see also Chap. 7.

Table 12.1 Development of CO_{2e} balances over time (arithmetic mean, in t CO_{2e})

City	N[a]	CO_{2e} balance at start	CO_{2e} balance after 1st year	Changes in 1 year (%)	CO_{2e} balance after 2nd year	Changes in 2 years (%)
Bregenz	21	1.612	1.513	−6.1	1.490	−7.6
Mariazell	21	1.645	1.597	−3.0	1.598	−2.9
∑ Austrian sites	*42*	*1.629*	*1.556*	*−4.5*	*1.544*	*−5.2*
Bremen	49	1.750	1.737	−0.8	1.749	−0.1
Bremerhaven	29	1.896	1.767	−6.8	–	–
Wennigsen	38	1.906	1.802	−5.5	–	–
∑ German sites	*116*	*1.829*	*1.766*	*−3.9*	–	–
Pamplona	73	0.860	0.946	+10.0	0.944	+9.8
Saragossa	179	0.970	0.933	−3.8	0.924	−4.7
∑ Spanish sites	*252*	*0.938*	*0.937*	*−0.1*	*0.930*	*−0.9*

[a] Number of panelists with at least six periodic measurements in Bremerhaven and Wennigsen, and 12 periodic measurements in Bremen, Bregenz, Mariazell, Pamplona, and Saragossa

and pedestrian friendliness, attitudes and preferences also influence driving behavior. Socioeconomic factors such as income, levels of education, and household size also play a key role (see Romero-Lankao 2012, p. 13).

All these factors influence the CO_{2e} balances reported in Table 12.1. For example, as regards climatic conditions, significant differences can be found among the sites participating in this project. In the Spanish cities, the average temperatures throughout the year are 15 °C in Saragossa and 12.5 °C in Pamplona, respectively. The average maximum temperatures in the hottest months are 31.5 and 27.8 °C, whereas the average lows in January are 2.4 and 1.2 °C, respectively. By contrast, the average yearly temperatures in the Austrian and German cities are much lower at about 9–10 °C in Bregenz, 6–7 °C in Mariazellerland, and 8–9 °C in Bremen, Bremerhaven, and Wennigsen. The number of average hours of sunlight is also lower in the Austrian and German cities, which also have lower average temperatures in summer and winter than Spain. All this translates into higher heating and electricity demands, and higher CO_{2e} emissions, in the Austrian and German panels, as evidenced in Table 12.1. In addition to the development over time of the average CO_{2e} balances in absolute figures, Table 12.1 also shows the corresponding savings or deterioration rate (in percent) achieved after 1 and 2 years of monitoring, compared to the baseline measurement.

As can be seen, even though there is some variation, all panels except the one from Pamplona achieved a reduction in their emissions. The results vary from 6.8 % savings in the first year in Bremerhaven to 10 % deterioration in Pamplona. Five out of seven citizen panels (Bregenz, Mariazell, Bremerhaven, Wennigsen, and Saragossa) achieved the 2 % savings target in the first year. Bremen improved below the 2 % objective, and Pamplona deteriorated. In the second year of measurement, no noticeable improvements have been achieved compared to the results after 1 year. None of the panels has achieved another 2 % savings in the second year. The maximum savings reached were about 1–1.5 % in Saragossa and Bregenz. The panels in Mariazell, Bremen, and Pamplona rather stagnated in the second year.

Taking years 1 and 2 together, only the panels in Bregenz and Saragossa reduced their emissions by more than 4 %. The Mariazell panel improved by about 3 %; the panel in Bremen remained more or less on the same level as in the baseline measurement, and the one in Pamplona deteriorated by almost 10 %. Hence, considering the target of 2 % savings per year, none of the panels succeeded by this criterion in the second year. Only Bregenz and Saragossa were successful overall, but only through bigger savings in the first year that helped achieve the 4 % target over 2 years.

In the following, the development of CO_{2e} emissions over time in the seven citizen panels is presented on a country level. Section 12.6 further explains the developments in the CO_{2e} balances per consumption area, once the different approaches to calculating savings and deteriorations have been used.

12.3.1 CO_{2e} Results in the Austrian Sites

The two Austrian panels ran between May 2010 and April 2012 (Mariazell) and July 2010 and June 2012 (Bregenz). The results for the panels from Bregenz and Mariazell are illustrated in Fig. 12.1 and Table 12.1.

The bars in Fig. 12.1 show the overall size of CO_{2e} emissions separated into their sources, compared between the two sites as well as with the Austrian average. The column on the right marks the average CO_{2e} balance of a citizen in Austria for a 2-month period in 2010 (1.72 t CO_{2e}). As can be seen, both panels improved their balances during the 2-year period and Bregenz more than Mariazell. Both panels started and ended with measurements that are clearly below the Austrian average (dotted line). It indicates that participants in Bregenz and Mariazell were already relatively engaged in environmental issues. Developments in heating and mobility are especially remarkable. Much improvement was achieved in the reductions of CO_{2e} emissions caused by heating systems (second part in the columns seen from

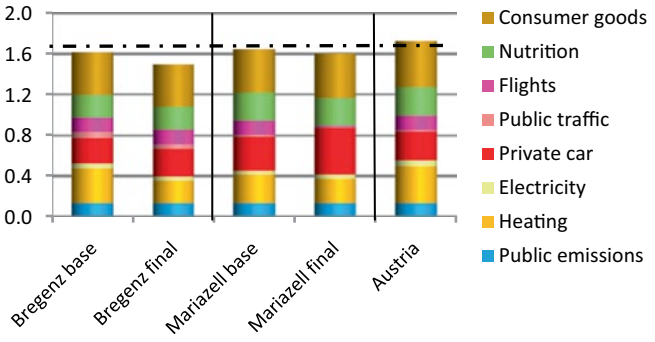

Fig. 12.1 Comparison of CO_{2e} balances of the two Austrian sites before and after monitoring over 2 years (arithmetic mean, in t CO_{2e})

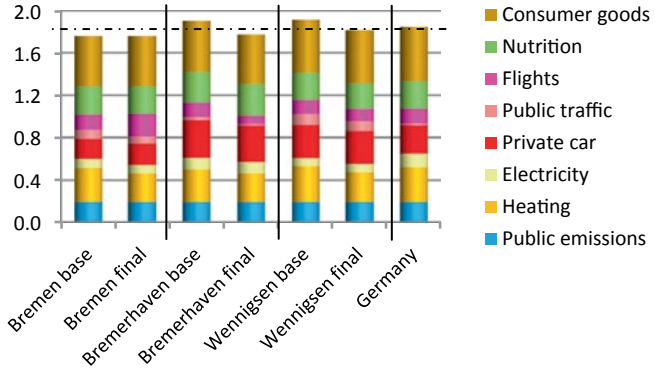

Fig. 12.2 Comparison of CO_{2e} balances of the three German sites before and after monitoring over 1–2 years (arithmetic mean, in t CO_{2e})

the bottom). By contrast, CO_{2e} emissions caused by private traffic (private car) increased significantly (fourth part in the columns seen from the bottom).

12.3.2 CO_{2e} Results in the German Sites

In contrast to the citizen panels in Austria and Spain, all three German panels ran over different time frames. The results for the three German sites are illustrated in Fig. 12.2 and Table 12.1. The column on the right marks the average CO_{2e} balance of a citizen in Germany for a 2-month period by 2010 (1.84 t CO_{2e}). As can be seen, the panels in Bremerhaven and Wennigsen started with a balance higher than the German average, but both panels improved after 1 year of monitoring, finally achieving a balance better than the German average. Bremen started and ended with a better balance than the German average, but only improved slightly through the 2-year period. The biggest differences among the three German sites become visible with regard to heating, private cars, and flights. As in Austria, the three German sites have significantly improved their emissions related to heating. As regards private cars (fourth part in the columns seen from the bottom), Bremerhaven has significantly improved, whereas Bremen has deteriorated and Wennigsen has remained more or less at a similar level. Finally, regarding flights Bremen has worsened significantly, whereas Bremerhaven and Wennigsen have significantly improved.

12.3.3 CO_{2e} Results in the Spanish Sites

The results for the panels in Pamplona and Saragossa are illustrated in Fig. 12.3 and Table 12.1. In contrast to Austria and Germany, where the IFEU provides data about average carbon emissions per citizen (KlimAktiv 2013), at the time of the project

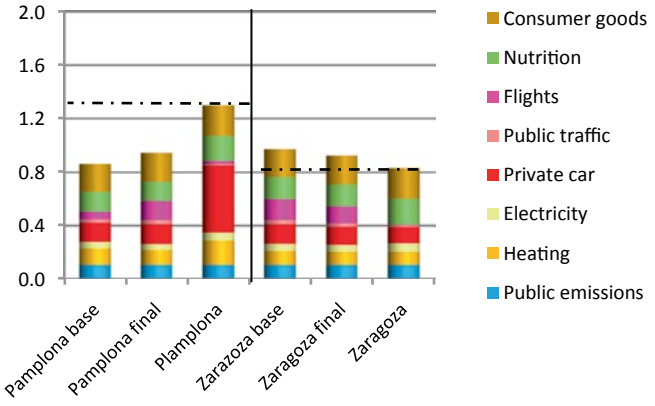

Fig. 12.3 Comparison of CO_{2e} balances of the two Spanish sites before and after monitoring over 2 years (arithmetic mean, in t CO_{2e})

in Spain there was no comparable carbon balance at national level. As explained in Chap. 8, CIRCE estimated the average carbon balances for a citizen in Pamplona and Saragossa with input data provided by the local governments or national statistics (in the case of electricity). As shown in Fig. 12.3, the estimated carbon balance of an inhabitant of Pamplona (1.30 t CO_{2e} per 2 months) is much higher than the estimated figure for Saragossa (0.83 t). So, the estimations made by CIRCE could be understood as a range for the real CO_{2e} emissions in both cities. As the results of Fig. 12.3 show, the base and final average emissions of panel members in both cities fall into the estimated ranges for an average citizen in those cities (and below the 1.28 t estimated by the European Environmental Agency for an average Spanish citizen), but closer to the estimation made with the data provided by the local government of Saragossa. The results are very different in the two Spanish panels. While the Saragossa panel successfully reduced its CO_{2e} emissions in the 2-year period, the Pamplona panel even increased them. The baseline emissions were significantly lower in the case of Pamplona, whereas the final emissions are almost the same in both panels (see Table 12.1).

As in Austria and Germany, improvements in heating (second part in the columns seen from the bottom) are noticeable in Spain. These developments are particularly outstanding in Pamplona, as the baseline measurements of panelists in this site were lower than the estimated average, which shows that improvements are possible even for citizens whose initial emissions are low. As regards electricity, baseline emissions in the panels were also lower than the average emissions of a Spanish citizen (data for electricity were not available at local level and CIRCE used data from national statistics). In this case, only the panel in Pamplona succeeded in further reducing its emissions. As regards private cars, emissions significantly improved in Saragossa, but deteriorated in Pamplona. Finally, regarding flights (third part in the columns seen from the top), Fig. 12.3 clearly shows that Pamplona has worsened significantly. Indeed, this is the reason why the Pamplona panel has increased its

overall CO_{2e} emissions during the 2-year period. On average, panelists in Pamplona have taken more flights during their participation in the project than they usually do (as reported in the baseline measurement). On the contrary, the Saragossa panel reduced the emissions caused by flights.

12.4 Comparing Results Using the Median and Effect of Flight Emissions

The results presented above are those obtained when the arithmetic means of all individual CO_{2e} balances per citizen panel are used. Before drawing conclusions from these results, two important aspects have to be considered:

- The number of panelists in each panel and whether the distribution of their balances is symmetric or not
- The decisive factor of CO_{2e} emissions caused by flights that may offset changes in other areas of CO_{2e} balancing.

12.4.1 Number of Panelists and Distribution of CO_{2e} Balances

The results presented in Table 12.1 are calculated by using the arithmetic mean. However, this method may not be the most adequate, particularly if the number of panelists in a citizen panel is low, if there are outliers (significantly high and/or significantly low individual CO_{2e} balances) and/or the different values are not symmetrically distributed around the mean value. When the data are not symmetrical, the median gives a better idea of any general tendency in the development of the CO_{2e} balances (Devore and Berk 2011, p. 417).

As an example, Fig. 12.4 presents the distribution of the 73 individual CO_{2e} balances in the Pamplona panel. The *x*-axis represents the CO_{2e} balances at the start of the panel (baseline measurement) and the *y*-axis represents the average CO_{2e} balance of the second year. The dotted lines represent the average CO_{2e} balances at the start of the panel and after 2 years of periodic measurements (0.86 and 0.942 t, respectively). As can be seen, the balances are not symmetrically distributed around the mean values and some outliers exist.

Table 12.2 presents the development of the average CO_{2e} balances over time by using the median as an alternative parameter. This changes the picture: The two Austrian, the three German panels, and the Saragossa panel achieved the 2% savings objective per year very well. Pamplona, which deteriorated by about 10% using the arithmetic mean, now improves by about 2.5%, achieving the 2% target in the first year, but not in the second year. The explanation is that the CO_{2e} balances of only a few panelists are so high after 2 years (see Fig. 12.4) that the overall arithmetic mean of all panelists is also pulled upward. Hence, it seems that outliers

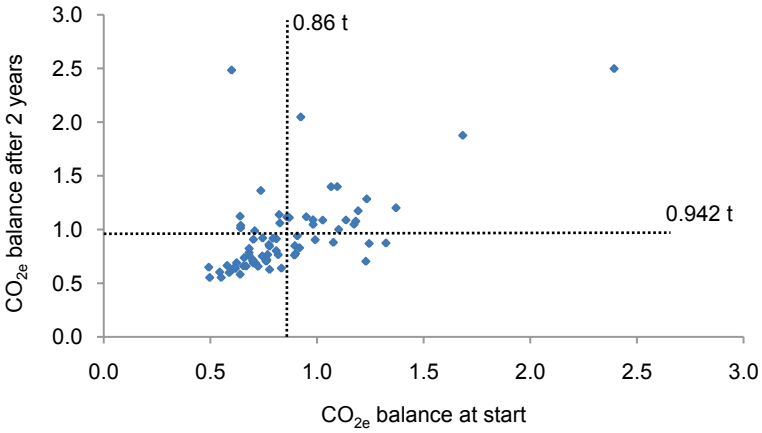

Fig. 12.4 Distribution of the individual CO_{2e} balances in Pamplona (arithmetic mean, in t CO_{2e})

Table 12.2 Development of CO_{2e} balances over time using the median (in t CO_{2e})

City	*N*	CO_{2e} balance at start	CO_{2e} balance after 1st year	Changes in 1 year (%)	CO_{2e} balance after 2nd year	Changes in 2 years (%)
Bregenz	21	1.366	1.292	−5.4	1.270	−7.0
Mariazell	21	1.636	1.449	−11.4	1.447	−11.6
∑ Austrian sites	*42*	*1.501*	*1.371*	*− 8.7*	*1.359*	*− 9.5*
Bremen	49	1.677	1.571	−6.3	1.537	−8.4
Bremerhaven	29	1.819	1.596	−12.2	–	–
Wennigsen	38	1.850	1.619	−12.5	–	–
∑ German sites	*116*	*1.755*	*1.593*	*− 10.0*	–	–
Pamplona	73	0.777	0.754	−3.0	0.758	−2.5
Saragossa	179	0.821	0.770	−6.3	0.761	−7.3
∑ Spanish sites	*252*	*0.809*	*0.765*	*− 5.4*	*0.760*	*− 5.6*

play a key role in the overall target achievement, and the influence of these outliers is minimized by using the median. This also corresponds to the results of Chap. 11 on individual ecologic impacts: The general tendency of the majority of panelists' individual CO_{2e} balances is improvement.

12.4.2 The Decisive Factor of CO_{2e} Emissions Caused by Flights

Flying is the traffic mode that generally causes the highest CO_{2e} emissions per km compared to, for example, cars, buses, or trains. Furthermore, air transport is mainly used to cover long distances, which means a high impact on the CO_{2e} balance of an individual. Going on holiday by plane in many cases exceeds energy savings

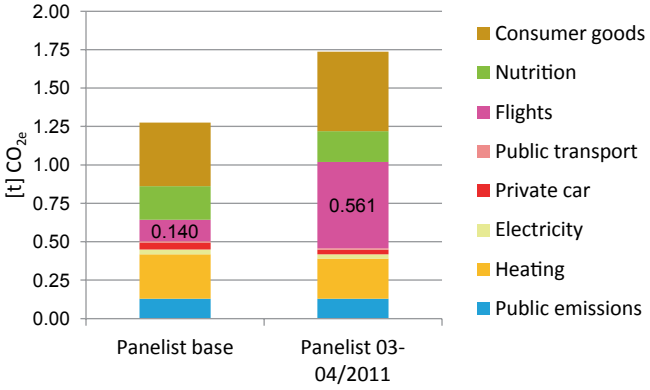

Fig. 12.5 Example of the impact of flight emissions of a panelist in t CO_{2e}

and changed behavior in other CO_{2e} relevant areas (e.g., switching off stand-by or, reducing the heating temperature by 1 °). Figure 12.5 depicts the impact of flying in the CO_{2e} balance of a panelist from Austria. As can be seen, one return flight from Vienna to Amsterdam in the period March/April 2011 increased her overall emissions drastically. The flight emissions in the baseline measurement were 0.14 t CO_{2e}, whereas this figure increased to 0.561 t in the period when the flight took place. In all her other periodic measurements, she did not fly, so she had zero emissions in the flights category. With this single flight she was not able to reduce her overall emissions. Instead, her balance deteriorated by more than 10 % after 2 years.

Apart from impact at the individual level, flights undertaken by only few panelists can damage the overall CO_{2e} balance of a citizen panel. So, it is necessary to compare the development of the balances with and without consideration of flight emissions (see also Chap. 8 for more information).

12.4.3 CO_{2e} Emissions with and Without Flights

Table 12.3 presents the development of the average CO_{2e} balances over time without consideration of the emissions resulting from air traffic. It compares the results by using the arithmetic mean and the median. Considering the arithmetic mean, the Bregenz panel has improved very well (reduction of 8.6 %) while Mariazell deteriorated (increase of 5 %). On the aggregate country level, the Austrian panels improved, but clearly failed the 2 % savings target per year. Considering the median, the picture among both Austrian sites completely changes: Bregenz increased its emissions by 3.6 % while Mariazell improved by 3.8 %. In contrast, the three German panels developed homogenously, regardless of whether the arithmetic mean or the median is considered, with aggregate improvements of 4.4 and 6 %. In Spain, small improvements are obtained considering either the arithmetic mean or the

Table 12.3 Development of CO_{2e} balances over time without flights. (2 years in all the sites except for Bremerhaven and Wennigsen (1 year))

		Arithmetic mean in t CO_{2e}			Median in t CO_{2e}		
City	*N*	Balance at start	Balance at the end	Changes (%)	Balance at start	Balance at the end	Changes (%)
Bregenz	21	1.472	1.346	−8.6	1.226	1.270	+3.6
Mariazell	21	1.505	1.580	+5.0	1.496	1.439	−3.8
∑ Austrian sites	*42*	*1.489*	*1.463*	*− 1.7*	*1.361*	*1.355*	*− 0.5*
Bremen	49	1.610	1.536	−4.6	1.537	1.447	−5.9
Bremerhaven	29	1.756	1.689	−3.8	1.679	1.583	−5.7
Wennigsen	38	1.766	1.690	−4.3	1.710	1.602	−6.3
∑ German sites	*116*	*1.698*	*1.622*	*− 4.4*	*1.614*	*1.532*	*− 6.0*
Pamplona	73	0.803	0.802	−0.1	0.762	0.746	−2.1
Saragossa	179	0.817	0.798	−2.3	0.749	0.746	−0.4
∑ Spanish sites	*252*	*0.813*	*0.799*	*− 1.7*	*0.753*	*0.746*	*− 0.9*

median. However, both panels clearly failed the 2% savings target per year, again regardless of whether the arithmetic mean or the median is considered.

Overall, comparing the monitoring results with and without flights, there is no homogenous development, neither among the seven citizen panels nor at the aggregate country level.

12.5 Summary of the Development of CO_{2e} Balances Using the Different Approaches

Undoubtedly, flights are an important source of emissions and an important area where behavior change has to start. From this point of view, there is no important reason to remove the flight emissions from the CO_{2e} balance of participants. However, due to the constraints mentioned above (e.g. huge share of flights on the overall CO_{2e} balance, low number of panelists, and different treatment of flights in the baseline measurement in the Austro-German and Spanish calculators), the development of CO_{2e} balances over time could be biased if flights are included. Furthermore, behavior change in other daily areas could fail to be visible because of a single holiday trip in a 2-year period. Using the median would mitigate the impact of flights to a great extent, but changes in other areas would also be offset. Moreover, the technical constraints of the Austro-German calculator would still be present. Hence, in order to obtain an overall picture of the impact of the panels, it is necessary to combine the results of the different methodological approaches used so far (see Table 12.4).

Key:

Definition	Symbol
Well done - target achieved (reduction per year ≥ 2%)	
Not bad - reduction between 1 and 2% per year	
Stagnation - only slight reduction between 0 and 1% per year	
Failed - increase between 0 and 1% per year	
Clearly failed - increase > 1% per year	

The two *Austrian* citizen panels developed differently during the 2-year monitoring period. Considering the arithmetic mean, the Bregenz panel has decreased its CO_{2e} emissions by 7.6% after 2 years and clearly met the savings target. The citizen panel in Mariazell only decreased its emissions by 2.9%, and hence failed the target. If flights are not considered, Bregenz further improved by a total decrease

Table 12.4 Summary of development of CO_{2e} balances

	With flights		Without flights	
	Arithmetic mean	Median	Arithmetic mean	Median
Bregenz				
Mariazell				
∑ **Austria**				
Bremen				
Bremerhaven				
Wennigsen				
∑ **Germany**				
Pamplona				
Saragossa				
∑ **Spain**				

of CO_{2e} emissions of 8.6% and Mariazell deteriorated, by increasing its emissions by 5%. This means that panelists in Mariazell mainly improved their balance by a reduction of flight emissions while, overall, there were impairments in other areas of CO_{2e} balancing (mainly due to a significant increase in the use of private car, as shown before in Fig. 12.1). On the other hand, panelists in Bregenz achieved reductions in several CO_{2e} relevant areas (especially in heating, see Fig. 12.1 above). If the median is considered, the picture is different. Now Mariazell improves independently of whether flights are considered (a reduction of 11.6%) or not (3.8%). However, when using the median, Bregenz only improves if flights are considered. The inconsistency of these results makes interpretations very speculative, but they suggest that outliers seem to play a key role in Mariazell and Bregenz. The number of panelists in the Austrian sites is the lowest among the sample (21 in each site) and deviation from the average of a few individual balances has a remarkable impact on the overall balance development on a collective level.

As regards the *German* panels, Bremerhaven and Wennigsen have developed very unambiguously. By using the arithmetic mean, Bremerhaven has reduced its CO_{2e} emissions by 6.8% and Wennigsen by 5.5%. Even without considering flights, the reductions in Bremerhaven are still at 3.8% and in Wennigsen at 4.3%. By using the median, the improvements are even higher: 12.2% in Bremerhaven (respectively, 5.7% without flights) and 12.5% in Wennigsen (respectively, 6.3% without flights). Hence, important savings have been achieved in the monitoring year. In contrast, the developments in Bremen proceeded completely different. After 1 year of monitoring, the arithmetic mean showed only a minor reduction of 0.8% and the situation after 2 years remained unchanged compared to the baseline measurement (0.1% reduction). The situation is completely different when the median is considered, with a reduction of 6.3% in the first year and 8.4% in the second year. Hence, some outliers with high CO_{2e} balances have led to the stagnation of the arithmetic mean, but the general tendency was a decrease in the CO_{2e} balance, as evidenced by the median. The calculation of the carbon emissions without flights confirms this appraisal. Without flight emissions, the Bremen panel has reduced its CO_{2e} emissions by 4.6% (5.9% when the median is considered); so there were savings in the other areas of CO_{2e} balancing. Hence, in Bremen too, the citizen panel had a positive impact on the development of carbon emissions.

As regards the *Spanish* sites, very different results are obtained in Pamplona and Saragossa by using the arithmetic mean: Pamplona increases its CO_{2e} emissions by 9.8%, whereas Saragossa achieves the target with a reduction of 4.7%. When looking at the median, both Pamplona and Saragossa reduce their emissions (by 2.5 and 7.3%, respectively). This shows that some extremely high emission values in Pamplona hide a general trend of reduced CO_{2e} emissions. When looking at the data without flights, in Pamplona the improvements are of 0.1% (arithmetic mean) and 2.1% (median). This confirms that most of the outliers in Pamplona were caused by extremely high emission values in the flights area. However, in Saragossa the improvements are much lower when flights are excluded (2.3% when using the arithmetic mean and 0.4% when using the median). This shows that in Saragossa most of the savings are due to a reduction in flights during the 2-year period. Overall, the

results show that the participation process has had a limited impact in Pamplona and Saragossa.

These results show that, depending on the methodology used, in all seven sites some improvements in the CO_{2e} balances on the collective level could be achieved. The higher reductions in Austria and Germany as compared to Spain are consistent with the results of the recent Eurobarometer surveys (European Commission 2009, 2011) and the representative surveys carried out in each site before the citizen panels started (see Chap. 7). Due to the financial crisis and political disaffection in Spain, interviewees ranked the importance of climate change after the aforementioned problems. However, as shown in this chapter, the CO_{2e} emission levels of both Spanish panels, as well as of the average for a Spanish citizen, are still noticeably below the Austrian and German levels, and the lower the balance level is, the harder is it to achieve further reductions. In any case, there seem to be learning effects for panelists in some areas of CO_{2e} balancing that have led to CO_{2e} savings. The next section describes the details of the results per consumption area, showing which panels are more successful in each area of CO_{2e} balancing and what context factors may be favoring climate-friendly behavior.

12.6 Comparing CO_{2e} Emissions by Consumption Area

The development in the different areas of CO_{2e} balancing is analyzed by reporting remarkable differences and findings in the following sections:

- At home (heating and electricity)
- Mobility (private car, public transportation, and flights)
- Nutrition and consumer goods

12.6.1 CO_{2e} Development in the "at Home" Section

In the "at home" section, covering heating and electricity (see Table 12.5), three of the panels (Bremen, Wennigsen, and Pamplona) developed very well, with reductions above 2% per year in the two areas irrespective of which measure is used. Bremerhaven has improved in heating, but conflicting results are obtained in electricity depending on the calculation method. Bregenz only improved when considering the arithmetic mean, but not when looking at the median. Mariazell and Saragossa improved in heating, but deteriorated in electricity.

It seems that activities within the panels were successful as regards heating. More doubts arise as regards the impact of the citizen panel in the electricity area. However, we have to bear in mind that the baseline emissions of participants in electricity of all the panels were below the average emissions in the respective countries in this category and obtaining further reductions in this category was, therefore, difficult.

Table 12.5 CO_{2e} development in "at home" section

CO_{2e} area	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
HEATING							
Arithmetic mean							
Median							
ELECTRICITY							
Arithmetic mean							
Median							

As indicated in Sect. 12.3, climate conditions are an important factor affecting heating-related emissions. In this regard, it is important to consider whether the reductions obtained in the heating area are "real" savings due to behavioral changes on the part of participants, or whether they are due to a less cold winter season. In the case of Spain, for example, data[2] show that the winters of the year 2010 and 2011 had similar average temperatures to a regular year. However, the months of summer of the year 2011 were, on average, around 2° hotter than the regular values, which may explain the inability to achieve the target in electricity in the case of Saragossa (because of higher use of air-conditioning during the summer months).

12.6.2 CO_{2e} Development in the "Mobility" Section

The mobility section covers CO_{2e} emissions caused by the use of private car, public transportation, and airplanes. As not all panelists used all three modes of transportation, their CO_{2e} emissions could be zero in one or several transportation components. This has a direct impact on the calculation of the median. For example, as only a minority of participants produced flight emissions, the median would be zero in all seven sites. There were also many panelists who did not use any public transportation or did not own a car, and hence produced no emission in these areas. Therefore, the median is not presented in the traffic section; only the arithmetic mean. Furthermore, we have to bear in mind that because of some panelists having zero emissions, it is impossible for them to improve (for them stagnation is a success). In the mobility area, it is impossible for some citizens to reduce their individual emissions; therefore, at collective level, it is also more difficult to achieve the target in this section (Table 12.6).

[2] Values per month available at: www.tutiempo.net. Standard climate values available at: www.aemet.es. Last access: 2 October 2013.

Table 12.6 CO_{2e} development in "mobility" section

CO_{2e} area	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
PRIVATE CAR							
Arithmetic mean	↑	↑	↑	↓	→	↑	↓
PUBLIC TRANSPORT							
Arithmetic mean	↓	↓	↓	↓	↓	↑	↓
FLIGHTS							
Arithmetic mean	↑	↓	↑	↓	↓	↑	↓

The mobility area seems to be a crucial section, deserving more attention in most of the sites. Only two of the panels (Bremerhaven and Saragossa) developed very well, with reductions above 2% per year in the three areas. But caution is needed as these improvements cannot be attributed only to the participation in citizen panels in these cities, but also to external factors, especially the economic situation. According to the latest available data from Statistics Bremen, the unemployment rate in Bremerhaven was almost 17% in July 2010, which is one of the highest rates throughout Germany. Similarly, the economic crisis has had a greater effect in Saragossa than in Pamplona.[3]

The use of a *private car* significantly decreased in Bremerhaven and Saragossa, it remained more or less the same in Wennigsen, and it increased significantly in the other four panels. The reduction in the use of a private car by more than 5% within 1 year of monitoring in Bremerhaven clearly corresponds to the results of the third panel survey questions on mobility: more than one third of respondents reported that they avoided travelling by car and used the bicycle or walked more often since their participation in the citizen panel. However, although in Wennigsen more than one third of panelists reported that they have replaced a share of their individual car traffic by cycling or walking, their CO_{2e} balance for private car traffic only improved slightly during the monitoring period. Even more strikingly, 67% of the panelists in Bregenz reported a positive change in individual car traffic, although the average emissions significantly increased during the 2-year period. Therefore, attitudes reported in the third panel survey seem to have clashed with other priorities in life. Even though some motorized trips could have been replaced by environmental friendly means of transport, this saving behavior seems to become absorbed by an increase of trips or by covering longer distances per trip. This phenomenon, known as the rebound effect, has frequently been observed. Energy savings, for

[3] Data at the regional level from the Spanish National Institute of Statistics (www.ine.es) shows that in the last quarter of the year 2008 the unemployment rate was around 7% in both regions. However, in the first quarter of 2011 the figures were 19.5% in Saragossa and 13.4% in Pamplona. In the third quarter of 2012 (when the periodic measurements finished) the figures were 20% and 15%, respectively.

example, by increased efficiency, are eliminated by an increase of the product use (Boulanger et al. 2013; Sorrell 2007; see also Chaps. 7 and 10).

Lifestyles, in particular the way in which people commute, are crucial in the generation of CO_{2e}. As urban areas become denser and rely more on public transport, carbon emissions can be reduced significantly (OECD 2010, p. 57). European metropolitan regions have been able to lower car use through a more extensive use of public transport, as well as development of other transportation modes including walking and cycling (OECD 2010, p. 60). However, the sites analyzed have very different *public transport* infrastructures, which may facilitate or hamper behavioral changes in mobility. For example, as regards the German panels, Bremen has a very well developed public transportation system in comparison to Bremerhaven and Wennigsen. Compared to Bremen with a share of 14 % of public transportation, the share in Bremerhaven is only 6 % (Schallaböck et al. 2009) and in Wennigsen 11 % (Infas 2012). Instead, the share of individual motor car traffic is higher in Wennigsen (59 %) and Bremerhaven (57 %) than in Bremen (42 %). Also, the proportion of commuters that work in urbanized areas clearly affects the individual modal split. In Saragossa, much has been going on in recent years regarding public transport and mobility. A new tram system has been developed and a complete reorganization of traffic has taken place. Furthermore, the use of the bicycle has significantly increased in recent years due to various initiatives carried out since 2008, like the new cycle lanes and a municipal bike service (www.biziZaragoza.com). Since then, the use of the bicycle has significantly increased in Saragossa, which has undoubtedly contributed to the reduction in the use of private transport for travel within the city.

Generally, the decrease of a CO_{2e} balance is a success, but not in the public transportation domain (unless the public transportation is replaced by bicycle or walking). Emissions from public transportation decreased in all panels but Pamplona, but in this case the use of the private car has also increased. So, most citizen panels did not succeed in reducing individual traffic or in transferring private traffic to public transportation systems. This is all the more remarkable in Bremen, as there is a rather well-received public transportation system.

As regards *air traffic*, results were also different among the panels. Mariazell, Wennigsen, Bremerhaven, and Saragossa have achieved the target, whereas panelists in Bregenz, Bremen, and Pamplona have increased their emissions. However, the results of the Austro-German panels have to be taken with caution, as these operated with an average flight emission factor for all participants in the baseline instead of individual empirical values for this component (see Sect. 8.6 for explanation). An increase of more than 50 % of CO_{2e} emissions has to be noticed for Bremen. Certainly, a big share of the increase is due to the inability of the CO_{2e} calculator to consider the real individual consumption of flights in the baseline. In some cases, such as Bremen, the increase of flight emissions complies with the assumption that an airport nearby does influence the mobility behavior (cf. Pfleiderer 2009). Long distances to the nearest airport seem to have a positive impact on the flying behavior in Bremerhaven, Mariazell, and Wennigsen. However, this is not the case in the Spanish cities: Pamplona has increased its emissions whereas Saragossa has reduced them, in spite of the fact that Saragossa is better connected with

Madrid and Barcelona airports. Here the economic situation seems to have played a significant role, as the economic crisis has affected Saragossa to a greater extent. In this regard, the unemployment rates suggest that other needs than air trips are currently more important (particularly in Saragossa and Bremerhaven). On the other hand, there is an overrepresentation of panel participants with a university degree (more than 70% in Bremen and about 48% in the seven panels) that suggests that higher income levels are connected with increased flight behavior.

12.6.3 CO_{2e} Development in the "Nutrition and Consumer Goods" Section

For nutrition and consumer goods, the interpretation of results is limited by the specific characteristics of these areas. The reasons are twofold. First, the calculation of CO_{2e} emissions in the nutrition and consumer good areas is rather complex and in many cases poorly received (see Chap. 8). This circumstance is reflected in the CO_{2e} calculator by providing either abstract or only few answering options. Second, even though the savings potential in both areas is high in principle, the opportunities to noticeably decrease one's emissions are rather low to date. For example, climate-friendly nutrition behavior would require food that is locally produced and that the generated CO_{2e} emissions are presented on the product in a transparent way so that consumers are informed and have the choice. However, such infrastructure hardly exists today.

Even though the nutrition section received high interest and was voted the section where most behavioral changes were reported by the panelists, there was little in the way of perceptible improvements in the CO_{2e} balance. As the symbols in Table 12.7 show, the developments in the panels can be characterized as nonexistent, with a majority of stagnation arrows. So, the monitoring results and the panel

Table 12.7 CO_{2e} development in "nutrition and consumer goods" section

CO_{2e} area	Bregenz	Mariazell	Bremen	Bremerhaven	Wennigsen	Pamplona	Saragossa
NUTRITION							
Arithmetic mean							
Median							
CONSUMER GOODS							
Arithmetic mean							
Median							

surveys show that the impact of nutrition and consumer goods on the climate is still not very well received by the panelists. Even though high interest (particularly in nutrition) has been indicated in the panel surveys, nutrition habits still seem to be rather a question of lifestyle and health. The impact of the participation process in this area seems to be questionable at least.

12.7 Conclusions

This chapter aimed at evaluating whether the cooperation of citizens as participants of citizens' panels has had a positive impact, at collective level, by contributing to the achievement of a 2% annual reduction in the CO_{2e} emissions in their city or region. Difficulties have arisen in assessing the ecological impacts at the collective level. Measuring CO_{2e} emissions is a difficult task, but comparing emissions within the panels and across sites and countries has turned out to be still more difficult. Comparisons among the panels and countries are complex because of different context factors (e.g., geographic position), methodological issues (different CO_{2e} calculators), and because of the high variation of the CO_{2e} emissions within the panels. Furthermore, the economic crisis has affected the participant countries, regions, and cities differently.

Because of the aforementioned challenges, different methodological approaches were used to assess the ecological impact of the citizen panels at the collective level, by comparing the evolution in the arithmetic mean and median figures, and by analyzing the CO_{2e} emissions with and without flights. Results show that only two panels (Bremerhaven and Wennigsen) met the reduction target completely (independent of the type of calculation) and only one (Pamplona) never met the target. However, even in those panels that failed to achieve the target, reductions in CO_{2e} are the general trend. So, altogether, considering flights or not, the arithmetic mean or median, in all seven sites, improvements in the CO_{2e} balances on the collective level could be achieved. This is a positive finding, especially if we bear in mind that participants voluntarily engaging in this project were already concerned about the environment and, in most cases (both Austrian and Spanish sites, and also Bremen), the initial CO_{2e} emissions were lower than the average in the respective countries, which made further improvements more difficult.

The higher reductions in Austria and Germany as compared to Spain are consistent with the results of the recent Eurobarometer surveys (European Commission 2009, 2011) and the representative surveys carried out in each site before the citizen panels started. Due to the financial crisis and political disaffection in Spain, interviewees ranked the importance of climate change after the aforementioned problems. However, the CO_{2e} emission levels of both Spanish sites, as well as of the national average in Spain, are still noticeably below the Austrian and German levels, and the lower the balance level is, the harder is it to achieve further reductions.

It is important to highlight that the results of the panels (improvements or deteriorations) are almost the same after 1 year of monitoring and after 2 years: That is, if savings have been achieved in the first year, savings have also been achieved in

the second year. Furthermore, comparing both years, the level of savings and deteriorations is more or less the same. This finding suggests that learning effects have already been achieved after 1 year. Conversely, panelists who have not learned to change their behavior within 1 year will not change it within activities that last for more than 1 year. As the tendency for savings or deteriorations is already found in the first year, climate participation processes lasting for longer than 1 year will not contribute to further savings. They might help to avoid relapsing into old routines that would cause higher CO_{2e} emissions again, but to further reduce carbon emissions, the participation instrument as well as the format needs to be improved and/or new ways to trigger further savings need to be developed.

Results show that the participation process was more successful in promoting behavioral changes in some consumption areas. The activities within the panels were very successful as regards heating, but varying results are found in electricity, mobility, nutrition, and consumer goods. This finding is consistent with previous studies (Abrahamse and Steg 2005; Staats et al. 2004, p. 357). There, too, the biggest savings were achieved in the heating energy section, and only minor effects in the electricity domain and mixed ones for mobility, nutrition, and consumption. All this makes it difficult to generalize the e2d results for the collective ecological impact. As a consequence, neither citizen panels nor any other single measure leads to the fulfillment of the climate protection goals alone. Instead, a multitude of actions, coming from different disciplines and activating citizens on different levels, must be taken into account in order to trigger behavioral changes and CO_{2e} reductions that, in turn, support the achievement of the ambitious climate protection targets.

Future research should analyze more deeply why participation processes seem to be more effective in certain domains, such as in heating, and less effective in traffic, nutrition or consumption. Certainly, the rebound effect and modern lifestyles play an important role as regards electricity emissions: energy savings (by increased efficiency of domestic appliances and so on) are eliminated by an increase in the use of these products. As regards the mobility area, we have to bear in mind that for some participants it was not possible to reduce their individual emissions; therefore, at collective level, it was also more difficult to achieve the target in this section. However, in any case, the mobility area deserves more attention in most of the cities analyzed and in future research, as the use of the private car increased in four of the seven panels. Finally, our results suggest that the impact of nutrition and consumer goods on the climate is still not very well perceived by citizens. Future research also needs to address the issue of how to effectively influence citizen behavior in these areas.

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Chapter 13
Citizen Panels on Climate Targets: Analyzing Dropout in Long-Term (e-)Collaboration Processes

Ralf Cimander

Abstract The e2democracy project studied citizen panels collaborating with local governments to achieve local climate targets in seven regions in three countries over a period of up to 2 years. Compared to many other participation projects, this is a very long time period and the project examined not only "words" but also intended changes of behavior. It was therefore a big challenge to maintain the citizens' participation and to minimize panel dropout. The aim of this chapter is to investigate the extent of dropout during the processes and to understand the reasons behind it. In fact, there were two kinds of dropout. Of 1159 registered panelists at all seven sites, 36% withdrew before entering any data for the CO_{2e}-monitoring process, a central component of the panels' activities (dropout 1). A further 27% dropped out during the subsequent period of up to 2 years (dropout 2), many of them as early as in the first 2–4 months. A survey was undertaken to determine the factors that led to the decision to drop out. The most common reasons were that participation cost too much time and that data collection and entry were not trivial but quite complex tasks. To some extent, the usability of the monitoring instruments employed also caused difficulties. Another critical constant was that many dropouts did not see any possibility of further improving their carbon footprint. Less common reasons were that panelists who dropped out expected no or only relatively low effects on climate protection, did not experience energy savings or were not ready to change their lifestyles.

13.1 Introduction

The European research project e2democracy (e2d) addresses the comparative evaluation of a consultative and collaborative type of (e-)participation in local climate governance (see Chap. 7). Among other things, it studied a set of similar forms of citizen panels set up by local authorities in Austria, Germany, and Spain aimed at contributing to climate protection. These panels were part of collective initiatives targeting a 2% reduction in greenhouse gas emissions per year and providing mea-

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surable indicators of the impact of the participation exercise. A key activity of the participants was the continuous monitoring of their consumption behavior over up to 2 years so that they could receive feedback information on their personal carbon footprints, that is, CO_2 equivalents (CO_{2e}). Based on this feedback, together with information on how CO_{2e} could be reduced in everyday life combined with various opportunities for exchanging experiences with other panelists and experts, the intention was to enable participants to change their behavior towards more climate-friendly and sustainable lifestyles. This chapter aims at analyzing the dropout from the seven citizen panels collaborating on CO_{2e} reduction with local governments in the period between 2010 and 2012. Their locations comprise the Bregenz and Mariazell regions (Austria), Bremen, Bremerhaven and Wennigsen (Germany), and Pamplona and Saragossa (Spain).

A quantitative indicator of successful participation is the outreach, that is, the number of participants and/or contributions in relation to the size of the target population (see Chap. 2). An additional success criterion is the continuity of participation over time or in other words the minimization of the number of people leaving the panels, an indicator known as the dropout rate, or, in research on panel studies, panel attrition or panel mortality (see Chap. 6). Panel sizes varied between 48 and 398 citizens at the time of registration for the project, between 35 and 290 citizens when the baseline data for continuous monitoring was entered and between 21 and 181 citizens in the final measurement round.

In social science and marketing research, panel attrition is a well-known phenomenon of longitudinal studies in which the unit of investigation is followed at specified intervals over a long period, often many years. Panel studies requiring individuals to provide information at multiple points in time often suffer from a high degree of cumulative nonresponse over time (panel attrition). Recent literature reviews show an attrition rate between 2 and 50 % for studies with annual data collection (Lee 2003; Frankel and Hillygus 2013). Hence, for the e2d cases, considering the special demands of the participation design outlined above, dropout rates of above 50 % were to be expected. However, in some panels in this project, the ratio turned out to be lower and in others much higher for the same kind of collaborative exercise. The design of the e2d project allows for some comparative analysis of the reasons for a greater or smaller dropout rate.

What was rather unexpected was the high number of so called “sleepers,” that is, participants who had registered but never really started their collaboration (dropout 1). It may well be that the reasons for the rate of sleepers (dropout in a wider sense) and for the dropouts among those who started CO_{2e} monitoring but discontinued later (dropout 2) depend on different factors. For example, for panelists who had registered but never tried the monitoring tools, their perceived ease of use can only be a factor for dropout 2 but not for dropout 1.

Personal as well as situational factors are also relevant for many other behavioral phenomena. Research on panel attrition assumes that a personal relationship between the interviewer and the respondent improves response rates and prevents dropout (Meltzer et al. 2012). Obviously, personal relationships are difficult to achieve in Internet-based environments; hence, offline facilities—preferably with

face-to-face contact—are better suited (Lee 2003, p. 8). It is conducive to continuous panel participation for the interviewer or panel organizers to be the same persons in all waves or over the whole time period, so that some kind of trustworthiness can be established between organizers and panelists (Meltzer et al. 2012). In this regard, the implementation by the organizers of extensive tracking procedures and appropriate survey designs can also count as success factors for low attrition rates.

Another aspect concerns the availability of incentives for the willingness to provide information. Even though the scale of the impact of monetary incentives is difficult to determine, it proved to be relevant, for example, in The National Longitudinal Survey of Youth in the USA (Lee 2003). In particular, monetary rewards may trigger action that would not occur otherwise. "Monetary rewards may serve as an extrinsic motivator to conserve energy" (Abrahamse et al. 2005, p. 280).

If panelists relocate or their personal situation changes, it is particularly difficult for organizers to maintain contact with them. In such cases, continued participation makes less sense for panelists or is of no use for the organizers. Besides, socioeconomic aspects play a key role in attrition studies. "[A]ttrition probabilities are greater at high and low income levels for male-headed households and lowest at the middle of the income distribution" (Lee 2003, p. 16). However, as the survey design of e2d was focused on the impact assessment of various forms of civic engagement, it does not allow for a deeper socioeconomic analysis of the sample of the e2d panels.

In what follows, we first introduce major theoretical arguments before presenting empirical findings based on a dropout survey in the e2d project. All the panelists that dropped out during the panel periods were asked to answer a standardized dropout questionnaire consisting of up to 38 questions. Of the 730 dropouts since registration with the citizen panels, 17% replied to the survey by answering all the questions. Of the total respondents, 94% were registered as onliners, that is, they took part in the panel activities via electronic media. Only 6% of respondents were offliners, that is, they used traditional channels like personal contact, telephone, or mail to participate. As shown in Chap. 15, the mode of communication had a strong impact on the dropout rates. For onliners, the rate was much higher than for offliners (75 vs. 29%). However, in light of the big differences in the response rate to the dropout survey, the 6% of offliners that responded to the questionnaire does not allow for a sound comparative analysis of the different influencing factors. For this reason, the empirical analysis is limited to the dropout among onliners. The regional distribution of the overall dropout from registration to final measurement and the response to the dropout survey are presented in Table 13.1.

As will be explained later on, even though the dropout rate varies between the seven panels, the average dropout of 63% between registration with the citizen panel and delivering data for the final measurement is quite high.

The analysis of the reasons for dropout is based on the answers of the 126 panelists who answered the dropout questionnaire. As Table 13.1 shows, most respondents came from Bremen and Wennigsen (53.2%), and thus the analysis has a strong bias to answers coming from these two German panels.

Table 13.1 Regional distribution of overall dropout[a] and dropout survey sample

Region	Dropout	Dropout rate	Respondents to dropout survey	
	N	%	*n*	%
Bregenz	43	67.2	16	12.7
Mariazell	40	64.5	13	10.3
Bremen	153	71.8	27	21.4
Bremerhaven	19	39.6	4	3.2
Wennigsen	71	62.3	40	31.8
Pamplona	187	71.9	18	14.3
Saragossa	217	54.5	8	6.4
Total	730	63.0	126	100.0

[a] Dropout stands for total dropout since registration with citizen panels

13.2 Theoretical Background

Understanding and explaining human action is a key subject of classical psychology, social psychology, and (micro-)sociology. It is most common to explain individual and group-related behavior as an interplay of personal and situational factors. This applies also to environmental behavior, which is the focus of the e2d project. When trying to explain the choice of media channel in Chap. 15, we employed a similar framework focusing on characteristics of the person on the one hand and characteristics of the task and the tools employed on the other. In the context of online participation, our basic assumption is that the motivation to participate and to engage continuously evolves due to person-related factors and that the tools and task-related aspects may impose certain barriers. There are many factors likely to influence the individual's environmental behavior and his willingness to participate in a climate panel. Depending on the individual's characteristics, desires and attitudes, the factors are of greater or less weight. The "integrated action model" developed by Rost et al. (2001) and Martens (1999) consolidates the main factors that may cause citizens to leave the panel in a unified explanatory framework. Even if no action model can predict pro-climate behavior, there are approaches that try to consider a wider set of behavior determinants and to relate them to each other, as outlined below. The integrated action model describes the complexity of environment-relevant decision mechanisms and provides an overview of different factors influencing behavior. It is divided into three phases preceding action: (1) the *motivation phase* leading to the development of an action motive (registration with a citizen panel), (2) the *action choice phase* leading to the development of action intent (actively taking part in the panel), and (3) the *volition phase* leading to concretization and finally inducing action (change of habits). The integrated action model provides an orientation for the analysis of the reasons for dropout. It can be considered as "a kind of stage model" (Rost et al. 2001, p. 13). Each stage or phase is influenced by several mental evaluation processes (Hunecke 2002, p. 16) that determine whether to continue participating or to drop out.

13.2.1 Sociodemographic Aspects of Dropout in e2d

The sociodemographic composition of the citizen panels is an indicator for the representativeness of the research findings. Both the regular panel surveys and the dropout survey gathered basic sociodemographic data: gender, age, education, employment situation, and whether the panelists have children or not. As shown by various surveys, there are population groups that are more climate-protection conscious than others. In environmental issues, these are clearly those who enjoyed a higher education. Managers, white-collar workers, and the self-employed are also more likely to consider climate change as particularly important. In addition, people with a politically left orientation classify climate change as an important problem more often than others. These fundamental relationships can be observed in all European countries (Kuckartz 2011, p. 129; European Commission 2009) and—as can be seen later on—do not differ among the three e2d countries.

13.2.2 Psychological and Social Aspects of Dropout in e2d

Not everybody is equally willing to engage politically and to participate in consultation or collaborative exercises. The literature on political participation refers either to resources (time, money, and skills) or to socioeconomic status as being the most important influencing factors. These factors may explain the size and the sociodemographic composition of the panels, but not so much the different dropout rates. Thaler and Sunstein (2008), analyzing a similar environmental monitoring project using theories from social psychology, identified one reason for participating in panels as being the basic human need to compare oneself with one's neighbors or other reference groups and to adhere to the norm. For this reason, the values and attitudes of individuals and their willingness to overcome everyday routines are important aspects in the decision on whether to continue participation over time or to leave the project.

Values and Attitudes

Addressing attitudes and values in order to reinforce pro-environmental and modify antienvironmental dispositions is seen as the key to changing individual behavior. Information campaigns and interventions that focus on persuading and encouraging consumers play a great role. However, climate change is a problem of society and the individual's perception is influenced by societal (medial and political) discourses. This means "individuals determine their everyday actions […] on the basis of the assessments and expectations of their social environment as well as social institutions and their rules" (translated from Baumgartner 2004, p. 47). Hence, individual behavior can only be understood if it is considered together with social and economic context conditions. This implies that climate-friendly or harming behavior is not only guided by our own choice but also by our relationships with others around us, by what others say and do, by power relationships, and the specific social

order in relevant contexts. Citizens who are characterized by values and attitudes in favor of the environment and whose living context encourages pro-environmental action are more likely to continue to participate in their panel than citizens who are not. Thaler and Sunstein (2008) argue that in order to direct people's behavior, an appropriate "choice architecture" has to be provided that anticipates the context in which people make their decisions. Accordingly, the panel organization also needs to consider such choice architectures that prevent panelists from dropping out. Thus, ultimately, the actual challenge is to transfer the pro-environmental attitudes of registered panelists into active participation that prevents them from dropping out and finally leads to pro-climate activities.

Participation-Related Effort

Diekmann and Preisendörfer (1992) developed the so-called *Low-Cost Hypothesis* to explain the lack of consistency between attitude and behavior. Correspondingly, pro-environmental behavior often takes place if the renunciation or the efforts required are low enough. Costs are understood not only as financial burdens but also the time to be spent, the inconveniences, and the acceptance of confusing or difficult situations. For example, fields of action that involve low-cost situations are shopping for ecologically produced goods and waste sorting, while energy or transport behavior (choice of transport means) are assigned to the "high-cost" category (Diekmann and Preisendörfer 1992; Baumgartner 2004). Participation as a panelist in e2d with detailed bimonthly reporting duties also implies various kinds of effort. To keep a record of one's car trips or to reconstruct trips done by public and private transport in the previous 2 months may already be a high-cost situation. Gathering various meter data in one's home and relating it to one's own ways of behavior could even be more difficult. The low-cost hypothesis thus does not explain environmental behavior by attitudes and psychological patterns but by cost-benefit models, which can be assigned to the *Rational Choice Theory* (RCT). In RCT, individual actors are considered as rational deciders who try to maximize their benefit when they have to choose between different action alternatives. With regard to environmental action, the explanation approach of RCT is often combined with so-called *Expectancy-Value Models* (EVMs; Liebe and Preisendöerfer 2011, p. 223; Baumgartner 2004, p. 46) that strongly correspond with the EVM by Zeithaml et al. (2000) described below. Actors weigh up alternatives, multiply the value of a desired event with the likelihood that a certain action will cause this result; then they consider the costs this action involves (Busch 2011). Even if the usability and applicability of RCT for explaining environment-friendly behavior is the subject of critical discussion (Littig 1995, pp. 35 f.; Liebe and Preisendöerfer 2011, pp. 227 f.), when combined with other perspectives, it can be of some value.

Involvement of Time Budgets and Other Competing Preferences

"Time is money" is an old proverb that is also of importance in the course of societal developments. A volunteer survey in Germany in 2009 showed that a good

ability to plan one's leisure time has a positive influence on the willingness to take on a voluntary function (Gensicke and Geiss 2010, p. 297). Once the work in question is established and integrated in everyday life, it seems to have a good chance of "surviving"—as opposed to activities that unbalance the familiar time management. On the other hand, Kuckartz and Rheingans-Heintze pointed out "that with the process of individualization, motives such as 'self-fulfillment' and 'having fun' as well as an interest in short-term self-organized projects have come to the fore. […] Thus an issue-specific involvement in temporary projects in the sense of problem focus is increasingly being preferred: identifiable issues, manageable subjects and fields of action in the immediate living environment" (translated from Kuckartz and Rheingans-Heintze 2006, p. 173). Moreover, other life preferences also play a key role and compete with environmental protection objectives. An example is the interest in getting to know foreign cultures that in turn results in travelling and implies an increase in carbon emissions. Another is the need for comfortable living in a building with several rooms, which—even when built to the highest ecological standards—means consuming more square meters and energy than an average citizen. But there are also short-term needs. For example, the wish to supply one's guest with strawberries in winter may be stronger in the short term than the wish to purchase regional food only.

Living Conditions and Incentives

The context we live in sets the framework conditions for the extent to which we are able to change our lifestyles. A person who lives in a rented apartment has fewer opportunities to save or change facilities than the owner of a house. A further factor or problem is the direct accessibility of meters in a house. One of the essential hypotheses underlying this research project is that feedback mechanisms have an impact on energy savings. However, feedback is only possible if users are able to get hold of their consumption data. Particularly in apartment houses, meters can be behind heavy doors in the basement to which only the caretaker has the key. Another example is the traffic infrastructure available in a city. Urban areas, particularly big cities, generally provide a better organized public transportation system with a higher service quality than a rural community. Saragossa and Bremen with their frequent tram services obviously offer better opportunities for changing mobility behavior than the rural sites of Mariazell and Wennigsen, and also Pamplona, Bregenz, and Bremerhaven. For the latter three, although they have adequate bus services, the mobility available and the operating frequency turned out to be less attractive. It is clear that changing from an individual motorized traffic mode to public transport is much easier in areas with good public transportation systems. Hence, it is obvious that limited opportunities for a sensible participation in the citizen panels and for changing behavior encourage dropout tendencies among the panelists.

Another aspect concerns the provision of incentives or rewards for taking part in a local initiative and research study. Rewards may encourage the motivation to take part and to stay on board over a longer time period. In the Austrian and German panels, participants earned bonus points for every monitoring period filed and survey questionnaire answered. Participants in Germany could change these points

into energy-saving facilities of different values; in Austria, they received modest financial compensation. Moreover, panelists in Germany took part in a lottery with a number of valuable prizes like bicycles or a green energy contract. No such incentives could be offered to panelists in Spain.

13.2.3 Tool-Related Aspects of Dropout in e2d

A special factor in e-participation is the usability of the e-tools employed. In their three-layer framework, Macintosh and Whyte (2008) propose three levels of criteria or views for evaluating e-participation. The first layer is usability and concerns the socio-technical or tool perspective. It considers the extent to which the tools used directly affect the outcomes and help to achieve the objectives of an e-participation project. Referring to the almost classical model of program or project evaluation developed within the Organisation for Economic Co-operation and Development (OECD), Kubicek (2010) emphasizes the importance of tool navigation and organization, efficiency and flexibility, or error recovery (see also Chap. 2). In order to explain dropout, we consider usability in terms of ergonomic, human–computer interaction (HCI) criteria but open it up to a broader approach of technology acceptance. From the wide range of concepts, we consider the two most relevant, the *Technology Acceptance Model* (TAM) by Davis (1989) and the *Expected Value Model* (EVM) by Zeithaml et al. (2000).

As mentioned above, registrants that never opened the CO_{2e} calculator and that did not enter the baseline measurement did not drop out because of a perceived lack of ease of use of the tools as they had not tried them (dropout 1). But the system design features and technology acceptance in general plays a key role in type 2 dropout group. Those panelists gathered experience with the tools. Depending on their individual online services maturity level, some might have more or less difficulty with the monitoring tools. Hence, the design of the usability and usefulness of the online participation service can be used to achieve a higher acceptance or use and finally to minimize dropout.

Technology Acceptance Model

The TAM is a model for studying user acceptance of (new) information systems and is based on the *Theory of Reasoned Action* by Fishbein and Ajzen (1975). Based on an information system, TAM describes the causal relationships from the system design features to the actual system use (see Fig. 13.1).

According to the model, the system design features exert a direct influence on the *perceived ease of use* as well as on the *perceived usefulness* of the information system (Davis 1989, 319 ff.). Perceived usefulness is defined as the degree to which a person accepts that the information system facilitates the task to be performed or improved (p. 320). Perceived ease of use, however, refers to the degree to which

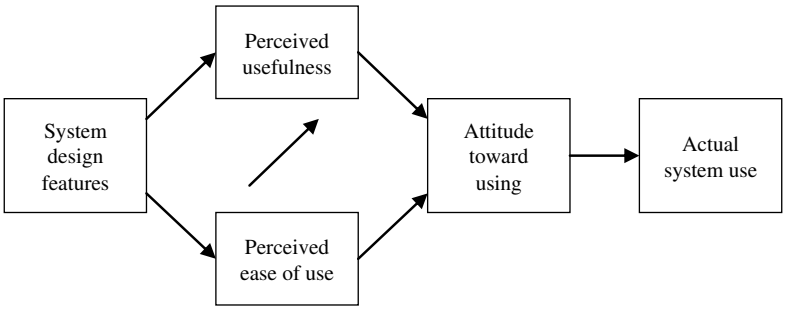

Fig. 13.1 Technology acceptance model. (Own illustration based on Davis 1993, p. 476)

a person assumes that he can use a particular system effortlessly. Through the perceived ease of use and usefulness, the system features exert an indirect influence on an individual's attitude to the use of the system and the resulting actual usage. It is interesting that in Davis' practice tests, usefulness showed a significantly higher correlation with the user's behavior than the ease of use. This means that users' (re-) use of the system is determined to a far greater extent by its added value for users than by its use-friendly design (Davis 1989, 1993).

Expected Value Model

In their EVM, Zeithaml et al. (2000) view the use of online services from another point of view, identifying the discrepancies (gaps) that may exist in the interplay of online services, providers, and users (see Fig. 13.2). The key features that determine the success or failure of online services are in the provision of genuine service quality on the Internet. The assumptions made in the EVM can also be applied to online facilities in e2d. This is because the relationships in terms of usability and usefulness of online participation services between organizers/providers and users are identical or similar, both sides sharing the same goal, including the use of a particular service. The EVM concept is based on four discrepancies (gaps) which may exist with respect to the mutual expectations of service suppliers and users. The discrepancies are mainly organizational in nature and relate to the design of the Internet service, the marketing of services and the service performance itself. Examples of the relationships between organizers, online participation service, and citizens, and the discrepancies between them are shown in Fig. 13.2.

The electronic service quality (e-SQ) perceived by the citizen determines whether the citizen makes use of the service or not. Perceived e-SQ according to the model is composed of the expected service and the experienced service. In the upper half of the figure, the e-SQ is evaluated by users. The evaluation will lead to the use, reuse, or refusal of the service. The lower half shows the simplified sequence of steps that organizers can apply to create and market their (e-)participation service. Zeithaml et al. (2000) assume that the smaller the gaps in expectations between organizers and users, the greater the e-SQ of the offer and the greater the likelihood that use is made of what is provided.

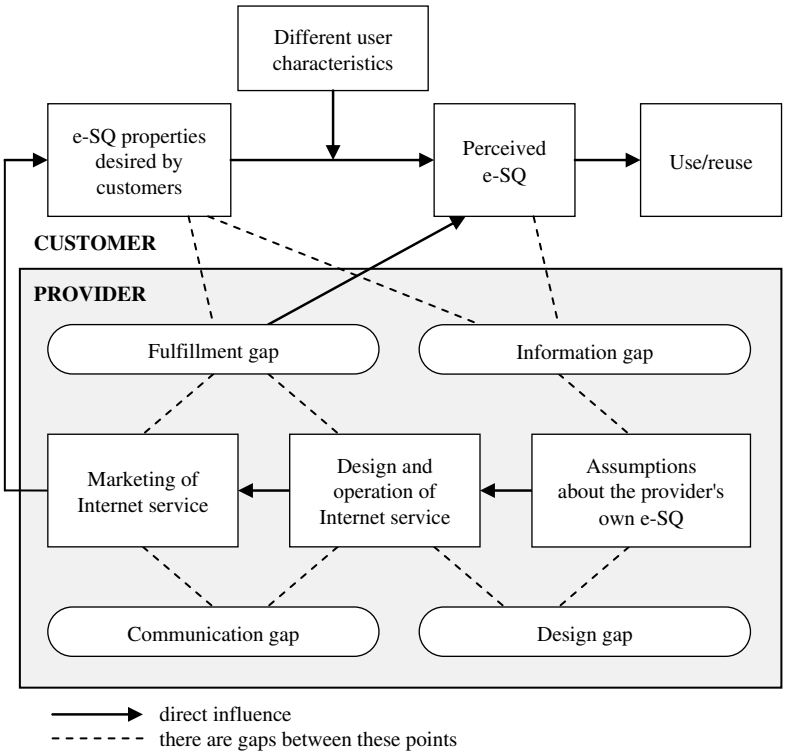

Fig. 13.2 Model for the understanding and improvement of e-service quality (e-SQ). (Illustration by the author, adapted from Zeithaml et al. 2000, p. 28)

13.3 Dropout Analysis in Citizen Panels on Climate Protection

13.3.1 Number of Participants Over Time

Table 13.2 presents the number of participants over time from registration to final measurement. Important points in time were the number of panelists filing the baseline measurement, the first periodic (bimonthly) measurement, the measurement after 1 year (seventh periodic measurement) and the number who took part in every bimonthly monitoring.

Dropout 1 marks the dropout of citizens who have registered and withdrawn before the baseline measurement had to be filed; dropout 2 marks the dropout between baseline measurement and final measurement. Obviously, the dropout reasons of the first group cannot refer to the impact of the tool assessment and the impact of the panels as they left before the actual panel activities started.

Even though the overall number of 1159 registered panelists seems rather high, the variation of panel sizes among the seven sites is considerable. In absolute

Table 13.2 Number of panelists and dropout rates over time

Panel	Registered	Baseline measurement	Dropout 1	1st periodic measurement	7th periodic measurement	Final periodic measurement	All measurements	Dropout 2
	n	*n*	%	*n*	*n*	*n*	*n*	%
Bregenz								
Onliner	46	23	50.0	15	14	9	9	30.4
Offliner	18	17	5.5	17	13	12	12	27.8
Total	64	40	37.5	32	27	21	21	29.7
Mariazell								
Onliner	42	25	40.5	14	12	11	10	33.3
Offliner	20	13	35.0	13	11	11	11	10.0
Total	62	38	38.7	27	23	22	21	25.8
Austria	126	78	38.1	59	50	43	42	27.8
Bremen								
Onliner	181	114	37.0	69	45	40	36	40.9
Offliner	32	22	31.3	21	19	20	13	6.3
Total	213	136	36.2	90	64	60	49	35.7
Bremerhaven								
Onliner	32	21	34.4	18	16	16	16	15.6
Offliner	16	14	12.5	14	12	13	13	6.3
Total	48	35	27.1	32	28	29	29	12.5
Wennigsen								
Onliner	92	60	34.8	49	–	26	23	37.0
Offliner	22	18	18.2	18	–	17	15	4.5
Total	114	78	31.6	67	–	43	38	30.7
Germany	375	249	33.6	189	92	132	116	31.2
Pamplona								
Onliner	186	67	64.0	59	32	26	26	22.0
Offliner	74	54	27.0	52	48	47	47	9.5
Total	260	121	53.5	111	80	73	73	18.5
Saragossa								
Onliner	278	182	34.5	152	112	88	86	33.8
Offliner	120	108	10.0	103	97	93	93	12.5
Total	398	290	27.1	255	209	181	179	27.4
Spain	658	411	37.5	366	289	254	252	23.9
Total e2d	1159	738	36.3	614	431	429	410	26.7

figures, at the outset, the participation in the Spanish panels was the highest with 260 in Pamplona and 398 in Saragossa. By contrast, the lowest number of panelists registered in the German city of Bremerhaven (48) and the two Austrian regions of Mariazell (62) and Bregenz (64). However, the participation rate relative to the local population size turned out to be highest in the smallest regions (see Chap. 7). The dropout before the actual measurement started was already high (36% on average).

The loss of participants was highest in the Pamplona panel, where about half left before the baseline measurement. The panel attrition rate between baseline and final measurement (dropout 2) was limited to a further 27% of the panelists who had originally registered, which corresponds reasonably to the levels found for panel studies in the literature cited above.

The Bremerhaven panel shows a dropout 2 rate of only 12.5% and, except for the Bremen panel with about 36%, all others are around 30% or below. However, it was rather obvious from the beginning, that a public participation activity requiring fairly long-term participation and input combined with requests for lifestyle changes would not be that popular among the general public. Further analyses on the mode of participation showed that the dropout 2 rate was especially high among onliners (32.2%), about eight times higher than among the offliners (3.9%). In line with this, the share of offliners in total dropout, that is, between registration and final measurement, in the seven panels during the 2 years is comparably low at 12.2%; in other words, almost 88% of the panelists that dropped out were onliners. This shows that the mode of communication has a strong influence on dropout. As discussed in more detail in Chap. 15, it was mainly the binding force of social relations and social control that resulted from the organization of regular CO_{2e} monitoring and feedback for offliners (with support staff calling the panelists via telephone bimonthly) that lowered the dropout among this group.

13.3.2 Sociodemographic Composition of Panels and Dropout

The pure overall figures alone are not meaningful enough. The representativeness by sociodemographic aspects is also of significance. As was to be expected and as has been the experience of similar projects in the environmental domain (see Chaps. 3 and 9), panelists have an above-average interest in and commitment to environmental topics, particularly with regard to climate change mitigation. Participants tend to be older than the general population (52% over 51 years) and on average are well educated (49% with university degree). For the dropout analysis, it is of interest to see which group has a higher dropout rate.

Table 13.3 shows the correlation matrix for age, parenthood, education, and occupation.

The negative correlation for age indicates that citizens over 50 years old are less represented among dropouts in all panels, that is, it was mainly the younger participants who withdrew from their panels. The results are particularly significant in Wennigsen and Bremen as well as among all the participants. It seems that other, competing preferences gained the upper hand among the younger population. More interesting are the percentages of dropouts who have children. In almost every panel, the share of dropouts who have children is smaller than for panelists without children. This is indicated by the negative correlation that is particularly significant in Bregenz as well as among all seven panels taken together. It could be interpreted

Table 13.3 Correlation between dropout and sociodemographic status variables

Region	*n*	Dropout by age	Dropout by parenthood	Dropout by education	Dropout by employment
Bregenz	27	−0.37	−0.61*	−0.10	0.06
Mariazell	23	−0.217	−0.21	−0.10	0.07
Bremen	89	−0.29*	−0.16	0.06	0.15
Bremerhaven	29	−0.03	0.07	−0.21	0.22
Wennigsen	50	−0.59**	−0.12	0.14	0.26
Pamplona	80	−0.21	0.073	0.08	0.15
Saragossa	206	−0.13	−0.049	0.18*	0.14
Total	504	−0.24**	−0.12**	0.13**	0.15**

Phi coefficient for Fisher's Exact Test of Independence
*$p < 0.05$; **$p < 0.01$
Dummy variables; dropout: 1 = dropped out; age: 1 = 51 and older; parenthood: 1 = has children; education: 1 = university degree; employment: 1 = in employment

as an indication that citizens who are parents tend to show a higher level of social responsibility towards subsequent generations than nonparents, as was one of the hypotheses in e2d. However, this finding has to be taken with caution as no significant differences were found in the levels of CO_{2e} reductions achieved between the two groups.

On the other hand, education played a role, as shown by the significant positive correlation between dropout and level of education among the total, that is, more academics left the panel than participants with compulsory or secondary schooling. With respect to the deviation in Bregenz, Mariazell, and Bremerhaven, the number of panelists included in the analyses is rather small. However, the lower the number of cases, the higher the effect on the level of significance. Certainly, these methodological constraints influence the correlation results for all four sociodemographic variables. Hence, a consideration of the total results for the panelists from all seven panels permits a more valid interpretation. Finally, employment status proved to be another interesting factor for dropout. The significant positive correlation in the total sample indicates that the panelists' employment status has an impact on their dropout decision. Participants who work regularly more often left the project than those who are retired, do not work, or are still studying. As a tendency, this observation could be made across all seven panels. From this result it seems that participation in the panel proved to be too costly for some participants. Panelists who are already retired and hence who have more time seem to be in a better position to balance their daily duties and their private lives including their participation in the panel.

In the following section, we present the findings on the reasons given for dropping out. The sociodemographic composition is not considered any further in this analysis, but an interpretation of the results should take into account the fact that more younger participants, more participants without children, more academics, and more participants who are employed left the project.

Table 13.4 Ranking of dropout reasons

		Applies to a great or very great extent (%)
1	The amount of time needed was too high	66.7
2	Gathering the required data was too complicated	61.1
3	I saw no more scope for improving my CO_{2e} balance	38.9
4	The climate initiative reached too few participants	30.2
5	Local administration and politicians have not contributed enough to the climate initiative	30.2
6	Local companies have not contributed enough to CO_{2e} reduction	23.8
7	I felt a lack of opportunities for an exchange with other participants	20.6
8	The project is of no value for climate protection	20.6
9	I was not ready to really change my lifestyle	19.1
10	The project does not generate energy cost savings	18.3
11	I was concerned about data protection	11.9
12	Information supplied for saving energy and CO_{2e} was insufficient	11.9
13	I felt a lack of rewards to compensate for the time dedicated	4.8

Multiple response, $n = 126$

13.4 Findings on Reasons for Dropping out

Although the dropout rate experienced in this project is in line with expectable panel attrition, the high rate of participation willingness expressed in representative telephone surveys at the beginning had promised a different course. For this reason, the standardized survey of all dropouts was intended to gather information on the reasons why these people left the panels before time. The main reasons given by the 126 respondents were analyzed in the light of the usability of the instruments used in the participation process (see Sect. 13.2.3) and the usefulness of the panel participation for citizens in general. In the latter case, the focus was on the above-mentioned determinants of behavior change from a sociological, environmental–psychological, and economical point of view (see Sect. 13.2.2). Table 13.4 provides an overview of dropout reasons.

In summary, the main dropout reasons according to the dropout survey were the limited time budgets that the citizens had for a reasonable involvement in the panel and the complicated data collection. Both reasons are interrelated as data collection required time. Depending on the individual conditions of the home and the number of household members that had to be considered when calculating consumption data, this can be a demanding, time-consuming task. The reasons are discussed in detail in the following section.

13.4.1 Psychological and Social Aspects

Values and Attitudes

The representative telephone surveys in the seven regions revealed that *climate change* is among the top concerns of citizens. Moreover, approximately 92 % of the

panelists believe that climate change is very worrying. These findings are in line with the European mood that has been ranking climate change as a main threat for years (European Commission 2011, 2009, 2014). However, people nowadays are confronted with several global-to-local problems. And it is not necessary to be a climate change skeptic to rate other (global or national) problems higher than climate change. Hence, individual concerns and preferences may change during the citizen panel period. Citizens may have registered because of their pro-environmental attitude and their general will to support climate protection behavior. But when activities are to start and individual involvement is needed, it is often not the right time, other interests are more important, or the expenditure is too high at that particular point in time or life. In particular, the time budgets available and competing preferences play a key role in this conscious or unconscious decision, as do the efforts needed to engage. The decision to register and to drop out before actual activities start is strongly influenced by the general question of preferences at a particular point in time. One third of all registrants (one half in Pamplona) seem to struggle with their preferences at a certain point in time. As the majority of dropouts were somewhat anonymous onliners less subject to social control (as was the case for offliners—see above and Chap. 15), they did not have to justify their decision to others. The situation is different when dropout 2 is considered. After the first round of individual data entry for the calculation of CO_{2e} footprints, there had already been sufficient contact between organizers and panelists and between the panelists to enable an initial community building, and the panelists had mastered the functionalities of the monitoring tools. Community building and the efforts needed for regular gatherings and the provision of data, as well as the individual (non-)affinity to (online) monitoring instruments, certainly became more relevant for dropout 2. As will be shown later, there were no significant differences in general values and attitudes towards climate protection among the population in the seven regions.

Participation-Related Effort

Participation in a citizen panel in e2d could be classified as a high-cost activity that requires a high level of motivation or interest in climate protection. The majority of citizens seem to have avoided such a high-cost situation. About 36 % of those who entered the arena by registration with the project had already withdrawn before the actual measurement started or after they had made acquaintance with the CO_{2e} calculator (dropout 1). About 11 % more left between baseline measurement and first periodic measurement (2 months later). Ultimately, about 53 % of the citizens originally registered overcame this high-cost burden, at least until the first periodic (bimonthly) measurement (see Table 13.2). A particularly high cost was the data measurement that required access to consumption meters. But not all participants had direct access to their meters, or they shared their meters with other people living in the same house. This aspect, however, was not considered in the conceptualization of the panels. The panelists affected were given hints on how to get access to their meters and how to calculate or estimate their consumption data instead. How-

ever, this work-around required additional efforts by the panelists and led to a further increase in the high-cost situation. Thus, about 61 % of the respondents named gathering required data as one of their reasons for dropping out (dropout rank 2). Except for the Saragossa panel with 25 %, in all other six panels, this problem was mentioned by 60 % and more.

However, the participation in the panel as such could also already be perceived as a high-cost situation. According to the uses and gratification theory, individuals weigh up the pros and cons of their efforts. The saving of energy costs was communicated to citizens as a main argument for registering with the project. In many cases, this argument proved to be a more important reason for participation than the reduction in CO_{2e} and climate protection. If savings could not be achieved, the expected reward for the efforts invested failed to materialize. Thus, panel participation could develop into a high-cost activity that individuals were not ready to take on. However, only about 18 % of dropouts did not achieve the expected energy savings and mentioned this as an argument for leaving the project (rank 10). This result is also underpinned by the finding that 75 % of the respondents perceived the project as being of high or very high value for climate protection and only about 21 % judged the project as of little or no value (rank 8). The concordance of respondents who mentioned both reasons is about 65 %. Significant differences among the seven regions were not observed in this regard; in general the pattern of dropout reasons reported was very similar. Most of the dropouts withdrew at a time where actual savings could not be clearly observed. It is expected to take at least 1 year for a valuable insight into the development and dependencies of one's CO_{2e} balance to be gained. Hence, it seems that reasons ranked eighth and tenth emanate more from emotional-intuitive assessments than from actual measurable results.

Besides these general prerequisites for pro-environmental behavior, values and attitudes are particularly represented by dropout reason numbers 3 and 9. A considerable portion (39 %) said they did not see any possibilities for further improving their individual carbon balance (rank 3). In this case, the assessment varied considerably among the seven panels, from 0 % in Saragossa and 7.7 % in Mariazell to 55 % in Wennigsen and even 100 % in Bremerhaven. Of all respondents, 19 % confessed to be unwilling to change their lifestyle (rank 9). No significant differences among the seven panels were observed. But interestingly, three fourths of those 19 % also saw no scope for further CO_{2e} reductions in their daily activities. This leads to two findings, firstly, the majority did not leave their panel because they did not see any chance for improvements, and secondly, from the view of the dropouts, CO_{2e} reductions only seem to be achievable through a simultaneous impairment of one's own lifestyle. The first finding may be taken as a good sign, with withdrawal being based on reasons other than a perceived lack of the individual's own saving potential. The second finding, that CO_{2e} savings could only be achieved through fundamental lifestyle changes, exposes a lack of information since this is actually not the case. Thus, local politicians and administration must do more to better inform and engage with citizens about the purpose, achievements, and priorities of climate protection. From an objective point of view, every citizen of a European country has a potential to reduce his/her greenhouse gas emissions. It is a question of how far they would

go to achieve further savings. *How far* does not mean that people have to abstain completely from any consumption or seriously restrict their living conditions. It is rather the degree to which panelists have to leave their comfort zone. Considering the various lifestyles of today, it can be assumed that a person sees no further scope for improving his or her individual CO_{2e} balance while maintaining the established daily routines and avoiding a scrutiny of the self-imposed living conditions. There are alternatives for almost any behavior. Change is a free choice. The associated reasons ranked third and ninth in Table 13.3 are closely interrelated. Presumably the 19% of respondents who answered that they were not willing to change their lifestyle were more honest than the roughly 39% that did not see any opportunity for making further reductions of their individual balance.

Involvement of Time Budgets and Other Competing Preferences

Competing interests formulated by panelists vary considerably. There is not only "competition" between the most crucial challenges facing the world today, but also competition between an individual's different interests. There is also only limited leisure time. Why not play with the children, pursue sport, or watch TV instead of investing time and energy in a participation project? Although not a direct subject of the dropout survey, there is evidence from additional interviews taken with all dropouts from Wennigsen and from various responses of dropouts from other panels in e2d that competing interests quite often led to the drop out of panelists. This is underpinned by the actual time budgets available for involvement in the citizen panel. Exactly two third of the dropouts reported that the amount of time required was too high. According to the survey, this is the highest ranked reason for dropping out. Considering the panels with the lowest (Bremerhaven) and highest total dropout rate (Pamplona), it is interesting that the available time budget was mentioned most frequently by respondents of both of these panels (100 and 77.8%). The share of respondents of other panels who gave this response ranges from 25 (Saragossa) to 72.5% (Wennigsen). Hence, the best and least performing panels regarding dropout both gave the involvement time budget required as being the most crucial dropout reason.

Living Conditions and Incentives

Living conditions include the context in which people live and its related implications. One aspect is the climate with its influence on the demand for heating energy and electricity, which is different in the southern regions in Spain and the more northern regions in Austria and Germany. Certainly, opportunities for behavior change are different, and some lie outside the influence of the individual panelist. Other examples include whether participants live in their own house and have the opportunity to make pro-climate changes (e.g., renovation of the home in energy terms or changing the heating energy type), or if they live in a region with a sound

public infrastructure that allows for a change of individual traffic mode. The effects of living conditions are closely related to the low-cost hypothesis and have already been described above.

Ranks 4–7 in Table 13.3 concern the team spirit of panelists and the coproduction type of participation of all three major local stakeholder groups. Both interrelated aspects seem to be of less importance for the decision to continue or discontinue participation in the seven panels. However, consideration must be given to the fact that no major group activities in addition to the meetings at the start, at mid-term and at the end were planned in the Spanish panels due to a different project organization. Moreover, an online platform that allowed for exchange was not established and maintained appropriately at all locations. Considering that only a certain percentage of the panelists regularly attended the panel-specific exchange and discussion meetings (online and offline) in the Austrian and German panels, opportunities for obtaining information about the achievements of other partners and for a common exchange do not seem to have had as high a relevance as expected. Even though this was a central element supporting the improvement of an individual's CO_{2e} balance (see Chap. 10), from the survey results it seems that the participation process tended to be perceived as an individual rather than a group activity by the dropouts.

The remaining three dropout reasons assessed as being of minor importance in 11th–13th position concern the panel organization: trust in data protection, provision of CO_{2e} relevant information and provision of incentives. The low rankings, however, do not necessarily mean that data protection and the quality of information provision were not important values for users. Rather, this could be an indication that the panels provided valuable information packages for citizens and imparted a sense of data security for panelists. With regard to incentives (dropout rank 13), participants were not eager to receive material incentives for their participation. For more than 95 %, the offering of incentives was of minor relevance for their participation. In all seven panels, participation was seen more as a matter of course to support the greater good without receiving any material compensation.

13.4.2 Technology Acceptance

e2d researchers have been working for years on issues around the ease of use and usefulness of online services in various projects, for example, Modinis (Kubicek and Cimander 2007), Demo-net (Tambouris et al. 2007), Backoffice (Millard et al. 2004), and Bonsai (Cimander and Taimanova 2004). Even though many efforts have been made in e2d to improve the ease of use of the CO_{2e} calculator and to amend it with brief and concise guiding information, the overall assessment of the greenhouse gas calculator by the research team was only medium. In particular, the log-in functionalities generated error messages from time to time, and entering the baseline measurement required users who were sophisticated with respect to the use of the Internet and who understood the facilities in their own homes.

Table 13.5 Assessment of ease of use of the CO_{2e} calculator

	The input mask of the CO_{2e} calculator makes data entry…				In comparison to similar applications you have used, using the CO_{2e} calculator is…			
	Loyal panelists		Dropouts		Loyal panelists		Dropouts	
	n	% (∑)	*n*	% (∑)	*n*	% (∑)	*n*	% (∑)
…very easy to rather easy	183	86.3	47	54.7	167	85.7	40	46.5
…rather difficult to difficult	29	13.7	34	39.5	28	14.4	42	48.8
Don't know	0	0.0	5	5.8	0	0.0	4	4.7
Total	212	100.0	86	100.0	195	100.0	86	100.0

In the dropout survey, the ease of use of the CO_{2e} calculators was not stated by dropouts as a single reason that supported their decision to leave their panel. This is why usability as such is not mentioned as a dropout reason in Table 13.4. Instead, several questions had to be answered to assess the online tool. A total of 72% of responding onliners who had dropped out had used the CO_{2e} calculator at least once; the rest had not and thus could not answer questions on usability. Two examples of answers received concerning usability are presented in Table 13.5. Moreover, answers are compared to those of the loyal panelists that did not dropout.

The survey results seem to prove the moderate expert assessment above: 39.5% had difficulties with the calculator input mask and 48.8% of respondents assessed the use of the CO_{2e} calculator as rather difficult to difficult. Moreover, the comparison with the assessments by the loyal panelists clearly shows that the latter struggled significantly less with the usability of the CO_{2e} calculator. Almost twice as many panelists who participated over the full period assessed usability as very easy to rather easy. As detailed in Chap. 8, the Austrian and German panels shared the same calculator, but the Spanish panels used a technically different one with different usability aspects. Further questions revealed that 44.2% had problems transferring meter data from their individual project web space to the calculator site and that 58.1% struggled with the calculator questions' accuracy of fit with the individual's actual living conditions.[1] However, the calculator could not be adapted to all individual cases. The consequences were inaccurate CO_{2e} balances of some panelists and thus frustration. Moreover, changes like relocating or leaving the city affected comparability with the previous balance, and thus balances lost their information value over time and led to participants leaving the project. As was to be expected, these findings do not correspond to the assessment of the roughly 220 onliners who stayed in the project for up to 2 years and who answered the regular panel survey questions. More than 80% of them assessed usability as good or rather good and did not discover major usability problems (see Chap. 9). In accordance with the TAM arguments, the usability of the tools influences the decision whether to use the tool;

[1] For example, exact consumption figures for heating energy could not be collected on a bimonthly basis, changing numbers of people living in the household could not be considered as well as the extension of one's home; data concerning dogs or other pets could not be entered into the tool.

that is, whether it is perceived as being useful or not for the individual. Some of the more obvious aspects defining the usefulness of the CO_{2e} calculator are the reduction in energy costs, getting to know one's carbon balance or meeting like-minded people. However, the direct correlation between the ease of use of the calculator and perceived usefulness could not be assessed for the group of dropouts: the majority of these had already left their panel before energy savings could have been noticed, meaningful carbon balances drawn up or lively discussions established. However, even if not possible from the assessment of the group of dropouts, from the final panel surveys, we can deduce a correlation between the ease of use of the monitoring tool and its usefulness: Between 70 and 80% of the loyal participants in the Austro-German panels perceived a reduction in energy-saving costs. About four fifths across all loyal panelists regarded the regular information on the development of their carbon balance as being important. From the individual ecological impact assessment (see Chap. 11), we know that panelists that did not perceive a feeling of group formation yielded less good results. So finally, as loyal panelists assessed these aspects positively and developed rather well while most dropouts could not perceive any of the aforementioned effects, there might well be a direct link between the ease of use and usefulness of the monitoring tool.

Another aspect concerns the provision of climate protection and behavior-relevant supporting information. This included regular newsletters with tips and tricks, invitations to local meetings, excursions, and other relevant activities in the hometown. Around 80% of dropouts assessed the information supplied during the panels as sufficient and thus not a reason for leaving the panel (rank 12).

In accordance with the EVM by Zeithaml et al. (2000), we see in particular an *information* and *design gap* between the perceptions of the providers and organizers with regard to the calculator functionalities and the actual needs of an average panelist (see Sect. 13.2.2). Generally speaking, the design of the CO_{2e} calculator was quite ambitious both with regard to specific functionalities that in fact were not seen as being easy to use by all, and with regard to the overall calculation of CO_{2e} levels based on multiple components. Moreover, the understanding, responsiveness and the efficiency of the system design features seem to have been perceived differently by the providers and panelists. Another discrepancy appeared in the form of the *communication* and *fulfillment gaps*. The local organizers of the citizen panels—sometimes for lack of detailed knowledge of the actual capacity of the balancing and monitoring instrument—announced a comprehensive CO_{2e} balancing service to their citizens that, however, ultimately could not deliver all that was promised.

13.5 Conclusions

Outreach is a crucial criterion for the success of participation exercises. However, it is not only the size of the panels that is important in collaborative processes, but also their continuity over time is relevant, that is, a low level of dropout and panel attrition. In the e2d project, total dropout rates per citizen panel ranging between

40 and 72% had to be dealt with: type 1 dropout (i.e., before baseline measurement) between 27% (Bremerhaven) and 54% (Pamplona), plus type 2 dropout (i.e., after baseline measurement) between 12% (Bremerhaven) and 36% (Bremen). To explain the dropout and the differences between the seven panels, two main theoretical strands have been presented in this chapter: the social and psychological patterns that shape the values and attitudes that keep the citizens participating in their panel or lead them to drop out, and on the other hand the requirements set by the tools used in the participation processes—here mainly the CO_{2e} calculator. Although the perceived ease of use is an important factor for keeping people using a certain service, about half of dropouts reported having difficulties in one way or another with the usability of the CO_{2e} calculator. By contrast, only about 15% of the loyal panelists reported such or similar problems. Hence, a lack of perceived ease of use is responsible at least for those dropouts whose affinity to and experience with online tools is low and where individual support is lacking. Supporting functionalities for onliners, however, were limited. It was part of the e2d project design that onliners should participate and obtain relevant information and support entirely by electronic means; no offline support was foreseen for this group. Austro-German panels received online support through an online helpdesk and an online forum. For organizational reasons, such facilities could not be provided for users in the Spanish panels. As presented above, this is to be seen as one major reason for the higher dropout rate in the Pamplona panel.

A shortage of time in combination with the complexity of gathering and entering consumption data into the calculation tool were named as the fundamental dropout reasons throughout all seven panels. These findings, however, are not surprising since from the beginning a narrow path had to be followed to design a monitoring tool that on the one hand was suitable for covering most relevant greenhouse gas emission elements of an individual's daily life and that at the same time did not overburden its users. As there were only limited possibilities for adapting the usability of the available CO_{2e} calculator, and because a meaningful CO_{2e} balancing is only feasible if a certain set of consumption and behavior data is available, a high dropout rate was to be assumed.

However, people bear difficulties if the expected gratification is high enough. For this reason, the most important dropout reasons are to be sought in the psychological and social sphere. In this regard, the hypothesis of Thaler and Sunstein (2008) that adherence to social norms and competition may trigger behavioral changes has only proven to be partially valid in e2d. In contrast to the experiments described by Thaler and Sunstein, participation in e2d lasted much longer and demanded the reflection of the individual's own lifestyle. Moreover, it required the adjustment of the personal lifestyle to climate-compatible behavior, which represents a challenge to long-established patterns and a confrontation with barriers. This means feedback information alone could not be a sufficient enabling factor. Even highly concerned people lose interest over time. Although it is clear that individual achievements can only be measured by comparing the same months for different years, many people do not have the patience and discipline to persevere. Disappointment at a single flight damaging the balance of achievements in other areas for a whole year

contributes to giving up. Therefore, feedback alone will not contribute significantly to lasting energy savings and CO_{2e} reduction. Instead, it has to be embedded in complementary measures supporting pro-climate behavior change.

For example, arrangements can aim at fostering sociability, conformity, recognition, or social control. They build the foundation for people's behavior and attitudes to influence the behavior of other actors. Community building may support the strengthening of pro-climate social norms, as was the aim in e2d, but results showed mixed success. The organizers of the Austrian and German panels had offered more meeting and exchange opportunities to their participants than was the case among the Spanish panels. Onliners in the Austro-German panels were also regularly invited to the face-to-face meetings. In Spain, due to the specific recruiting model in Saragossa, using a group of volunteers already established at the time of the EXPO activities in 2008, the initial situation and chance for community building was better in Saragossa than in Pamplona. In addition, the existing infrastructure, such as the spread of public transport and the supply of regional and organic food is of considerable importance. Here, the bigger cities with a better infrastructure like Saragossa and Bremen offer better conditions for change and hence less reasons for dropping out.

Another major aspect concerns the services and facilities around the monitoring tool offered to citizens. As the survey showed, users in all seven panels were very satisfied with the general information and communication facilities and with questions of data security. More important reasons for dropping out were the lack of wider participation and support by other citizens, businesses, and finally the organizing public authority. Thus, better participation rates can in the future only be achieved by increased marketing of the possibility to participate with better support by public authorities and better integration of businesses. The citizen panels started as a joint effort by all groups in society but ended up with a strong focus on the achievements of the citizens only. Moreover, to attract panelists, further investments in the ease of use of the calculator tool and in the provision of assistance to panelists adapted to their individual needs need to be undertaken. The latter, however, could be perceived as an intrusion into private life and, overall, is perhaps not affordable by public authorities.

Alongside the usability of the monitoring tool and its ease of use for the citizen panels, there is another more decisive factor that has an impact on the question whether the possibility to participate is used or not. In accordance with TAM and EVM, too, it is the perceived usefulness of the online service. Tools characterized by high usability may encourage their use, but do not imply it. Thus, particular focus needed to be put on the additional value of the participation for citizens. The citizen panels offered various advantages to their participants: be it financial benefits as a result of energy savings, broad and free of charge energy consultancy services, discussion and exchange facilities with experts and other panelists, or modest material incentives as compensation for data gathering. However, participation in climate protection is different to other, relatively common participation fields like voting, public budgeting, or urban planning. It concerns questions of individual lifestyles, and people react very sensitively when their social and environment-related

conscience is concerned. With regard to the protection of the environment, it is not unusual for individual aspirations to differ from real action, which in turn causes inner psychological difficulties. People try to avoid such mental inconsistencies and tend to balance them. This could be either by adapting their behavior or their desires or by simply ignoring the difference. In the latter two cases, withdrawing from a citizen panel on climate protection with reporting duties regularly confirming this difference would be a first logical consequence. Hence, it is no wonder that the reason for dropout with the third most votes concerns the participant's ability and will to contribute to climate protection. Overall, the self-evaluation of dropouts revealed that 38.9 % have already exhausted all their saving options and see no further improvements of their individual balances; this is remarkable. It is to be hoped that the practical reasons (e.g., those ranked 1 and 2 in Table 13.4) will be mitigated in future participation processes by more suitable instruments and arrangements; the last-mentioned reason calls for an emphasis on explanation, education, and persuasion.

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Chapter 14
The Managers' View of Participation Processes with Citizen Panels

Vicente Pina and Lourdes Torres

Abstract The aim of this chapter is to evaluate the effectiveness of citizen participation from the organizers' point of view. We analyze the experience of managers from Germany, Austria, and Spain and their expectations about citizen participation in local government programs through an empirical survey focused on citizen participation in climate change programs. We seek to compare the opinion of these managers, experts in climate change initiatives, about the impact of e-participation. This research will allow us to know the opinion of managers about the success and failure factors of citizen participation in environmental programs.

14.1 Citizen Participation and Trust in Government

Citizen participation initiatives can be found in almost all the modernization programs of industrialized democracies with the aim of strengthening citizen trust in governments and to overcome the passive role that citizens as "customers/clients" had (Pratchett 1999; Dimitriu 2008) in the New Public Management (NPM) reform wave of the 1990s. After more than three decades of NPM reforms, in which the bureaucratic public administration model has been strongly criticized, there is a feeling among the citizenry that the "customer approach" has widened the distance between government and citizens and that there has been a decline of public trust in governments (Welch et al. 2004). In the conclusions of the Sixth Global Forum on Reinventing Government (Kim et al. 2005), the search for new styles of governance which promote higher levels of citizen engagement is viewed as a way of changing such feelings and improving citizens' trust in governments. The idea of participatory governance is gaining popularity and reflects the potential of citizen participation in public policy and service delivery.

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According to Nabatchi (2012), citizen participation may have many goals. When determining goals, public managers must be mindful not only of their own needs but also of the needs (and interests) of potential allies, stakeholders, and citizens. For example, participation can be used to inform the public (to let citizens know about issues, changes, resources, and policies), explore an issue (help citizens learn about a topic or problem), transform a conflict (help resolve disagreements and improve relations among groups), obtain feedback (understand citizens' views of an issue, problem, or policy), generate ideas (help create new suggestions and alternatives), collect data (gather information about citizens' perceptions, concerns, needs, values, interests, etc.), identify problems (get information about current and potential issues), build capacity (improve the community's ability to address issues), and develop collaboration (bring groups and people together to address an issue).

Citizen participation may be indirect or direct. Indirect participation, such as voting or supporting advocacy groups, occurs when citizens select or work through representatives who make decisions for them. Direct participation occurs when citizens are personally and actively engaged in decision-making. This is the case, for instance, of participatory budgets, the co-production of services, and e-petition. In the academic literature, citizen participation has been considered under a number of labels including citizen engagement, citizen involvement, active citizenship involvement, and citizen empowerment. Typically, the highest degree of citizen participation has been found in climate change, garbage recycling, and social programs, and the benefits of citizen participation are related to improvements in effectiveness and efficiency, decision-making quality, and legitimacy (Bovair 2007; Smith et al. 2009).

After more than a decade of academic and professional studies about the contribution of information and communications technologies (ICTs) to enabling citizen participation, at present, there is an ongoing theoretical debate about the need for a well-founded evaluation of e-participation and traditional participation initiatives (Aichholzer and Westholm 2009).

The aim of this chapter is to evaluate the effectiveness of online versus offline participation from the point of view of managers, experts in climate change initiatives (hereinafter managers). For this purpose, we analyze their previous experience in, and their expectations about, citizen participation in local government programs through an empirical survey focused on citizen participation in climate change programs. The final part summarizes the managers' assessments of the development and results of the citizen panels of the e2democracy project. There are a few online/offline citizen participation evaluation studies and none of them addresses the evaluation from the point of view of local government managers. This chapter allows for a comparative evaluation through an international survey, employing the opinion of managers from Austrian, German, and Spanish cities or regions. We seek not only to compare the opinion of managers on the use of e-tools but also to assess the impact of e-participation on the policy goals for which citizen participation is offered.

14.2 Theoretical Framework: The Search for New Styles of Governance

Institutional theory has been extensively used in recent years by academics for interpreting the adoption of innovations in the public sector. Many studies about the implementation of public sector reforms have used institutional theory (DiMaggio and Powell 1983) to explain the features of these implementations and the gap between rhetoric and actual results. Institutional theory is a positive theory, which explicitly considers the organization as part of a broader social system and seeks to describe corporate behavior rather than prescribing how organizations should behave. It has a degree of overlap with a number of other theories, notably the stakeholder and legitimacy theories (Deegan 2006).

Institutional theory is mostly concerned with the diffusion and spread of organizational models within a given organizational environment and with understanding organizations within larger social and cultural systems (Oliver 1991; DiMaggio and Powell 1983). Institutional theory assumes that organizations respond to pressures from their institutional environments and adopt structures and practices that have high social value as answers to external changes in expectations and formal rules.

According to this theory, citizen participation can be viewed as the search for new styles of governance in order to be responsive to the wishes and expectations of citizens. Thus, in an environment of lost trust in governments, public institutions could view citizen participation as a symbol of responsiveness and of "good governance." Citizen participation may be considered as a key element of transparency and good governance (Kim et al. 2005). Organizations introduce practices which are expected to be interpreted by citizens as improvements in transparency and accountability. The intentional or unintentional separation between external image and actual structures and procedures has been referred to as "decoupling" (Meyer and Rowan 1977; Meyer and Scott 2002). Public sector entities are required to demonstrate responsiveness and citizen participation initiatives are seen as one way in which public sector entities can legitimize their operations.

The hypothesis that the public sector adopts innovations for their symbolic value is not new. It is one of the most frequently repeated arguments for explaining the features and results of the implementation of public sector reforms. So, it may come as no surprise that citizen participation initiatives are sometimes undertaken simply for image and legitimacy since no government can say that citizen participation in public action is not useful or that it is a waste of time. Furthermore, citizen participation can be seen as a sign of good governance in response to institutional and/or social pressure in order to secure legitimacy from constituents and resources from the institutional environment.

An important issue in this theory is the concept of isomorphism. Three classifications of isomorphism are proposed: coercive, mimetic, and normative (DiMaggio and Powell 1983): (a) coercive, results from both formal and informal pressure imposed on an organization by legal, hierarchical, or resource dependence (in the case of local governments, from central or regional governments); (b) mimetic, in which

organizations may imitate practices and models of leading organizations in their institutional field in an attempt to get greater recognition, becoming, in this case, passive adopters of innovations; and (c) normative isomorphism stems from environmental pressure for transformation from stakeholders such as politicians, financial institutions, scholars, and multilateral organizations, as well as from specialized groups within a profession who try to define the conditions and method of work.

14.3 Methodology

A two-part questionnaire was designed. Part A deals with the experience of the managers in previous initiatives in which citizen participation was involved via the Internet and/or traditional ways. Part B collects the future expectations of managers about the contribution of citizen panels to climate saving.

In part A, the assessment of the experience of managers regarding citizen participation processes was carried out through interviews with 48 managers of climate change programs of 19 local governments from Germany, Spain, and Austria involved in some of the most relevant international environmental initiatives (Agenda 21, Aalborg Commitments, Covenant of Mayors (CoM), Climate Alliance, e5 Programme, R20 Regions of Climate Action, etc.): Bremen, Munich, Bremerhaven, Freiburg, Hannover, Wasserburg, and Wennigsen in Germany; Saragossa, Pamplona, Diputacion Provincial de Zaragoza, Alcobendas, Sant Cugat del Valles, Alicante, and Regional Government of Aragon in Spain; and Bregenz, Mariazellerland (Steiermark), and Vienna in Austria. The interviews were carried out from September 2010 to April 2011.

In part B, the survey about expectations was limited to those cities involved in our citizen panels' initiative (Bremen, Bremerhaven, Wennigsen, Saragossa, Pamplona, Bregenz, and Mariazellerland; see http://www.e2democracy.eu).

Finally, at the end of the project, we sent a questionnaire to those managers ($n=23$) who had accompanied the e2democracy project throughout, asking about their degree of satisfaction with the development and results of the citizen panels.

14.4 Analysis of Results

Figure 14.1 shows the structure of the questionnaire in which managers answer or skip questions according to their degree of involvement and experience in online and offline citizen participation programs about climate change.

1. Experience in climate change or environmental protection

Interviewees ($n=48$) report different degrees of experience in climate-saving projects. More than 64% state that they have up to 10 years of experience and around 40% state that they have up to 5 years of experience. The average participation of

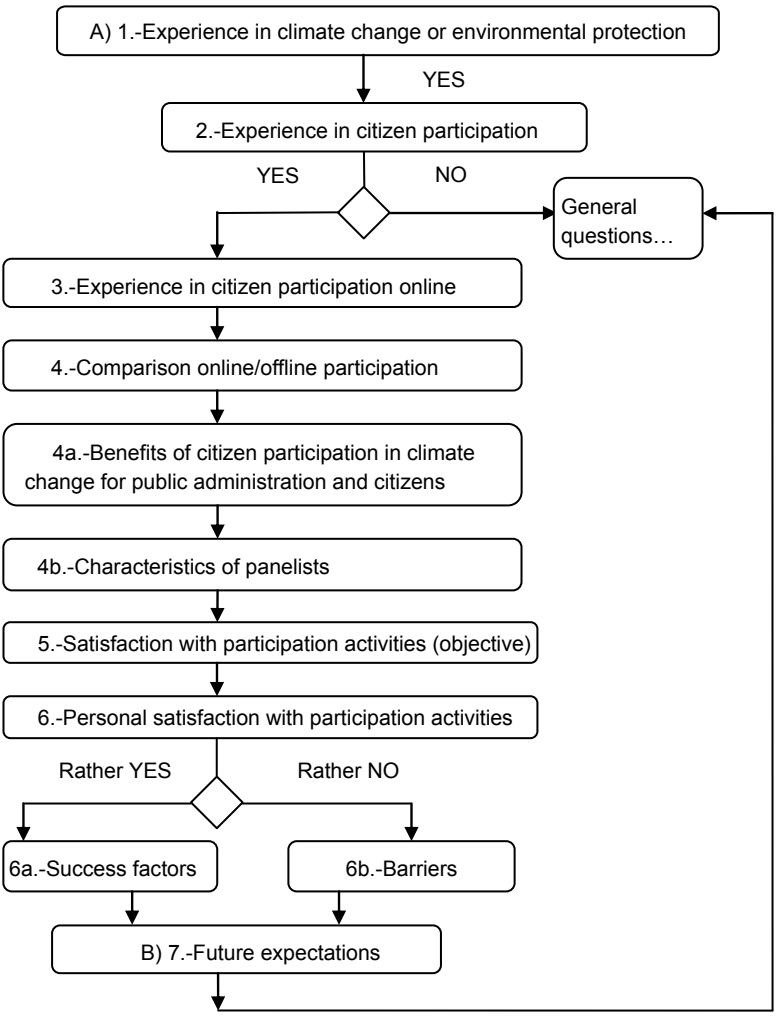

Fig. 14.1 Questionnaire diagram

managers in this kind of projects is 9 years. This experience in climate-saving programs gives managers a solid background to build an informed opinion about what can be expected from citizen participation in climate-saving programs, even though these initiatives are relatively recent in local administration agendas.

2. Experience in citizen participation

Most of the interviewees also have experience in citizen participation projects in which citizens are involved in local programs (80 %), such as energy saving, mobility, ecology education, CO_2 reduction habits, and recycling. In addition to climate-saving programs, some interviewees have also been involved in programs included in Agenda 21.

3. Experience in citizen participation online

Germany and Spain show the highest level of experience in e-participation with 58 and 43 %, respectively, of the managers interviewed stating that they have been involved in e-participation initiatives; the level in Austria is 12.5 %. The questions directly related to e-participation have been answered only by the managers with experience in e-participation.

4. Comparison online/offline participation

Around 50 % of the managers report better online project performance in cost for public administrations and citizens, better offline project performance in the "value of the content of the contributions" and they find no differences in effectiveness in CO_2 reduction.

4a. Benefits of citizen participation in climate change for public administration and citizens

From the point of view of managers, the most outstanding benefits from both online and offline participation programs are "better transparency in the development of local measures for climate saving" and "increased attention to the climate effects of actions in various fields of life" (see Table 14.1). Other effects from the contribution of citizen participation are a test of new ways of governance and the improvement of the image of the city. German, Spanish, and Austrian managers show a similar degree of satisfaction with respect to their previous experiences with citizens. In all cases, the standard deviations of the Spanish managers' answers are below average, which means a lower degree of dispersion of manager views about the benefits of citizen participation than in the case of German and Austrian managers.

4b. Characteristics of participants in climate-saving programs

For the interviewees, there is no difference in age, gender, income, and political orientation in the population who participate in climate-saving programs. By contrast, they report more participation in citizens with higher education and a lower background of migration. Interviewees with experience in online participation initiatives describe the profile of citizens participating online as young, with high education and a nonmigrant background.

5. Satisfaction with participation activities (objective)

Among managers with experience in citizen participation in climate-saving programs, there is a tendency towards offline projects, as reflects the mean value of the answers of 6.2 for offline projects with respect to 5.5 for online projects. Only the item related to the cost-benefits is slightly higher in the case of online initiatives. The highest scores can be found in "quality of citizen contributions," "payoff for participants," "increase of citizen knowledge about the topic," "cost-benefit ratio for organizers of participation processes," and "short-term changes." Regarding long-term changes, only 19 % of the managers expect noticeable changes.

With respect to the number of participants, in the case of offline projects, 25.7 % of the respondents are happy with the level of participation, 54.3 % show a moderate

Table 14.1 Benefits of citizen participation initiatives

	Spain		Germany		Austria		Total	
	m	SD	m	SD	m	SD	m	SD
Better image of the city administration has been achieved	6.4	1.3	5.6	2.2	5.1	2.5	5.8	2.0
The participation process was proof that public administration is testing new forms of governance	6.6	1.8	5.5	3.2	5.3	3.0	5.9	2.7
An improvement of social cohesion has been achieved	6.1	2.0	5.2	2.9	6.1	2.2	5.7	2.4
Better transparency in the development of local measures for climate saving has been achieved	7.2	1.3	6.8	2.6	4.6	2.3	6.5	2.3
Increased attention to the climate effects of actions in various fields of life has been achieved	7.5	1.3	5.8	2.2	5.4	2.6	6.3	2.1
On the whole, a reduction in the CO_2 emission levels among participants has been achieved	6.1	1.6	5.8	1.7	3.9	1.5	5.5	1.8
A positive effect on climate-saving behavior among other citizens in the area has been achieved	5.6	1.3	5.6	2.0	4.6	2.1	5.4	1.8
A significant improvement in citizen engagement in city affairs has been achieved	6.8	1.3	4.8	2.9	3.4	2.5	5.3	2.6

m mean, *SD* standard deviation; scale from 0–10 (0 = very low extent, 10 = very high extent), $n = 48$

level of satisfaction, and 20 % are not happy. The managers are very critical about citizen participation in online projects since 29.4 % are happy, 29.4 % show a moderate level of satisfaction, and 41.2 % are not happy with the number of citizens who participate in these initiatives. By countries, the German and Austrian managers are the most critical about the number of participants. Almost all the Spanish managers show a moderate degree of satisfaction with the number of participants.

Regarding the representativeness of the participants, the managers are critical since only 23.5 % for offline and 25.1 % for online projects give a score of over 7 to the degree of representativeness; for the rest, it is moderate (around 50 %) or insufficient.

6. Personal satisfaction with participation activities

The general level of satisfaction is high since 75 % of managers state their satisfaction with previous experiences. By countries, only the Austrian managers show some degree of dissatisfaction while 100 % of the German and Spanish managers are satisfied with previous project results.

Table 14.2 Factors of citizen participation panel success

	Previous experience m	SD	Expectations on citizen panels m	SD
The level of changes in personal lifestyles required to meet the reduction objectives	4.9	2.7	5.7	2.6
The level of coordination among panelists required	4.6	3.0	6.1	2.7
The level of clarity of the objectives	8.3	2.0	8.5	2.0
The level of support provided, such as advertising, supervision by moderators, or similar	8.6	1.6	8.6	1.8
The level of incentives provided lotteries to maintain interest in the participation process	3.0	3.4	6.5	2.5
The level of transparency in the process and traceability of the results	8.8	1.1	8.0	2.1
The variety of participation modes offered for different target groups: online, offline	6.6	2.8	7.6	2.3
The length of the time span for monitoring citizen engagement	5.1	3.5	7.4	2.5
The level of regular input demanded from panelists	6.4	2.8	6.6	2.4
The level of competition among panelists	2.1	2.5	5.6	2.5
The variety of channels, media, and multiplicators used in order to mobilize participation	7.6	2.0	8.3	1.8
The level of user-friendliness of the ICTs employed	6.7	3.0	8.6	1.9
The existence of commitments signed in national or international programs to reduce CO_2 emissions or to engage in citizen participation activities (e.g., Aalborg Commitments, Covenant of Mayors, and Climate Alliance)	7.0	3.0	5.7	2.7

m mean, *SD* standard deviation; scale from 0–10 (0 (very low extent, 10 10very high extent), *n* er48

6a. Success factors

The key conditions for the successful participation of citizens with mean values over 7 points are “the transparency of results,” “the support to citizens,” “the clarity of the objectives,” and “channels used to mobilize participation” (see Table 14.2). The implementation of incentives and competition with other citizens are not considered relevant. The standard deviations of the success factors with the highest means (over 8) are the lowest. This reflects a consensus about what they consider to be the relevant factors in citizen participation processes.

6b. Barriers

Around 25% of the managers state that they are not satisfied with their citizen participation projects. The main reason (with a mean value of over 7 points) is that

Table 14.3 Failure factors of citizen participation panels

	Previous experience m	SD	Expectations of citizen panels m	SD
Limited political will and drive	5.3	3.7	7.1	2.5
Lack of interest by citizens	5.6	2.7	7.3	2.5
There are always the same already known people who engage	7.7	1.1	6.7	2.8
Lack of financial resources	5.4	2.4	6.6	2.5
Lack of personnel resources	6.3	2.9	7.0	2.7
Cooperation with other actors, for example, with enterprises, is more effective	4.1	2.8	4.1	2.5
Risk of being criticized by steering committees or political bodies in case the participation activity fails expectations	2.9	3.3	4.6	2.8
Risk of getting results that are not wanted or that are difficult to implement	3.4	3.5	4.5	2.8
Decreasing citizen motivation during longer periods of time	–	–	7.1	2.2
Limited attractive opportunities offered to citizens to put their motivation into practice	–	–	6.2	2.1
Time citizens are willing to spend in participation processes overall	–	–	7.0	2.5
Lack of economic incentives for citizens	–	–	4.9	2.6
Lack of consideration of citizen input in decisions	–	–	6.9	2.4

m mean, *SD* standard deviation; scale from 0–10 (0 = very low extent, 10 = very high extent), $n = 48$

it is always the same (already known) people who participate in the initiatives (see Table 14.3). Other reasons with mean values of over 5 and 6 points are limited political will and drive, lack of interest from the citizens, lack of personnel, and lack of resources.

7. Future expectations

Regarding the effectiveness of citizen participation programs, managers estimate that, on average, 65 % of participants will change their climate-saving behavior in the short term, while only less than 45 % of participants will maintain such changes in the long term.

As can be seen in Table 14.2, most items increase their mean value when referring to expectations. The mean value of "setting clear objectives," "the provision of support," and "the level of transparency of the process" again score over 8 points when referring to previous experiences and expectations; so there seems to be a wide consensus between managers in considering these items as key factors of success. From previous experience to expectations, "the variety of different channels of communication" and "the level of user-friendliness of the ICTs to enhance citizen participation" increase their mean value to over 8 points with the lowest values of

standard deviations. However, the expectations for the contribution of "the signing of commitments to the improvement of citizen participation" decrease.

The expectations about the factors that might lead to the failure of future citizen participation are included in Table 14.3. In general, the items included in this question increase their mean in the column of expectations. There are several items with mean values of over 7, which show an acceptable consensus regarding the reasons for the failure of citizen participation: limited political will, lack of interest from citizens, and decreasing citizen motivation during longer periods. Notwithstanding, the standard deviations are relatively high, which means different views between managers about the extent to which they are failure factors.

Finally, just over 50 % of the German and Spanish managers and around 25 % of the Austrian managers report that some evaluation of citizen participation programs is carried out. If almost half of the local governments do not test the results and/or the impact of their climate-saving programs, it could mean that the implementation of these initiatives is an objective in itself. This low level of interest in monitoring their participation programs is consistent with the low values they give to the contribution of citizen participation, especially in the case of Austrian local government climate-saving programs.

14.5 Managers' Evaluation of Citizen Panels of the E2democracy Project

This section collects the opinions of the managers about the citizen panel initiative at the end of the project. The questionnaire was made up of 16 questions, which encompass a total of 94 items. It was responded by 23 local organizers of the project. In almost all items, managers were invited to give points from 0 to 10. The following tables collect the answers which score over 7 or below 4 points in order to highlight the answers with a higher degree of consensus.

The overall results are grouped into three thematic blocks: the benefits for the city resulting from the citizen panel initiative, the adequacy of the number of participants, and the degree of satisfaction of the managers with the e2democracy citizen panel project.

a. The benefits for the city resulting from the citizen panel initiative

For the managers, the most outstanding benefits of the citizen panels (with scores of over 7 points) are "increased attention to the climate effects of actions in various fields of life," "on the whole, a reduction of the CO_2 emission level among participants," "a boost to the ego of participants from acting as a responsible citizen," and "a positive effect on climate-saving behavior among other citizens in the area." Only the first item matches up with the expectations stated in part B of the first questionnaire. The managers find the achievements of the citizen panels in the reduction of CO_2 satisfactory, especially in the energy-saving field. Furthermore, most of the managers have detected behavioral changes in the participants by the

end of the project, although fewer than half expect those changes to be maintained beyond the end of the project. Just under 50% agree that the monitoring of consumption and corresponding feedback carried out in the project have increased individual efforts to reduce CO_2 emissions.

Regarding the benefits from the online and offline modes of participation, the managers highlight the low cost for citizens and the administration of the online mode, and the strengthening of community building and the sustainability and continuity of achieved results of the offline mode.

b. The number of participants

The managers agree in considering "the support to citizens through training for participants, supervision by moderators or similar" and "the variety of participation modes offered for different target groups: online, offline" as key factors of success and as aspects that have boosted the number of participants. The items related to barriers for citizens to participate in the panel on climate-saving score below 7, which reflects that managers did not find strong barriers in the development of the project. Notwithstanding, most of the managers are of the opinion that, when there are a low number of participants, the usefulness of the participation results is limited.

c. The degree of satisfaction of the managers with the e2democracy citizen panel

Table 14.4 shows the degree of satisfaction of the managers with the e2democracy citizen panels. The overall impression of the managers is, with 7.5 points and one of the lowest standard deviations, highly positive. The managers are also satisfied with the sensitization of participants concerning climate protection, the behavior changes among participants, perceived fun in organizing, accompanying the panel, and the usefulness of CO_2 monitoring. All of them show low standard deviations.

Table 14.4 Satisfaction with the e2democracy citizen panel

	m	SD
a) Overall impression	7.5	1.4
b) Usefulness of CO_2 monitoring	8.0	1.3
c) Practicability of CO_2 monitoring	6.0	2.1
d) Number of participants	4.5	2.4
e) Reduction of CO_2 and energy consumption	6.2	2.1
f) Sensitization of participants concerning climate protection	7.7	1.2
g) Behavior changes among participants	7.2	1.4
h) Community building	6.4	1.4
i) Participation intensity of participants	6.6	1.5
j) Representativeness of participants	4.7	2.1
k) General impact on panelists, for example, to keep them interested in climate protection and to keep them active in a community	6.6	1.2
l) Perceived fun in organizing, accompanying the panel	7.2	2.0

m mean, *SD* standard deviation; scale from 0–10 (0 = very low extent, 10 = very high extent), $n = 23$

Table 14.5 To what extent do the following effects apply to the citizen panel on climate saving carried out in your city/region?

	m	SD
a) Enhanced collaboration between local government and citizens	4.9	2.9
b) Increased interest of local government to practice citizen participation	5.7	2.9
c) Increased readiness of panelists to engage in local sustainability issues	6.5	2.0
d) A lasting change towards citizen participation in climate policies	5.1	2.3
e) Information about local government policies for panelists	5.4	2.5
f) Enhanced civic skills among the panelists	6.1	1.8
g) A higher level of trust in local government among the panelists	5.9	2.3

m mean, *SD* standard deviation; scale from 0–10 (0 = very low extent, 10 = very high extent), *n* = 23

By contrast, the managers are critical about the number of participants which has been very low in the case of Mariazell, Bregenz (Austria), and Bremen (Germany).

Table 14.5 collects information about the opinion of the managers on other collateral effects of the citizen panel initiative. As can be seen, all items are scored between 4 and 7, which reflects the lack of consensus about these additional potential effects of citizen panels.

Regarding the contextual factors of the citizen panels in the different cities involved in the project, all the managers—except for those of Mariazell and Bremerhaven—state that environment and sustainable development have been relevant policy issues in their cities. In all the cities, except for those mentioned above, direct participation of citizens in local government issues seems to be a common practice and most of the managers agree that citizens had had previous opportunities to participate in the sustainable development policies developed in their cities. In any case, the strong variations in the answers of the managers to these questions in cities such as Mariazell, Bremerhaven, and Bregenz reduce the representativeness of the averages shown in Table 14.6.

Table 14.6 How do you assess the context of the citizen panel on climate protection in (city/region)?

	m	SD
a) Environment and sustainable development have been relevant policy issues in (city/region) already before this initiative	7.3	2.7
b) Direct participation of citizens in local government issues are common practice in (city/region)	5.5	2.1
c) Public administration in (city/region) has already had some experience in citizen participation in the area of sustainable development (e.g., with local agenda processes)	6.2	3.3
d) Citizens in (city/region) had little opportunities to engage in sustainable development policies before this initiative	3.8	2.3
e) Civil society activities (NGOs, NPOs) have had a visible impact on local climate policies in (city/region)	6.1	2.3

m mean, *SD* standard deviation; scale from 0–10 (0 = very low extent, 10 = very high extent), *n* = 23

14.6 Discussion

The answers of the managers show that most participation initiatives started in the second half of the 1990s at the same time as the publication of feedback studies about NPM reforms and the warnings of academics about the doubtful benefits and the decline of public trust in governments derived from these reforms.

Programs involving citizen participation are often applied to environment issues. An overall view of the managers' responses about previous experiences shows a positive evaluation of these experiences. The general level of satisfaction is high since around 75 % of them report satisfaction with the participation of citizens in local government programs.

The managers do not find noticeable differences between online and offline participants (although the profile of onliners is young, with higher education and a nonmigrant background), and expect only slight improvements from the use of ICTs in future projects. This is one finding of this survey because the expected prevalence of online over the offline methods is not clearly confirmed by these managers. For the Organization for Economic Cooperation and Development (OECD; 2003), the online provision of information is an essential precondition for engagement, but quantity does not mean quality. Active promotion is critical for effective online consultations. This assertion is consistent with the opinion of managers who consider that "the variety of different channels of communication" and "the level of user-friendliness of the ICTs to enhance citizen participation" are relevant aspects of successful citizen participation initiatives.

For the managers, most outstanding benefits from previous participation programs have been the increment of citizen attention on climate change effects and the enhancement of transparency of the local government, together with better image of the city administration and the contribution to testing new modes of governance.

However, the managers only find moderate benefits in aspects directly related to the participation projects. They report moderate effects in the reduction of CO_2 and on climate-saving behavior among other citizens who do not participate in these projects. This is an important result because citizenship involvement is critical for the success of climate-saving initiatives. The effective reduction of greenhouse gas emissions requires the active engagement of the population.

More than 40 % of local governments do not evaluate the outcomes of citizen participation programs. However, the entities which do not monitor these outcomes consider the contribution of e-participation programs important for the strengthening of ties among the local community. It seems that local governments are more interested in implementing citizen participation initiatives than in achieving the specific objectives of that participation. These results are consistent with the institutional theory, which suggests the institutional image as a driver of some public sector reforms. Citizen participation programs may represent local government interest in implementing new horizontal modes of governance and in enhanced responsiveness rather than a desire to achieve the specific objectives of climate-saving.

The intrinsic value of the engagement of citizens in city affairs in terms of image contributes to explaining the "decoupling" of citizen participation contributions from the overall public policy of the organization, as the institutional theory states. So, some citizen participation programs may be introduced when they are considered as signals of "good governance" and then copied from other local governments with reputations for responsiveness and openness to citizenship wishes (mimetic behavior). Even though we have not empirically tested whether there is mimetic behavior, when the local governments studied introduce citizen participation initiatives into their local government agendas and fail to control and monitor the results, there is evidence for concluding that citizen participation may not only be sought for the value of its contributions. This implementation of citizen participation could be carried out through a mixture of mimetic institutionalism—when there is an imitation of practices implemented by other local governments with a reputation for being well-managed—and coercive institutionalism—when there is a legal requirement which imposes citizen consultation in local government environmental issues.

The managers report that well-educated and nonmigrant background citizens collaborate more in citizen participation activities than the rest of population. Previous studies, such as Smith et al. (2009), for the USA, only find that well-off and well-educated citizens participate more than the rest of the population. Some managers report that citizen participation initiatives only attract and reach the well-informed and active citizens but not the total population, and recommend seeking new ways of approaching citizens. For Smith et al. (2009), income and education have the same relationship to online and offline political activity, and there is no evidence that Web-based participation fundamentally alters the long-established association between offline political participation and the above-mentioned socioeconomic factors.

As in previous studies referring to the USA, the managers who collaborated in our survey do not find differences between online and offline participants. The managers only report a higher online participation in young people. Contrary to the hopes of some advocates, for the moment, the Internet is not changing the socioeconomic character of citizen engagement in the European Union (EU). It seems that, in Europe, the Internet and broadband technology is spread over wide levels of the population and, therefore, income does not make a difference in attracting citizens to participation programs.

Some managers are critical about the number of participants and about the representativeness of participants. This view can also be found in other answers in which the managers say that the participants are always the same. These results confirm a common concern about the representativeness of results, taking into account that participants may have greater or special motivation or interest in the topic than the average of the population, or may be more politically active. Despite this potential problem of representativeness, the managers are happy with citizen contributions to the programs, the contribution of programs to the participants, and the cost-benefit ratio.

Some key conditions for successful citizen participation programs are "the clarity of the objectives," "the support to citizens through training for participants,

supervision by moderators, or similar," and the "transparency of the process and traceability of the results." By contrast, "limited political will," "lack of interest from citizens," the participation of the "same, already known, people," and the lack of personnel seem to be main reasons for the failure of citizen participation programs. Notwithstanding, the standard deviations are high, which shows strong dispersion in the answers of managers. For 25 % of the managers, barriers for recruiting citizens are related to the citizen perception of both the lack of effectiveness of their collaboration and the lack of true interest of politicians in the contributions of citizens. Therefore, key factors for the success of citizen participation initiatives are those that have to do with motivation, credibility, and responsiveness, whereas the citizen perception that participation does not make a difference in the development of public policies seems to be the main cause of failure.

The answers of the managers to the questions in part B deal with what can be expected from citizen participation. The answers reveal a positive view and a high degree of expectations about the role that citizen participation can play in environmental programs. Managers agree that citizens can make a noticeable contribution to CO_2 reduction, especially through changes in their domestic habits such as in energy saving. The opinions of managers from previous experience to expectations are similar: In terms of cost, they envisage better results in online than in offline participation and, in terms of social consequences and sustainability, better offline than online.

These results are consistent with previous studies in other countries. Studies carried out by the OECD (2003) show that successful online consultation requires demonstrating commitment, tailoring your approach to fit your target group, integrating online consultation with traditional methods, providing feedback, and ensuring coherence.

Several lessons could be learnt by managers and academics alike. Citizen participation programs have the intrinsic value of giving citizens an image of responsiveness, but the mere implementation of citizen participation initiatives does not guarantee improvements in public policy decision-making and in accountability.

14.7 Conclusions

The survey carried out has allowed the identification of conditions for the success and failure of e-participation initiatives/programs and the determination of what can be expected from them compared to traditional participation projects.

Managers are critical about the success of citizen participation initiatives. Almost half of the local governments analyzed do not evaluate the results of citizen participation programs; therefore, it seems that local governments are more interested in implementing citizen participation initiatives than in achieving the specific results of that participation. Some managers are also critical about the number of participants and their representativeness, given that participants may have greater or special motivation or interest in the topic than the average of the population, or may be more politically active.

The evidence collected answers some research questions raised in the academic literature about e-participation and in a number of publications from multilateral organizations. These questions include whether online tools could offer more opportunities for participation, allow for a greater range of participants, and facilitate "better" participation. The answers to these three questions seem to be negative or at least doubtful. For the managers interviewed, the recruitment of onliners is not easier than recruitment in offline modes and, with the introduction of ICTs, the problems for the engagement of citizens remain or even increase. Regarding the second question, the socioeconomic profile of the participants is the same in both modes, with no difference in age (perhaps onliners are younger), gender, or income. The Internet is not allowing local governments to access a wider range of citizens: the same well-informed, educated, and politically active citizens who participated in the traditional model continue to do so. Finally, the managers do not report differences in the quality of participation between onliners and offliners; therefore, the hypothesis that ICTs allow better participation is not confirmed by the results of the study.

The results reveal that the use of technology is only an enabler but is not the solution for the engagement of citizens in participation processes. It facilitates existing or, in some cases, new methods of engagement, but the key issues for success or failure, participation or nonparticipation, and social and political problems cannot easily be solved by merely introducing technology into the process. It seems that the integration of e-participation with traditional "offline" tools for public participation in policy-making is needed.

Although this study analyzes the features of citizen participation in climate change policies in three EU countries, the results will also be useful for other countries considering citizen participation as a way of strengthening and enhancing the relationship between governments and citizens.

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Chapter 15
What Difference Does the "E" Make? Comparing Communication Channels in Public Consultation and Collaboration Processes

Herbert Kubicek

Abstract Expectations have been high that offering online, that is, electronic or "e"-communication channels in public participation will improve its outreach and quality. However, so far, there is no empirical evidence that confirms these hopes. Applying a variety of research methods, this chapter presents empirical findings on the advantages and disadvantages of online communication compared to face-to-face communication in six consultation processes and seven collaborative citizen panels. To control for contextual differences, one of the consultation processes has been set up paralleling online and face-to-face meetings. In this case, organizers showed a preference for face-to-face meetings as regards the content of contributions and the style of discussion. For the citizen panels, collaborating with local governments to achieve climate targets, impacts in terms of carbon equivalents (CO_{2e}) savings, and dropout rates have been compared for parallel processes online and via telephone. These comparisons do not, however, deliver clear performance profiles of the communication channels or a generalizable assessment of their appropriateness for particular objectives. The factors influencing the choice of communication channels are complex, and the analysis shows that assessments depend on the type of participation and the role of an actor in the process as well as on time frames and contexts in which the assessments are made. Showing that none of the channels offers clear advantages over the other, we conclude that practitioners are well advised to follow a multichannel strategy and offer a media mix of online and traditional modes of participation.

15.1 Introduction

Whenever new communication technologies emerged, it was hoped that they would not only lead to economic growth but also enhance democracy by making access to information and active participation in political decision-making easier.

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This was the case for the radio, two-way or interactive cable television, the microcomputer revolution and, most recently, the Internet. The terms changed from teledemocracy to computer or e-democracy and cyber democracy, but the basic view and argument remained the same (Dutton 1999): Political engagement means efforts, and established forms pose certain barriers. New technologies have the capacity to overcome some of these barriers. As it turned out, neither radio nor interactive TV changed the degree and kind of political engagement. But with its newly emerging applications and social networks, the Internet is offering new opportunities, which may deepen certain kinds of engagement and/or extend the share of citizens taking political action. Scholars of Internet research, however, also point to the fact that access to the Internet is limited, that the technical means may be selective and produce biased results and at best lead to more intense engagement of those already active (Davis 2010). Others argue that factors such as socioeconomic status, values, experience, and peer groups are much more influential for political engagement than the technical means (Pratchett et al. 2009).

Ann Macintosh in a chapter of the *OECD Book on Promise and Problems of E-Democracy* provides a good summary of expectations of how information and communications technologies (ICTs) will improve public information, consultation, and participation processes by:

- Reaching and engaging with a wider audience
- Providing relevant information in a format that is both more accessible and more understandable to the target audience
- Enabling more in-depth consultation and supporting deliberative debate
- Providing relevant and appropriate feedback to citizens to ensure openness and transparency in the policy-making process (Macintosh 2003, p. 33)

Certainly, there are cases where these advantages could be observed. It is, however, also certain that they do not occur in every instance and are not perceived equally by all the people concerned with a particular issue nor by citizens in general.

Against this background, the research challenge from a practitioner's point of view is to develop guidelines for choosing the appropriate media for participation processes and, in particular, to answer the question whether or to what extent new electronic forms of participation should substitute or complement traditional modes of participation such as town hall meetings or telephone surveys. The challenge for academic research lies in the development of appropriate research designs for assessing the comparative advantages and disadvantages of these electronic forms with regard to certain success criteria, as mentioned in Chap. 2. These success criteria include the number of participants, quality of contributions, inclusion, and the building of trust, which can help to assess the meaning and effects of the "e" in participation processes with sound methods.

15.2 Basic Concepts and Research Questions

A first requirement is to be more precise with regard to what is compared and the terms that are used. In e-participation research, the alternatives are most often termed "online" and "offline" (-communication). "Online" clearly refers to a state where a computer or another electronic device is connected with other devices via a telecommunication network, even when devices are connected wirelessly without "lines." The term "offline" has changed its meaning:

- In the early days of computing, offline referred to the exchange of data between two (host) computers by carrying magnetic tapes from one place to another.
- Since the digitalization of telecommunication networks, offline refers to a digital device, which can be connected but which, at the moment, is disconnected from the network. The term is also applied with a similar meaning to people who at some time are online but for the moment are not.
- In the context of political participation, "offline" is applied to face-to-face communication (e.g., in town hall meetings) but also to information exchange via telephone or mail (e.g., in contacting an elected politician).

Using the term "offline" as the only counterpart to "online" would ignore unquestioned differences between face-to-face communication in a physical meeting and a telephone conference and between oral and paper-based exchanges of messages. Therefore, in this chapter we will be more precise and, wherever appropriate, differentiate between "face-to-face" communication and communication by telephone and post (in short, "PTT" for post, telephone, and telegraph companies). Instead of "offline," in contrast to "online" modes of communication, we use the term "traditional." In many cases, online tools do not completely replace face-to-face or PTT communication but are complementary. For these cases, we use the terms multichannel communication, media mix, or blended participation.

Research on communication channels applies either a macro- or a micro-perspective. Within the macro-perspective, two research questions have been in the foreground:

- Has or will e-participation become a substitute for traditional forms?
- Do e-channels increase the number of participants?

Although many opinions have been published on these questions with regard to participation in the form of public consultation and citizen–government collaboration, there has been no valid empirical research on this particular form of participation. However, research on the broader issue of political involvement of citizens supports a "mobilizing" hypothesis as well as a "reinforcement" hypothesis with regard to the number and the sociodemographic characteristics of online activists (Oser et al. 2012). While some studies show that the new online facilities draw previously less active citizens into the political process (Gibson and Cantijoch 2013), others come to the conclusion that the main social factors of political involvement also prevail in the digital world and that online tools are "weapons of the strong" (Schlozman et al.

2010). Based on the Oxford Internet Survey, Di Gennaro and Dutton (2006) compared survey data on political engagement in the form of seeking information and contacting politicians. They found no evidence for a substitution, but rather "online and offline political participation tend to reinforce each other but enable increased participation at the margins: …53 % of those who had engaged in politics online had also engaged in offline politics" (p. 306).

Reddick (2005) comes to a similar result comparing citizen-initiated contacts with government via the telephone or web, based on a broad survey in the USA. There is no evidence for a general substitution of telephone contacts but only a displacement by particular kinds of citizens' needs and for different occasions.

Therefore, there is a need to turn to the micro level and to two other research questions:

- Which factors influence people's choice of communication channels, and what makes them prefer online channels to traditional ones?
- Does e-participation deliver the same results in the view of the consulting party, or is there a trade-off between a higher number of participants and poorer quality of contributions and impact?

In a socio-technical framework, mediated communication has a technical and a content dimension with different requirements for successful use (Kubicek et al. 1997, pp. 26 ff.). Within the content dimension, sender and receiver must share the same language, have some common knowledge on the subject, and some interest in the topic and/or the partner. Within the technical dimension, they have to have access to the devices and be able to use them for their purpose (see Fig. 15.1).

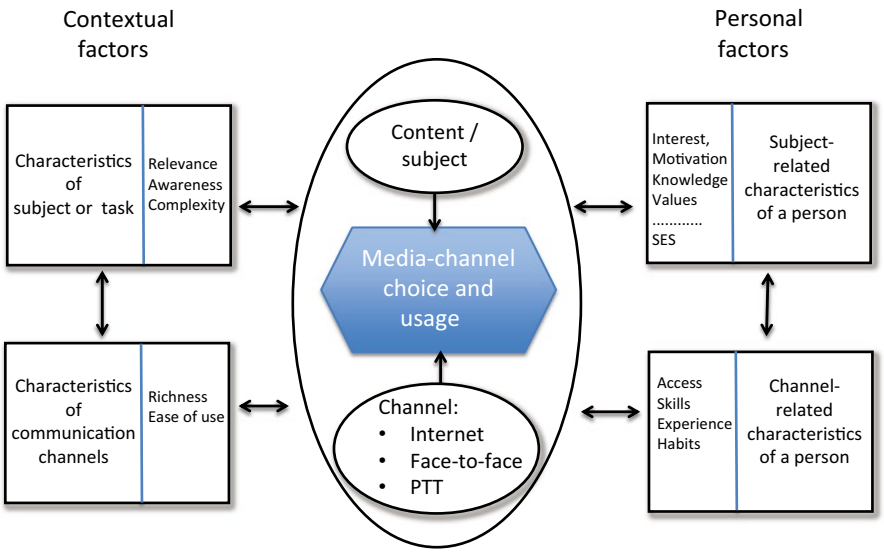

Fig. 15.1 Personal and contextual factors influencing media-channel choice. *PTT* post, telephone, and telegraph companies, *SES* socio-economic status

The aforementioned list of advantages of online communication is based on a comparison of the characteristics of the communication channels. In communication and media research, there are several theories which support this perspective (Kubicek et al. 2009; Pietersen and van Dyke 2007; Pietersen 2009). Media richness theory (MRT) compares communication channels according to the number of senses included, for example, by showing that telephone communication excludes visual senses. Text-related online communication compared to face-to-face communication is "poorer" because visual and acoustic senses are not involved (Daft and Lengel 1984). These characteristics of different channels can be related to the content of a communication act and the intentions of the communicating parties. Research on media-channel choice most often conceives the content dimension as a task which the users want to fulfill and assumes that people choose the channel which is considered most appropriate for the task they want to fulfill (Pietersen 2009, p. 63). For more complex or more effective tasks, richer channels are considered to be more appropriate. Johannessen et al. (2012) tried to establish general relations between communication channels and what they call genres of participation instead of tasks. Other scholars doubt whether such general relations can be established and point to the importance of personal factors as intervening variables (Pietersen 2009, p. 63).

Explaining the choice between telephone and e-mail or web sites for citizen-initiated contacts, Reddick (2005) refers to the "Uses and Gratification Theory," which stresses the importance of personal factors and assumes that the Internet will displace functionally similar traditional media if people perceive it as superior in content, less costly, and/or more convenient (Kaye and Johnson 2003). In general, the uses and gratification theory asserts that people, when they have a choice, use the medium they perceive to be superior for meeting their particular needs in a given situation. But this does not provide much more insight than general choice theories as there is no distinct list of needs or gratifications people expect in different situations, for example, in using government services, contacting government or politicians, or taking part in a consultation. Pietersen and van Dyke (2007), therefore, refer to the "Social Influence Model" (Fulk et al. 1990) and the "Technology Acceptance Model" (Davis 1989), which address the influence of the social environment of the users, their habits and, for example, established communication patterns with their regular partners.

There are some attempts to test these assumptions about the different influencing factors by survey data and multivariate statistical analyses, for example, with regard to public services (Pietersen 2009), but the data show rather weak connections. Considering the different types of participation and the broad spectrum of technical tools as well as the many influencing factors on media use and on political engagement, one cannot expect clear-cut patterns of channel choice or advantages and disadvantages of e-channels in different kinds of consultations.

15.3 Frame of Reference and Comparative Research Design

In our own research, it was not possible to collect data on all the influencing factors mentioned in the different theories. But these theories provide ideas for developing hypotheses explaining the empirical findings. Figure 15.1 tries to integrate the elements and factors highlighted in the different theories into one conceptual frame of reference.

Media-channel choice by the target groups of a consultation or cooperation offer is conceived as a matching exercise between the content of the consultation and the channels offered, made by a person with preferences regarding the subject and communication channels. The decision to participate and use a certain channel is made in the light of the perceived characteristics of the consultation's subject, the task required, and the communication channels. The preferences are based on subject-related factors such as the interest and the knowledge related to the respective subject and with regard to access, skills, and habits in respect of the communication channels offered.

The e2democracy project applied different research methods and research designs for assessing effects of the "e" in different dimensions. This chapter draws on six cases of consultation processes (described in Chap. 5) on climate policy issues (Pamplona, Saragossa, and Bremerhaven), political program formulation (Bremen), neighborhood development (Wennigsen), and a citizen charta (Vienna). Additional case material stems from citizen panels in seven regions collaborating on climate protection with local governments (see Chap. 7).

- In all six consultation cases, participants were asked about perceived advantages of online communication, and in the case of the "Vienna Charta," also about their experience. In four cases (Bremen, Bremerhaven, Vienna, and Wennigsen), the assessments of organizers have also been collected. In the seven climate protection cases and a few other cities, organizers have also been asked about their perceptions and preferences regarding communication channels.
- The case of the consultation on the government program of the Social Democratic Party (SPD) of Bremen has been explicitly designed to compare the contents of online and face-to-face communication and allows for comparing the output.
- The seven citizen panels on climate protection even allow for comparing the impact of online and PTT communication with regard to carbon equivalents (CO_{2e}) savings and dropout rates.

The following three sections of this chapter will present the results of these comparisons.

15.4 Perceived General Advantages of Online Channels

If we assume that personal preferences play an important role in channel choice, it is relevant to learn how potential participants evaluate online channels compared to traditional modes of communication. In all the consultation processes described in

Chap. 5, participants and organizers have been asked whether they consider online or traditional ways of communication to be better or more favorable with regard to efforts and effects. These surveys took place in different settings and at different points in time within the consultation processes:

- In Pamplona and Saragossa, the surveys were integrated in the online consultation.
- In Bremerhaven and Wennigsen, questionnaires had been distributed in the kick-off meeting and were also offered in the online consultation.
- In the case of the Vienna Charta, participants were asked via the Internet and in local meetings to participate in an online survey at the beginning and the end of the process.
- Organizers in Wennigsen and Vienna as well as experts on participation and climate policies were interviewed in person, via telephone, or via an e-mailed questionnaire.

The phrasing of the items varied in detail. They had been discussed between the three research teams, then translated by each team into the language of the respective country. Before presenting the quantitative results of the surveys, the following quotation illustrates that no channel is perfect with regard to all requirements. Rather, each one has specific advantages and disadvantages, at least in the view of organizers of the consultation on the Vienna Charta. In interviews, they said:

> There were lively discussions offline and online. But the offline discussions cannot be substituted through online debates when there are concrete personal matters at stake. Face to face discussions are more valuable when the sharing of experiences, social coherence and strengthening local democracy are the aim. For clearly defined questions online processes are also suitable, but I see problems with the anonymity of nick-names and formation of pressure groups which posted in an organized way.

> The barrier to participate was lower in the online process, because there was less time and effort involved. But there was no argument between people about contributions, especially not between people with different views. In contrast, there were many very interesting arguments and exchanges of opinions in the face-to-face discussions.

A clear and unanimous vote in favor of offering both channels in future participation projects was taken. There was also a telephone hotline as a third channel. While there was mostly positive feedback in meetings and online, an organizer noted that people who called on the phone made negative comments throughout.

15.4.1 Efforts and Outreach

The most frequently mentioned advantage of e-participation compared to town hall meetings and other kinds of traditional face-to-face communication settings is that it means less effort for the participating citizens and offers more flexibility with regard to time and place, and thereby reaches a larger number of people. The opinion has also been expressed that online consultations require less effort on the part of the consulting party and, therefore, could be offered more frequently. The two

Table 15.1 Participants' assessments of participation channels regarding costs and effort

With regard to		Internet preferable (%)	Traditional ways preferable (%)	Both equal (%)	NA (%)
Costs for participant	Pamplona[a]	60.3	4.0	33.7	2.0
	Saragossa[b]	60.1	3.2	35.4	1.3
Personal effort	Bremerhaven[c]	67.3	3.5	27.4	1.8
	Wennigsen[d]	41.1	16.1	28.6	14.3

NA not applicable
[a] $n=199$
[b] $n=158$
[c] $n=111$
[d] $n=48$

Spanish consultations on local climate policy organized by the City Councils of Pamplona and Saragossa were conducted online only and included a link to an online survey (for more details see Royo et al. 2014). In Bremerhaven and Wennigsen, there was a combination of local meetings and online consultations, and the surveys were carried out at the kick-off meeting as well as linked to the online forum. Table 15.1 presents the results on the two slightly different questions (translated from Spanish and German).

> Pamplona and Saragossa
> This consultation has been implemented through the Internet, but it could also have been done using traditional means (telephone, post, or in person). Thinking about the following issues, which do you think is the most appropriate format for citizen participation?
> Bremerhaven and Wennigsen
> You can submit your ideas not only via the virtual pin board but also personally at the Environment Department, by phone, or at public events (in Wennigsen, personally in the working groups or at the town hall). What are, in your opinion, the advantages and disadvantages of submitting your ideas via the virtual pinboard as opposed to doing so via phone, at meetings, or at the town hall?

In the two Spanish cases, almost two thirds of the respondents agree with the common view that participation through the Internet is more appropriate with respect to personal efforts or cost. With the exception of a small minority of 3–4 %, the other third says there is no difference. Responses in Bremerhaven show a similar distribution, whereas in Wennigsen less than half of the participants (41 %) agree with the common view, while 16 % say that participation on-site (local meetings) is better, and 14 % did not answer this item. The differences are explained by the place of the survey and the characteristics of the participants.

It is not surprising that a high number of those participating online in the two Spanish cases say that online is better. In Bremerhaven, there was also a citywide consultation on local climate policy, but not only online. There, an even larger share prefers online communication with regard to efforts, although one third of the respondents answered the questionnaire at the kick-off meeting. In Wennigsen, even more citizens responded at the kick-off meeting, and there are other differences. As described in Chap. 5, the consultation was about the development of a local

Table 15.2 Participation in on-site meetings and online

	Bremerhaven *(n)*	Wennigsen (Hohes Feld) *(n)*
Residents	113,000	550
Participants in kick-off meeting	38	160
Online idea collection:		
Proposals	264	112
Comments	202	NA
Participants in second meeting	39	23

NA not applicable

neighborhood of inhabitants mostly aged above 60 years. The kick-off meeting took place within walking distance; and for those without their own Internet access, local meetings in fact mean less effort or they are unwilling to compare something they do not know personally. The two latter cases allow for comparing the reported preferences with the actual behavior (Table 15.2).

In Bremerhaven, the widespread assumption that more people can be reached online than by local meetings is confirmed: Only 38 people attended the kick-off meeting, but 264 proposals were submitted online, and 202 comments were received. In Wennigsen, it was the other way round: 160 inhabitants came to the kick-off assembly, but only 112 proposals were collected, including about 15 at the meeting.

In both phases, there was the possibility of submitting proposals in writing or by phone and of voting on paper in an office. While 16% of the respondents in the Wennigsen survey said voting in local ballots would be more appropriate, not a single citizen did take advantage of this opportunity. Everybody without online access found someone in his family or neighborhood for support.

In the case of the Vienna Charta, there was a mix of local talks and online fora, and participants have been asked to compare and assess both options before and after the participation process. This allows for comparing expectations and experiences (Table 15.3).

In this case, the share of respondents preferring the online channels decreased after they had experienced both ways, and the number of respondents who preferred local talks increased.

When establishing communication channels, organizers of consultation or cooperation processes consider the efforts or costs to the citizens targeted as well as the costs to their own institution. In the case of the Vienna Charta:

Table 15.3 Before and after experience comparison of consultation channels on the Vienna Charta

With regard to	Internet is better		Face-to-face is better		Both are equal	
	Before (%)	After (%)	Before (%)	After (%)	Before (%)	After (%)
Personal effort for participants	45.3	38.8	21.7	30.6	33.0	30.6

n before = 106, *n* after = 85

Table 15.4 Cost comparison of communication channels by organizers of local climate panels

With regard to	Online is better (%)	Traditional ways are better (%)	No difference (%)
Costs for public administration	85.4	12.5	2.1
Costs for citizens	70.8	25.0	4.2

$n = 48$

- Nearly all organizers saw no difference regarding the efforts for the public administration; only one considered online to be better.
- As regards the personal efforts for participants, the organizers disagreed: Three said the Internet is better, two voted for local meetings, and to another one there was no difference.
- In a similar way, organizers disagreed on which channel would bring a larger number of participants.

By contrast, in the organizers' survey on local climate panels described in Chap. 14, a large majority preferred online channels in both respects (Table 15.4).

15.4.2 Quality of Contributions

The second most frequently discussed aspect refers to the quality of the contributions, submitted in writing online without immediate feedback or delivered in a meeting among other people who agree or disagree immediately. In the consultations in Pamplona, Bremerhaven, and Wennigsen, about half of the respondents see no difference; in Saragossa, it was 39 %. Again, the onliners in Pamplona and Saragossa say online is more appropriate for higher quality. In Bremerhaven and Wennigsen, where some of the respondents answered the survey in the kick-off meeting, traditional ways of communication receive higher approval rates (Table 15.5).

Table 15.5 Citizens' perceptions of communication channels regarding quality of contributions

With regard to		Internet is better (%)	Traditional ways are better (%)	Both are equal (%)	NA (%)
Quality of the contributions of the participants	Pamplona[a]	37.2	5.5	51.8	5.5
	Saragossa[b]	42.4	1.8	39.2	7.6
	Bremerhaven[c]	20.4	25.7	49.6	4.4
	Wennigsen[d]	14.3	17.9	53.6	14.3

NA not applicable
[a] $n = 199$
[b] $n = 158$
[c] $n = 111$
[d] $n = 48$

In the course of the Vienna Charta, the preference for face-to-face-communication with regard to the quality and relevance of contributions increased from 45 % at the beginning to 67 % at the end. Accordingly, the number of those who said the Internet is better in this respect decreased from 12 to 8 %.

Organizers in Wennigsen were able to compare the suggestions made in the kick-off meeting and online. Four of them then said there was no difference in the quality of the contributions; three said the quality was higher in the local meetings, and only one voted for the Internet in this respect. Also, the organizers of the Vienna Charta rated the quality of contributions in traditional formats as clearly higher (four out of six).

15.4.3 Deliberation

According to Coleman and Gøtze (2001), deliberative participation is about changing preferences; it is more likely that people change their mind in face-to-face-communication in direct verbal and non-verbal interactions than in an online consultation. However, only in Wennigsen did the majority of participants take this position (Table 15.6). In Saragossa, 44 % say online is more appropriate; in Pamplona and Bremerhaven, 51 % and 40 %, respectively, see no difference between the two modes of communication.

In the before and after assessments by participants in the Vienna Charta consultation, a clear majority considered on-site talks better with regard to important deliberative elements. Moreover, the share of those preferring on-site talks increased significantly (Table 15.7).

All six organizers of the Vienna Charta agreed that the intensity of exchange among participants was higher in the local talks. Half of the organizers in Wennigsen said the readiness to change one's own position and to find compromises is higher in traditional modes of communication; only one of them voted for online communication, and three said there was no difference.

Table 15.6 Assessments of communication channels regarding deliberation aspects in consultation projects

With regard to		Internet is better (%)	Traditional ways are better (%)	Both are equal (%)	NA (%)
Revise and change personal attitudes and opinions	Pamplona[a]	36.2	6.5	50.8	6.5
	Saragossa[b]	43.7	13.3	34.8	8.2
Readiness to change own position and find a compromise	Bremerhaven[c]	23.9	31.0	39.8	5.3
	Wennigsen[d]	8.9	42.9	32.1	16.1

NA not applicable
[a] $n = 199$
[b] $n = 158$
[c] $n = 111$
[d] $n = 47$

Table 15.7 Assessments of communication channels regarding deliberation aspects before and after experience in the Vienna Charta consultation

With regard to	Internet is better		Local meeting is better		Both are equal	
	Before (%)	After (%)	Before (%)	After (%)	Before (%)	After (%)
Deliberating arguments and opinions of others	14.4	8.3	45.2	58.3	40.4	33.3
Reflecting and changing own opinion	18.3	9.5	49.0	60.7	32.7	29.8

n before = 106; *n* after = 85

15.4.4 Social Relations and Community Building

Participation processes may also change the social relations between participating citizens, making them more intense. Citizens may want to find support for their personal position or proposal. Some proponents of public consultation hope that such a process may foster common political engagement among participants and that they develop the feeling of being a part of an active community.

Again, between Wennigsen and Bremerhaven, there are some differences in the assessment of online channels regarding the support for one's own ideas. While in Bremerhaven only a minority says participation in local meetings is more appropriate, in Wennigsen 27% take this position (Table 15.8).

By contrast, in the consultation on the Vienna Charta the vast majority of the participants consider meetings on-site better to develop contacts with other participants (Table 15.9), both before and after the exercise.

Organizers in the Wennigsen case take a somewhat different view: They disagree on which format is more appropriate to make contact with other participants. However, a clear majority considers on-site meetings more appropriate to get support for one's own ideas and to develop a feeling of cooperation.

In the case of the Vienna Charta, all six organizers agree that local talks were better with regard to the intensity of exchange between participants and for community building. The results among the experts on climate change policy and participation

Table 15.8 Citizens' perceptions of communication channels regarding social relations

With regard to		Internet is better (%)	Local meeting is better (%)	Both are equal (%)	Undecided/not specified (%)
Getting support for own ideas from similar minded people	Bremerhaven[a]	40.7	15.0	40.7	3.5
	Wennigsen[b]	23.2	26.8	35.7	14.3

[a] *n* = 109
[b] *n* = 48

Table 15.9 Citizens' perceptions of communication channels regarding contact potentials before and after usage in the Vienna Charta consultation

With regard to	Internet is better		On-site is better		Both are equal	
	Before (%)	After (%)	Before (%)	After (%)	Before (%)	After (%)
Getting into contact with other participants and organizers	6.7	9.6	81.7	81.9	11.4	8.4

n before = 106, *n* after = 85

are similar: Two thirds share this view and say that on-site meetings are better for community building; only 9% find online is better.

Altogether, the results from these different surveys do not present a clear and consistent picture of the advantages and disadvantages of different communication channels in public consultation and collaboration processes. One outcome is that media richness theory does not deliver sufficient explanations for the differences encountered. Therefore, we can conclude:

- The more or less objective characteristics of the communication channels are not decisive in the participants' and organizers' views. Although online consultations do not include nonverbal elements, they are considered as equal or even more appropriate for getting support, making contact, and other aspects of social relations by a smaller or larger part of respondents.
- The characteristics of the participants play a relevant role in such assessments. As regards the mostly senior participants in Wennigsen, we find the results of the survey in line with the supposed preferences for on-site meetings. But with regard to the voting phase, we notice a difference between the assessment in the survey and actual behavior later on. If there is a high motivation to participate, people find a viable way, even if in general they have other preferences.
- The most striking insight is the granularity of the spatial dimension. We thought of Wennigsen and Bremerhaven as local consultations. But to participants, it obviously makes a difference whether there is a meeting place within walking distance or whether they have to cross their city and perhaps change the bus or tram, in particular when meetings take place in the evening. It seems that preferences for online channels increase with the size of the spatial distribution of the target group.
- From a methodological point of view, we found that previous experiences influence the assessment. Responses by people who have only participated in an online consultation differ from those who take part in a kick-off meeting, and the assessment at the end of a process in some aspects is different from that at the beginning. Assessments are most valid if they are delivered by people who have just had the same practical experience.

15.5 Comparing Perceptions and Observations of a Two-Channel Consultation

The perceived advantages of communication channels before and after usage represent the subjective preferences of the respondents. Our data so far show that these preferences are not stable and general but highly contingent on the subject, the role taken in the process, and the time of responding. In addition, respondents are overstretched if they are asked to compare two modes of communication when they have only used one in a particular process. When they have used both channels, the cases presented so far centered on different subjects, or participants were asked in different phases of the whole process. In other words, the usual methods of assessing the comparative advantages of online communication in participation processes by design do not deliver valid data, and, therefore, the research design has to be adapted. Accordingly, in the case of the consultation on the government program of the Social Democratic Party (SPD) in the German Federal State of Bremen, the following steps have been taken towards this aim: Firstly, the two phases of collecting ideas and drafting the program were carried out in meetings and online in parallel, and secondly, in addition to the perceptions of organizers and participants, we also compared observations made at meetings and content analyses of online discussions dealing with the same subjects.

As described in Chap. 5, the consultation process was organized by the party's subchapter office by nominating members as chairpersons of six working groups covering the different subject areas of the program. These working groups, open to party members only, were to elaborate basic points for the government program, which was to be presented in the forthcoming election campaign.

- In October and November 2010, these basic points were presented for discussion at seven local meetings open to the public and with invited representatives from civil society.
- In addition, seven online fora on the Internet were opened for public discussion of these basic points.
- Based on this feedback, in December 2010, the board drafted the government program, presented it at a press conference, sent the text via mail to the delegates of the coming assembly, and also published the text on the Internet with a request for comments.
- On February 26, 2011, the draft was presented to the party's state assembly for approval. Comments from the Internet discussion were treated in the same way as demands for revision put forward by the delegates in the assembly.

As in the case of the Vienna Charta organizers, working group members and participants in the local meetings and the online consultation were asked to compare the two modes of communication with regard to personal efforts, influence, contacts, and community building:

- All four groups of respondents say that the Internet is better with regard to personal efforts; participants of the online consultation do so to a notably higher degree than participants in the local meetings (80 % vs 41 %).
- The majority of organizers (70 %), working group members (63 %), and participants in the local meetings (66 %) say the quality of contributions face-to-face is better, while 25 % of the onliners say online is better and 40 % see no difference.
- Between 65 and 76 % of the organizers and working group members also say that local meetings are better with regard to contacts among participants and community building.
- Concerning the number and the representativeness of the participants, there is no clear preference for online or offline in any of the four respondent groups.

As well as these opinions from interviews and surveys in the consultation phase, it was possible to compare the discussion of the basic points in the meetings with the discussion of the same points in the Internet fora with regard to content-related criteria. Additionally, the organizers have been asked for their own assessment of the same aspects of the discussion in the meetings and the online consultation.

Drawing on Winkler (2007) for comparing the face-to-face and the online discussion of the basic points, a conceptual scheme has been developed. It focuses on aspects of the deliberative quality of discourses, such as rationality and reciprocity, on the length and tone of contributions as well as on personal concerns and more. These dimensions have been operationalized for observation of the face-to-face discussion in the local meetings as well as for text analyses of the online fora.

Observation was conducted in three of the meetings, which dealt with the issues of (1) ecological growth, (2) education, and (3) work and related basic points for the party's government program. The situation in each case was quite similar. Members of the working group who had drafted the basic points chaired the session, with the public seated in front of them. Authors of the basic points and two or three invited experts presented and explained the points and answered questions put by participants. In the third meeting, the respective minister in office moderated the discussion. In the online fora, there was no moderation. Users were only able to write comments on each basic point.

As there was no registration for the online discussion, the number of participants is not known, only the number of contributions, which is remarkably low (Table 15.10). However, in October and November, there were 2800 visits to the

Table 15.10 Outreach of the consultation on the Social Democratic Party government program by communication channels

	Local meetings (LMs)			Online fora (OFs)		
	LM1	LM2	LM3	OF1	OF2	OF3
Topics	Ecological growth	Education	Work	Ecological growth	Education	Work
n participants	17	53	17	NA	NA	NA
n contributions	36	37	36	23	29	11

NA not applicable

Table 15.11 Rationality of contributions to the consultation on the Social Democratic Party government program

	LM1 (%)	LM2 (%)	LM3 (%)	OF1 (%)	OF2 (%)	OF3 (%)
Expression of opinion	5.6	5.5	2.8	52.2	24.2	9.1
Reasoned argument	86.1	81.1	94.4	43.5	72.4	81.8
Unclear	8.3	13.4	2.8	4.3	3.4	9.1
n	36	37	36	23	29	11

LM local meeting, *OF* online forum

web site, covering a total of seven fora. The survey at the public meetings showed that only half of the participants there also contributed to the online discussion, and in addition, very few people participated online only.

To assess and compare the degree of rationality of the contributions, these were classified by whether they were an expression of a personal opinion of the author or a reasoned argument (Table 15.11).

For all three themes, there was a higher share of reasoned arguments in the local meetings, while in one online forum there were more expressions of opinion than reasoned arguments. This finding shows that the two modes of communication should not be compared without reference to the respective subjects. Ten organizers were asked to assess the rationality of contributions on a five-point scale. Here too, the average score was higher for local meetings (3.6) than for online discussions (3.2).

There is a clear difference between the two modes of communication with regard to recursivity, that is, whether participants make reference to contributions by other participants and are open for multilateral communication (Table 15.12). The results show that it is the case to a much higher extent in local meetings than in online fora. This should be no surprise as in a local meeting each speaker has heard the contributions of others preceding him, whereas online you can write a statement without having read the other ones. However, organizers tend to have a different view. On a five-point scale, online discussions get an insignificantly higher score (2.6 vs 2.4).

As the consultation aimed to draft a government program, organizers preferred suggestions for concrete phrases to general comments on the basic issues. Once more, the differences between the three discussions within each group are greater

Table 15.12 Recursivity and concreteness of contributions to the consultation on the Social Democratic Party government program

	LM1 (%)	LM2 (%)	LM3 (%)	OF1 (%)	OF2 (%)	OF3 (%)
Contributions referring to other contributions	94.4	73.0	88.9	17.4	37.9	54.5
Concrete phrases	13.9	43.2	25.0	47.8	10.3	0
n	36	37	36	23	29	11

LM local meeting, *OF* online forum

than the difference between the two modes (Table 15.12). However, organizers, again using a five-point scale, rate the concreteness of the contributions in the online fora higher than that in the local meetings (3.5 vs 3.0).

Regarding standards of civility, there was not a single case of offending contributions in the local meetings, and only 2 out of 29 in online forum number 2, but no case in the other two online discussions. Accordingly, organizers were very content in this regard and rated the politeness of the contributions in the on-site meetings slightly better than the online contributions (4.4 vs 4.1). In the interviews, they admitted that they had expected greater problems with offending contributions as there was no registration and no moderation.

Finally, we asked for the innovativeness, that is, whether the consultation has yielded any new ideas which had not been considered when drafting the basic points. This aspect could not be assessed by observation, only by asking the organizers. The resulting score was the same for both communication modes (3.0 on a five-point scale) and suggests that neither channel is superior when it comes to eliciting new ideas.

Altogether, the comparison of three consultations on the same subject with the same goals does not show clear differences between the two modes of communication. Rather, the differences within each mode with regard to most aspects are greater than the ones between them. This may be because the basic points for the different subjects (ecological growth, education, and work) may have been of different quality, have attracted people with different communication styles, and due to minor differences in the moderation in the three local meetings.

The comparison so far is related to the first phase of the consultation, that is, on collecting comments on the basic points. We did not compare the different modes of communication in the second phase, when there was a request for changes to the draft program before and at its final enacting at the official party assembly. In an interview, the chairman of the Bremen chapter summarized his view on the additional value of the online consultation in three points:

- The main objective of the first consultation phase was to see how the basic points were likely to be accepted by the electorate in the forthcoming election. The board had hoped that via the additional online channel, people could be involved who certainly would not come to one of the public meetings. But this happened only to a very small degree. Although online participation requires less effort than attending a meeting, this is not sufficient reason to participate if there is no general interest in politics and, in particular, in the program of the SDP.
- For the working group chairmen, it was much easier to get a feeling of approval for the proposed points in the meetings by looking at the nonverbal reactions of all participants on every single contribution than by browsing through the written comments with little discursivity in the online fora. Therefore, some of the working group chairmen did not see any additional value to the online channel.
- In the second phase, requesting comments on the draft before the final ballot, there was an unexpected advantage as people who were not delegates to the assembly checked the text online and reported contradictions and mistakes in the

> detailed phrasing. One point in particular saved the party from an unintended mistake. One of the program points was the equal treatment of same-sex partnerships with matrimony in legal terms. But in the draft program, it read the SDP would adjust matrimony to same-sex partnerships, that is, take the same-sex partnership as the rule and adapt matrimony with regard to legal regulations.

Most important to the chairmen was the high degree of final acceptance of the program by the delegates of the assembly without a single dissenting vote. In his view, the online consultation leads to a higher level of legitimation because it reaches more people and leads to a greater diversity of opinions, has a lower level of social control than meetings and therefore allows for more critical comments, and comments are much easier to write online than putting a written request for change at the assembly.

As the comments submitted online have been introduced to the assembly in the same way as requests by delegates, they thought that any item which had not received critical comments should not be questioned by them.

In summary, the organizers who were actively involved give a mixed assessment on the cost–benefit relation with regard to the content-related aspects, while to the political leader the unanimous approval of the assembly is the most important benefit, which in his view justifies the additional efforts.

15.6 Comparing the Impact of Climate Protection Panels

Comparing observations instead of or in addition to reported perceptions is an advance with regard to validity—even if it does not yield clear-cut results. The observations reported in the previous section still include a certain degree of subjective interpretation by the observer, in this case by two different members of the research team. Observer influence can be avoided when the comparison relates to aspects which can be definitively counted. Such a research design has been developed within the e2democracy project with the climate protection panels, as described in Chap. 7. In this case, we can compare the impact of the collaboration in terms of emission savings measured in CO_{2e} as well as the dropout rates in online and PTT mode panels over time.

We may expect higher achievements and less dropout for the PTT mode of participation, that is, being called regularly to collect the data via telephone by a member of the project team and receiving the scores by mail. Thaler and Sunstein (2008), referring to a similar experiment carried out by Schultz et al. (2007) in California, argue that social control by being compared to other citizens has an impact on the saving behavior. In a similar way, panelists might feel under control by the project team when they are called personally on the phone and are asked to report their consumption data in a two-way communication with a knowledgeable person instead of entering the data in a database. The database gives an immediate feedback on the individual scores, shows where there is an improvement or a deterioration,

and puts these scores in relation to other panelists. But this feedback allows for rational self-control, while the telephone mode includes social control by another person with some authority. In other words, if panelists report their consumption data to a person, they may wonder what this person thinks about their performance and therefore try to achieve some savings and to report positive results in order to avoid disappointing this person. However, the longer the monitoring period, the less likely a higher effort will be maintained by a panel member just because of this sort of control by reporting to an external person.

15.6.1 Comparison of Emissions

As for the general impact analysis, we can compare the savings in relation to the communication channels both on a collective and an individual level. On the collective level, we compare the average savings in the two subgroups in each regional panel (Table 15.13).

The data do not yield a clear-cut picture, and the low number of cases at this level of disaggregation forces us to take the results with caution. In Bregenz, Bremen, Wennigsen, and Pamplona, onliners were more successful; in the three other panels, PTT communication (telephone and mail) is associated with higher savings. In the general impact analysis, the number of flights by panelists played an important role, and therefore a comparison was also undertaken without considering the emissions of flights. With regard to the mode of communication, the distribution slightly changes: PTT communication yields better results in four of the seven panels.

Another way of assessing the impact of the collaborative participation process is comparing the number of panelists in each case that achieved the 2 % savings target and of those who at least improved their personal CO_{2e} balance. Because of the small sample size of some panels, we present the absolute number of panelists who

Table 15.13 Carbon equivalents (CO_{2e}) savings[a] achieved in citizen panels on climate protection by communication channels

Region	Total savings		Savings without flights	Total savings		Savings without flights
	Online *(n)*	Online (%)	Online (%)	PTT *(n)*	PTT (%)	PTT (%)
Bregenz	9	−11.2	−12.1	12	−3.8	−5.4
Mariazell	10	+3.3	+15.6	11	−8.3	−1.5
Bremen	36	−4.0	−7.2	13	+14.2	+7.5
Bremerhaven	16	−3.6	−2.3	13	−10.6	−5.4
Wennigsen	23	−9.1	−3.4	15	−0.4	−5.6
Pamplona	26	+8.4	−2.6	47	+10.4	+0.6
Saragossa	86	−4.4	−1.8	93	−8.8	−3.4

PTT post, telephone, and telegraph companies

[a] Change rates of average emission levels over full participation period (means)

Table 15.14 Success of citizen panels on climate protection by communication channels

	Panelists that achieved the 2 % target		Panelists that improved their balance <2 %	
Region	Online (*n*/*N*/%)	PTT (*n*/*N*/%)	Online (*n*/*N*/%)	PTT (*n*/*N*/%)
Bregenz	5/9/55.6	8/12/66.7	2/9/22.2	2/12/16.7
Mariazell	5/10/50.0	6/11/54.5	1/10/10.0	2/11/18.2
Bremen	21/36/58.3	2/13/15.4	4/36/11.1	2/13/15.4
Bremerhaven	10/16/62.5	11/13/84.6	1/16/6.3	0/13/0.0
Wennigsen	18/23/78.3	10/15/66.7	1/23/4.4	3/15/20.0
Pamplona	6/26/23.1	13/47/27.7	3/26/11.5	2/47/4.3
Saragossa	36/86/41.9	39/93/41.9	8/86/9.3	7/93/7.5

PTT post, telephone, and telegraph companies, *n* target size, *N* corresponding subpanel size

have achieved the respective target (*n*) and the size of the corresponding sub-panel (*N*) as well as the percentage of successful panelists (see Table 15.14).

As regards the 2 % target, only in Bremen and Bremerhaven are there larger differences of about 40 and 22 percentage points between the two modes of communication, but in different directions. In Bremerhaven, more panelists using the PTT mode were successful, while in Bremen, a much higher percentage of panelists using the online channel achieved the 2 % target. For panelists who improved by less than 2 %, there are only small differences in both directions.

This mixed pattern leads us to conclude that the communication channel does not have a direct and distinct influence on the impact of the collaboration in terms of CO_{2e} reduction, in whatever way this is measured. If we consider our hypothesis, the perceived control by the project team members when reporting consumption data does not seem to be so strong that it leads to changes in CO_{2e}-relevant consumption behavior. This is in line with the general conclusion that the Thaler and Sunstein theory of changing behavior through norm control and competition refers to an important but not sufficient factor for changing consumption patterns (see also Chaps. 11 and 12).

15.6.2 Comparing Accuracy

Another aspect where the mode of communication may have an influence is the accuracy of the data reported by panelists. A check for differences in accuracy levels has been made by comparing the number of total entries and the number of valid entries at the beginning and at the end of the monitoring period. Validity has been assessed in terms of plausibility and consistency (see Chap. 8).

The comparison of the seven panels showed that at the beginning, in five of seven panels, there were up to 16 % invalid measurements among those reporting online, but in only one panel among the reports in PTT mode, there were 6 % invalid entries. This may be due to the possibility that reporting data to a project member by phone offered the opportunity to clarify questions, which onliners did not have.

However, the final measurements with no invalid entries left shows that onliners have improved their measurements during the project. So, the conclusion is not that online reporting in general delivers less valid results, but that data collection by an interviewer from the beginning provides support for valid measurement, while onliners have to learn over time.

15.6.3 Comparing Dropout Rates

Almost all panels lose some of their members over time. For studies with an annually repeated data collection, a dropout rate ("panel attrition") between 2 and 50% has been observed (Lee 2003). A research design requiring data collection on a bimonthly basis over up to 2 years without or with only very modest financial incentives certainly makes still higher demands on panel members. Therefore, according to the literature, an attrition rate of more than 50% had to be expected (see Chap. 7). Most important factors influencing continuous participation are the benefits received and the efforts connected with participation. In this particular case, a high number of panelists was already lost before the baseline measurement, that is, many people registered but did not enter any consumption data even after a reminder. The different communication channels are supposed to have great influence on this development. Online registration was easy, but there was no direct support when entering data for the first time. So, onliners either did not try to enter data at all or gave up when they encountered problems with the online entry form. By contrast, those opting for PTT communication have been called by the project team after leaving their phone number at the kick-off meeting or having sent a postcard. Thus, they would have to say "no" when the project team called and asked for the data. Accordingly, in the PTT communication mode group, the loss before the first data entry in most panels was only one third of the loss among onliners; in Bregenz, even as low as one tenth (Table 15.15).

Similarly, it was much easier for onliners to stop entering data. They received an e-mail reminding them that a new measurement was due. But they could just ignore this and drop out without any justification, while the panelists in the PTT mode were called by project team members with whom they were in contact for some time. They would have had to declare that they would no longer participate and certainly would have had to give some reasons. So, the barrier to dropping out was much higher for them than for onliners due to the mode of communication.

For measuring the dropout, we can relate the number of panelists who participated in the final measurement to the number of participants at registration or at the baseline measurement.

As expected, in all panels, the dropout rate of onliners is significantly higher. The rates are up to 86% in relation to the number of participants registered and still up to 61% in relation to the real panel members who have started entering data. Among those communicating in PTT mode, however, dropout rates were less than half as big; in the German subpanels, even extremely low.

Table 15.15 Dropout rates of citizen panels on climate protection by communication channels[a]

	Registered		No data entered after registration		Dropout in relation to registration		Baseline		Dropout in relation to baseline	
Region	Online *(n)*	PTT *(n)*	Online (%)	PTT (%)	Online (%)	PTT (%)	Online *(n)*	PTT *(n)*	Online (%)	PTT (%)
Bregenz	46	18	50.0	5.6	80.4	33.3	23	17	60.9	29.4
Mariazell	42	20	40.5	35.0	73.2	45.0	25	13	56.0	15.4
Bremen	181	32	37.0	31.3	77.9	37.5	114	22	64.9	9.1
Bremerhaven	32	16	34.4	12.5	50.0	18.7	21	14	23.8	7.1
Wennigsen	92	22	34.8	18.2	71.7	22.7	60	18	56.7	5.6
Pamplona	186	74	64.0	27.0	86.0	36.5	67	54	61.2	13.0
Saragossa	278	120	34.5	10.0	68.3	22.5	182	108	51.6	13.9

PTT post, telephone, and telegraph companies

[a] %=Percentage in relation to *n* in corresponding subpanel

Of course, there are many factors influencing dropout rates (see Chap. 13), but it is obvious that the mode of communication has a strong influence. The claim that online participation attracts a larger number of people and keeps them active may apply to consultations which are carried out at one or two points in time, but as these figures show, not for a cooperation process which lasts for a whole year or even longer. The practical conclusion from this analysis is that panels which include the reporting of data can reduce the dropout rate when they use a proactive approach by calling the panelists via the telephone, even if the feedback may be provided by e-mail online.

15.7 Conclusions

Most of the sources quoted in the introduction at least implicitly maintain that the advantages of the "e" in e-participation with regard to the number of participants as well as the quality of the process, and the results are universal. In the e2democracy project, we have employed a mix of different research methods and designs to test these claims, that is, surveys on preferences and comparative assessments, observations of discussions, document and content analysis, and quantitative measurements of tangible impacts. Based on evidence from six cases of three different kinds of consultations and seven collaborative citizen panels, we found no single qualitative advantage of online communication compared to traditional modes of communication that occurred in all processes. Rather, where we looked at two or more similar participation processes, the differences between the outcome and impact of online communication most often were bigger than those between online and traditional modes. This points to a great influence of person- and role-related characteristics in the conceptual framework presented in Sect. 15.3. While this is already known from the literature, we found that the details of the measurement itself contribute to

additional variance. One should not generalize research findings without reflecting the methods by which they have been generated.

Surveys of preferences for different communication channels are most frequent but deliver the least valid and least reliable results as they are highly volatile.

- Reported preferences and perceptions of advantages are biased if respondents have practiced only one of the two modes which they are asked to compare.
- Before and after comparisons show that the assessment changes due to the actual experience.
- Reported preferences do not allow for conclusions on future action. For example, in the Wennigsen and Bremerhaven cases, respondents who reported the advantages of on-site voting did not choose this option and voted online instead.

Comparing the quality of online and face-to-face discussions by observation and content analysis delivers more valid but still no clear-cut results. There are too many influencing factors, for example, the rationality, the concreteness, the discursivity, or the length of contributions that cannot be controlled to isolate the influence of the communication channel.

The same is true with regard to the influence on the impact in terms of achieving CO_{2e} savings. The only general effect in all of the seven climate protection panels is the lower dropout rate when panelists are called by the telephone instead of taking their own initiative to report their bimonthly consumption data online. However, only a minority was ready to participate this way.

Against this background, we cannot provide clear evidence for the general claims that online communication is superior to traditional ways and helps to overcome barriers in political engagement and participation. Rather, we would not encourage any organizer to substitute traditional modes of communication completely by an online channel only. However, an additional online channel is necessary for exhausting the participation potential.

Accordingly, the vast majority of the organizers interviewed in the e2democracy project said that in the future they would offer a combination of communication channels, a media mix, a so-called blended participation. This preference is not based on any well-founded cost-benefit analysis but only on the hope of getting more people involved and achieving a higher degree of representativeness of participants and, thereby, a higher legitimation of the results. Offering a media mix is undoubtedly more expensive than offering an online channel only, and there may be a demand for justifying additional expenses.

We cannot encourage the authorities deciding about budgets for participation to expect well-founded empirical evidence which informs them exactly in which cases which kinds of channels should be offered. Rather, we recommend blended participation as the rule. When organizers are to decide which communication channels they should offer in a particular consultation or cooperation process, they have to make assumptions about the channel choice of the members of their target group. The model presented in the first section of this chapter supposes a high degree of complexity of the task-related and person-related factors influencing this choice. It is unlikely that further research in the future will discover stable relations between

these factors, which allow for a good prediction of the channel choices of a heterogeneous group of people addressed. On the contrary, all the data presented in this chapter show that there are always some participants who prefer one channel and others who prefer the other one. So, the simple conclusion is that if both groups are to be involved, both channels have to be offered.

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Chapter 16
Summary and Outlook

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Abstract The European collaborative research project e2democracy provided an opportunity to study three different types of (e-)participation processes: access to e-information, e-consultation processes and collaborative forms of e-participation. This chapter summarizes major results and lessons from the empirical evaluation of examples of each type and draws some conclusions for enhancing the evaluation methodology and practice. Its methodological contribution rests on applying a generic evaluation framework to the assessment of input, process, output, outcome and impacts tailored to individual cases of (e-)participation. Based on a quasi-experimental field study, the evaluation of a collaborative type of (e-)participation in local climate protection focuses in particular on the assessment of the impacts on a policy-field-related level. It shows the extent to which collaborative forms of citizen participation can contribute to climate protection and may thereby prove to be a good practice case of environmental democracy and, by employing online channels, a case of electronic environmental democracy, or "e2democracy".

16.1 Introduction

The previous chapters present the results of research in the e2democracy project (e2d) aiming to close the evaluation gap in the field of e-participation by focusing on the policy field of climate protection. The reason for choosing this subject area was the assumption that this subject is a salient issue and that there is a possibility to assess the impact of participation processes quantitatively in terms of CO_2 reduction achieved.[1] Hence, our research allows for insights into two different scientific fields:

[1] Strictly speaking, CO_2 stands for carbon dioxide equivalents (CO_{2e}) throughout this book.

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- The methodological issue of exploring and testing an appropriate concept and effective methods for the comparative evaluation of different kinds of (e-)participation processes, i.e. information, consultation and cooperation processes.
- The policy-field-related issue of whether and to what extent collaborative forms of citizen participation can contribute to climate protection.

In this chapter, we summarize the results achieved and the lessons learned for both issues.

16.2 Applying a Generic Evaluation Framework

Following the OECD classification, three different kinds of citizen participation may be distinguished (OECD 2001, 15 ff.):

- Access to information
- Communication or consultation
- Active participation or cooperation

For each of these categories a variety of methods is available (Table 2.2 in Chap. 2) and applied in participation processes initiated by governments on all levels dealing with different objectives, a wide range of subjects and addressing different groups of citizens. But little is known about the degree to which the respective objectives have been achieved and what led to success or failure.

16.2.1 A Twofold Relativity Theory of Evaluation

We assume that it is not promising to aim at a general standardized yardstick to assess the success of each and every participation process and that there are at least two different purposes of an evaluation, which call for different approaches.

Governments and/or politicians as organizers of exercises pursue certain objectives when they initiate a participation process, and citizens who participate have their own expectations of what can be achieved and gained. If at the end both parties want to know whether their objectives have been achieved and their expectations have been met, an assessment should be made against exactly these individual objectives and expectations. There is no practical use in imposing other success criteria on such an individual process. However, in order to learn from these individual exercises, to gain some general insights and to draw some consequences for future participation processes, it is necessary and possible to classify success criteria and success factors.

After looking at several classifications of success criteria and characteristics of participation processes, we have selected the Input-Activities-Output-Outcome-Impact model (see Chap. 2) as the most promising generic framework which allows the

range of individual objectives to be classified by an important but often neglected differentiation. Quite frequently, the success of a participation process is measured by the number of people who come to a meeting or visit a website. But this is not the main objective. Rather the contributions they make in this process, the change that is initiated and the effects on the organizers, the participants and in the policy field count. Therefore, it is important to distinguish between output, outcome and impact.

We maintain that any participation process, which is initiated by a government or by politicians, providing information to citizens, consulting them or asking for cooperation, employs some kind of input, runs through certain stages of a process, produces an output, which finds some kinds of resonance among or is more or less used by the participants (outcome) and hopefully has an impact on the organizers, the participants and the policy field. Therefore, these categories can be used to collect and map the success criteria and success factors of individual participation processes and to make a comparison between different processes. Such a collection in turn provides a pool of indicators for tailoring an assessment of new individual processes or for a comparative assessment of a number of similar processes.

However, when selecting indicators we have proposed a twofold relativity theory. By this, we mean that account has to be taken of the differences between information provision, consultation and cooperation processes, and that within each category there is no absolute, quasi-objective result. Rather a multi-perspective approach is recommended, taking into account the fact that, for example, organizers and participants have different expectations and apply different success criteria when assessing the same process.

16.2.2 Appropriate Research Methods

The evaluation of (e-)participation processes uses a variety of research methods. An evaluation of information offered to citizens by print or electronic media is frequently done by content analysis of documents and websites and less often by surveys of recipients or users. Consultation processes are mainly evaluated by surveys of participants and interviews with organizers about objectives, expectations and achievements. Similarly, cooperation processes are assessed by interviews, surveys, protocols, diaries and participant observation.

In evaluating the different kinds of participation processes initiated and studied in the e2d project, it became obvious that for the assessment of output, outcome and impact not all of these methods are equally appropriate and that the point of time when an assessment is done plays an important role.

- Output in terms of the information provided or the number of meetings and events offered can easily be counted.
- Outcome can be measured by the number of participants, their representativeness and/or the number of contributions and the content and quality of these contributions.

- Impacts can occur at different levels and different points in time. Changes in attitudes of organizers and participants may be assessed most easily, but changes in behavior some time later and the assessment of any impact on the issue at stake, for example the quality of a decision or as in our case climate protection, needs much more effort, may occur with a time-lag and most often is influenced by other factors as well.

If we take a multi-stakeholder approach as recommended for evaluating a consultation process, ideally there should be interviews with organizers and a survey of participants about objectives and expectations at the start. At the end of the exercise, there should be an analysis of input and output, interviews with organizers about the number and composition of participants and the quality of their contributions, as well as surveys of participants about the extent to which their expectations have been met and how far their attitudes towards the organizer's institutions or issues at stake have changed (e.g. trust in government agencies and/or politicians; appropriateness of policy measures) and their competence has improved. Wherever possible the subjective assessment of impacts by participants and organizers should be matched by assessments and data from third parties or other sources. However, in practice most often such a comprehensive approach is not possible because of limited resources or other constraints, and the process for assessing e-consultation exercises itself usually does not allow for an ex ante survey of participants. Therefore, some kind of compromise has to be made for each kind of participation.

16.3 Findings on e-Information

The evaluation of e-information is such a case of limited possibilities for a comprehensive evaluation. From users and citizens, respectively, it is only possible to collect and analyze login data (outcome) and to offer an online questionnaire at the end of the session with questions about expectations and satisfaction. Organizers may well be interviewed about their objectives and perceived achievements, but their perception can only partially be matched with the assessments by the users as the response rate of online surveys is usually very low and not representative.

However, our analysis of websites providing e-information in Chap. 4 was not directed at evaluating a participation tool as such; it rather aimed at assessing European local governments' environment departments' compliance with the obligations under the Aalborg + 10 Commitments which they had deliberately signed. The results show that more signatories are only providing information rather than offering interactive communication. The websites were rated on the four dimensions of transparency, interactivity, usability and sophistication. If the provision of information or interactivity becomes more developed and requires greater effort by the local governments, the level of adoption decreases. Thus, the creation of an interactive e-dialog still seems to be a pending issue for European local governments fighting against climate change.

The public administration style seems to condition the level of development of environment-related e-participation initiatives among European local governments; Anglo-Saxon, Nordic and Germanic cities are among the leaders in this regard. Local government using the Internet as a tool to revitalize the public sphere is still limited to those countries with higher levels of transparency and a culture of citizen engagement.

16.4 Findings on Consultation Processes

For the evaluation of consultation processes, we have adapted the basic model in Chap. 2 and applied it to the assessment of six different consultation processes employing different methodological approaches and research designs.

16.4.1 Informal and Voluntary Consultations

The six consultation processes under investigation can be called informal or voluntary. There was no legal obligation on the organizers to conduct such a consultation and there was no legal right of the citizens to be consulted before a decision was taken. The results of the consultation were in no way binding on decisions taken by the organizers. The main differences between the consultation processes are their objective and the number of stages. In general, a consultation by a government agency is undertaken either to collect ideas for solving a problem at stake or to get feedback on predefined alternative options for solving a problem. Depending on the objective, different process designs are appropriate. For example, for collecting ideas, open questions should be formulated, comments should be possible on ideas by other participants, and registration should not be necessary. In contrast, getting feedback for setting priorities is a kind of voting. Alternatives should be defined exactly, registration is necessary to avoid double voting etc. In both cases an assessment by organizers and participants can be made before and after the exercise or only afterwards.

Among our own six consultation processes the ideal two-stage multi-stakeholder before and after assessment was only possible in two cases. For two one-stage consultation processes (in Pamplona and Saragossa carried out online only), a template has been applied for assessing success criteria and success factors. This was done by external observers, in these cases the national research team, partly based on data collected and partly based on its observations. The final assessment by the researchers was chosen because interviewees from two different departments involved in the consultation did not agree whether it was a success or not. The lesson learned from this experience: As the result of an evaluation depends on who is asked and as within a government agency most often different departments and levels are involved, assessments should be made by a representative sample of organizers.

In two other one-stage consultation processes (dealing with political documents in Vienna and Bremen), it was possible to assess the organizer's aims and expectations at the beginning and at the end of the consultation as well as the participants' views at the end. Again we found different assessments by different organizers, for example diverging views between political leaders and staff in the case of the consultation on the Bremen SPD government program. As this is in line with other reports, the recommendation is to include in any case political leaders and administrative heads of units and operative staff in an evaluation exercise.

In both cases, there was a combination of face-to-face meetings and online consultation and dialog. As regards citizens' expectations, it was not possible to get both ex ante assessments and reviews at the end. For online dialogs, it is in practice not possible to get a questionnaire answered before people have read the webpages and entered the dialog. In the case of physical meetings it seems possible to ask for expectations at the beginning by distributing questionnaires on-site, collecting the replies and providing another questionnaire for assessments at the end of a meeting. But we were skeptical of the response rate and used only one questionnaire to be completed at the end of the meeting, asking ex post for the initial expectations and the extent to which these were met. Of course there is a risk of a bias when the original expectations are reported in the light of the experience made in the meantime. A more realistic method for a before and after assessment could be an electronic assessment tool used by the moderator (interactive response software or polling app). At the start of a meeting, he or she can put a few questions about expectations on a screen, and participants are given small handheld keypads and enter numbers for predefined answers or can download an open source app and use their mobile phones.[2]

Finally, in two cases, in the German cities of Bremerhaven and Wennigsen, there was a two-stage consultation with a first phase for collecting ideas and a second phase assessing the results in order to set priorities for implementation. Organizers were interviewed at the start of phase 1 and at the end of phase 2, and participating citizens completed questionnaires before and after. Therefore, a comparison between expectations ex ante and a separate ex post assessment of how far they have been met was possible, but not on an individual level, as there was no identifier on the questionnaires distributed in the meetings. A more serious problem is posed by the fact that the composition of participants between meetings and even more between the two stages usually changes. Moreover, in the two cases investigated, some people who reported their expectations at the start did not show up later, while others took part in the evaluation at the end who had not been present at the beginning.

This can raise questions as to the validity of the final survey. However, with regard to the impact of participation and future behavior, it is not relevant what citizens expected before the consultation, but only what they think at the end, whether their expectations and aspirations have been met, regardless of what they said months earlier. Therefore, in view of the cost of conducting an evaluation, for a final assessment it is sufficient to conduct only an ex post survey and to ask about the extent to which expectations have been met or missed. Ex ante surveys, however,

[2] http://en.wikipedia.org/wiki/Audience_response (Accessed July 28, 2015).

are relevant as input for organizers in order to design and adapt an ongoing process to the expectations of the participants.

There remains an almost unsolvable limitation to the assessment of the impact of such processes. Participants are asked when the results of the second consultation phase are presented in a meeting and/or online. However, at this point in time it is not clear whether the decision-making entities and boards will adopt these priorities. There may be legal, financial or political reasons for ignoring the options with the highest number of votes. The implementation may take months, and most often there is neither a final report to the public nor a justification of why high-ranking proposals have not been realized. This has an influence on the participants' satisfaction with the process, their trust in the organizing bodies and their future engagement. However, participants in earlier meetings can usually not be reached any more. Participants in an online survey might be asked again after some time, if they have left an e-mail address, but only a small number of participants are ready to do so. Another option may be a telephone survey after the implementation of the decisions taken. But this only seems appropriate if the participating people can be located and if their share of the population in the respective area is significant.

16.4.2 Transfer to Formal Participation Structures

All the consultation processes initiated in the e2d project were voluntary and informal in the sense that there was no legal obligation and no specification or regulation on how to do it. More relevant for sustainable environmental development and also with regard to climate change are mandatory participation procedures defined by law which lead to binding decisions and can be contested before a court. At present, the legal provisions in Germany and Austria require the participation of organizations representing the public interest, but increasingly they are being supplemented by aspects of the involvement of interested citizens as well. The federal state of Baden-Württemberg recently issued a directive recommending its public authorities to conduct citizen participation before and alongside the formal participation procedures (Erler and Arndt 2014). In the case of new supply networks for the transport of electric power from wind energy parks in the North Sea to the industrial plants in the southern parts of Germany with 28 regional subnets, the Ministry of Economics and Energy and leading politicians are encouraging the regional network providers to involve local citizens as early as possible, and the coordinating Federal Network Agency (Bundesnetzagentur) has also started a dialog.[3] A set of laws regulates the whole process in four stages, the planning of demand, the national network development plan with a broad north–south alignment and the 28 regional projects, and the routing decisions to be made in two stages. First a corridor of about 10 km is specified, for which a broad environmental assessment is made. If the latter is positive, the exact routing is planned on the basis of many detailed expertises and surveys. The

[3] See http://www.netzausbau.de/cln_1421/DE/Home/home_node.html (Accessed July 28, 2015).

two stages may each take several years. Politicians and the Federal Network Agency expect there to be a greater acceptance of power pylons by local citizens if they are involved in the planning procedures, but there is no proof of this so far, and some serious doubts can be raised (Kubicek 2014a; Schweizer et al. 2014).

There is also hope for greater acceptance of infrastructure projects through citizen participation in the field of road and motorway planning. The German Federal Ministry of Transport has issued recommendations for citizen participation (BMVI 2012) The German team has accompanied and evaluated two projects in this field for 2 years, with formal stakeholder consultation having been amended by an informal citizens' dialog with citizens' initiatives and action groups and in one case with randomly selected citizens. Based on the generic Input-Activities-Output-Outcome-Impact model, organizers and the participants in a steering group or, as the case may be, citizens board including local action groups, were interviewed at the beginning and the end, and surveys were conducted with citizens participating in town hall meetings, public road shows etc. In both cases, the planning agencies and the responsible state ministries hoped most of all for broad acceptance of their planning through transparency, and in one case even asked for a binding citizens' ballot on whether to proceed or not. From the two detailed reports (Kubicek 2014b, 2015) three important lessons can be learned which are also relevant to the planning of the energy supply networks:

- Planning bodies at each stage are obliged to build on the decision taken in the previous stage. In contrast, most action groups and citizens in the later stages do not accept previous decisions and in each phase raise the question of demand and the "whether at all" again.
- In each case several action groups opposing the highway project left the dialog after a few meetings. They had gained up-to-date information on the state of the planning process. Having failed to attract the support of other members for a vote to stop the project, they continued their fight against the project outside the dialog and in one case raised money to file a lawsuit.[4]
- An official citizens' ballot on different options is legally impossible or has no relevance, as this decision can only be taken according to the environmental and health requirements laid down in the relevant laws. A citizens' vote is not among the criteria that have to be considered and weighed in the final decision. Moreover, its validity could be questioned because there is a fundamental asymmetry between those citizens who may gain and those who will probably lose something. It is typical of infrastructure projects that they provide benefits at supra-regional level at the expense of local residents. While it is easy to collect the votes of local residents, it is almost impossible to identify a representative sample of voters at supra-regional level. Therefore if only locals are allowed to vote, there is a negative bias, while the admission of citizens at supra-regional or national level might lead to a positive bias instead.

[4] Protesting citizens' initiatives and action groups against infrastructure projects are an increasingly important challenge and limit to gaining acceptance in planning procedures by direct participation as their protest and often disregard of formal and democratic decisions receive increased support in the media and the public. See Marg et al. (2013) and Bentele et al. (2015).

To summarize the results within the e2d project including these additional insights, the *most important lesson* to be learned is that there is no use striving for a standard set of objectives and expectations against which all kinds of consultations could be evaluated appropriately. There were good reasons why the three research teams in the e2d project selected tools differently and adapted them to their respective situation. Accordingly, it would not make sense to suggest the different variants of tools employed as standard instruments. They rather serve as examples, and it seems more reasonable to document the major components of the generic tool from which selections and adaptations can be made, tailored to each individual project, as each evaluation will need a unique design and instruments.

16.5 Findings on Cooperation Processes

There are many different forms of collaborative participation, cooperation and co-production (see Chap. 6). While in consultation processes people exchange opinion about what the consulting party should do, in cooperation processes participants are expected to actively co-produce something, for example an agenda for action on a public issue, or the implementation of policies such as measures to achieve climate targets which also demand a pro-climate behavior change. This is of particular relevance as the behavior of private households contributes significantly to pollution and CO_2 emissions. Therefore environmental democracy is not so much about discussing and voting but much more about collective action and changes of behavior, life styles, consumption patterns and values (see Chaps. 3, 11 and 12).

The extent to which the collaborative participation in the e2d project has contributed to climate protection will be discussed in Sect. 16.7. Here we will deal with the methods of evaluation employed, the experiences made with the adapted Input-Activities-Output-Outcome-Impact model (see Chap. 7), different methods of assessing various output and impact indicators, the validity of measurements, dropout rates etc.

As already mentioned we chose the field of climate protection for our evaluation exercises not only because it is a salient issue of global relevance but also because we had assumed that an impact here can be measured immediately and quantitatively by a CO_2 reduction achieved on an individual level for each participant and on a collective level for larger panels of citizens at each of the seven sites.

16.5.1 Sample Size: Recruitment of Panelists and Dropout

While consultation processes most often do not take longer than a few weeks or up to 3 months, citizens' cooperation in fighting climate change by reducing CO_2 emissions had to last much longer. Because of seasonal differences in energy consumption, it had to cover 2 yearly seasonal cycles in order to measure impacts.

Therefore, according to the comparative research design, at each of the seven sites a citizen panel with about 400 people was to participate over a timespan of 2 years, collaborating with local governments, reporting bimonthly consumption data and continuously receiving feedback about their CO_2 emissions produced in relation to the previous period and to average scores of the panel. However, only in Saragossa was the target size reached (398 participants), followed by Pamplona (260), Bremen (213), Wennigsen (114), Bregenz (64), Mariazell region (62) and Bremerhaven (48). It is well known that over 2 years of bimonthly measurements it is inevitable that there will be what is known as panel attrition, that is some people will drop out over time. In our case it was surprising that a high percentage of people who had registered never started really participating by reporting basic data and/or their first consumption figures after 2 months. Between registration and the first periodic report, the exercises lost between 33 % of the participants (Bremerhaven) and 58 % (Pamplona and Bremen), or 47 % on average. By comparison, the dropout rate over the much longer timespan of the subsequent periodic measurements up to the final round was much smaller (on average 30 % of the first round participants or 16 % of the total at registration). While in Saragossa, Pamplona and Bremen 181, 73 and 60 participants respectively continued until the end and provided for a sufficient sample size, in Wennigsen, Bremerhaven, Mariazell region and Bregenz the final sample sizes of 43, 29, 22 and 21 were not satisfactory, in particular for the concluding assessment since the response rates to the final survey was below 100 % (see Chap. 7). As dropouts do not occur by chance, account must be taken of the fact that the assessment of those who remained will have a positive bias. Therefore, it was important to conduct a separate survey among the dropouts (see Chap. 13).

16.5.2 Impact Measurement via Carbon Calculators

As described in Chap. 8, carbon calculators transform consumption data on electricity, gas, water, use of traffic means, food, and more general statements on consumption patterns into CO_2 emissions. This tool had an important function in our research design: A reduction of energy consumption by x percent was to produce feedback on the reduction of CO_2 emissions and visually show the contribution to the fight against climate change. For this transformation the calculator has to consider the national electricity mix, as electricity produced by coal power plants is associated with higher emissions than solar or wind energy. As there are different energy mixes in Austria, Germany and Spain, some adaptations were necessary in order to produce correct figures. While this could be achieved by a one-off adaptation, some problems arose from mistakes the panelists made when entering data. There was a need for regular check for plausibility of the data reported and for clarification via e-mail or telephone. Panelists had the choice to report their data online or by telephone; the error rate of online entries was much bigger, as some obvious mistakes in reports by phone were immediately detected

and cleared. This was time consuming but in the end led to data which are well comparable.

16.5.3 Outcome and Social Impact Measurement

Project output comprised not only the bimonthly feedback of CO_2 data but also included regular newsletters, various events and meetings with expert inputs, the provision of advice and opportunities for exchange between the panelists. For each of these measures, it was possible to measure outcome in terms of the number and distribution of participants (see Chap. 9). However, we did not trace the individual usage over the entire time and therefore were not able to look for relations between the intensity of engagement and the impact achieved individually. As impact was conceived in a broader sense than actual CO_2 reduction, three surveys were conducted among the participants to try to assess intermediate effects (e.g. individual and social learning, community building, etc.), and behavior changes (see Chap. 10). Here again it was not possible to link survey responses to the CO_2 emission data on an individual level. For the evaluation of the collaborative participation process this was not essential; the data from the third survey provided a sufficient basis. The main methodological shortcoming as already mentioned was response rates below target to the participation offer at the start in most cities and a high dropout rate in the initial phase. This was mainly due to the specific participation format demanding above average levels of commitment and endurance. It is therefore almost tautology to report that those who stayed on and responded were well or very much satisfied with the participation process.

16.6 Comparing Online and Face-to-Face Participation

It was one of the objectives of the e2d project to find out whether there are systematic differences between online and face-to-face participation. In most of our consultation case studies there was no choice of channels but rather a sequential combination. But for the collaboration panels on CO_2 reduction, participants had the choice of reporting their data by telephone and receiving feedback by mail or doing this online.

The literature on e-participation mostly maintains that online participation can reach larger numbers of participants and a broader range of contributions compared to face-to-face meetings on the same subject. But this has seldom been proved. In the e2democracy project, we used different research methods and designs to test these claims, that is surveys on preferences and comparative assessments, observations of discussions, document and content analysis as well as quantitative measurements of tangible impacts. Based on evidence from six cases of three different kinds of consultations and seven collaborative citizen panels we found no single

qualitative advantage of online communication compared to traditional modes of communication that would have occurred in all processes. Rather, the differences between the outcome and impact of online communication in two or more similar participation processes were most often greater than those between online and traditional modes. This points to a great influence of person and role related characteristics in the conceptual framework presented in Chap. 15 (Sect. 15.3). While this is already known from the literature, we found that the measurement design itself, in particular the point in time and the size and composition of the sample, contributes to additional variance. One should not generalize research findings without reflecting the methods by which they have been generated.

Surveys of preferences for different communication channels are most frequent but deliver the least valid and least reliable results as they are highly volatile.

- Reported preferences and perceptions of advantages are biased when respondents have practiced only one of the two modes which they are asked to compare.
- Before-and-after comparisons show that the assessment changes as a result of the actual experience.
- Reported preferences do not allow for conclusions on future action. For example, in the Wennigsen and Bremerhaven cases respondents who reported the advantages of on-site voting did not choose this option and voted online instead.

Comparing the quality of online and face-to-face discussions by observation and content analysis delivers more valid but still no clear-cut results. There are too many influencing factors, for example the rationality, the concreteness, the discursivity or the length of contributions that cannot be controlled to isolate the influence of the communication channel.

The same is true with regard to the influence on the impact in terms of achieving CO_2 savings. The only general effect in all of the seven climate protection panels is the lower dropout rate when panelists are contacted by telephone instead of having to take their own initiative to report their bimonthly consumption data online. However, only a minority was ready to participate in this more traditional way; 74 % of the participants registered at the start had preferred e-participation.

Against this background, we cannot provide clear evidence for the general claim that online communication is superior to traditional ways and helps to overcome barriers in political engagement and participation. Rather, we would not encourage any organizer to substitute traditional modes of communication completely by an online channel only. However, an additional online channel is necessary in order to make full use of the participation potential.

Accordingly, the vast majority of the organizers interviewed in the e2d project said that in future they would offer a combination of communication channels, a so-called media mix or blended participation. This preference is not based on any well-founded cost-benefit analysis, but only on the hope of getting more people involved and achieving a higher degree of inclusiveness and representativeness of participants and, thereby, a higher legitimacy of the results. Offering a media mix is undoubtedly more expensive than offering an online channel only and there may be a demand for justifying additional expenses.

We cannot encourage the authorities that are deciding on budgets for participation to expect well-founded empirical evidence which tells them exactly in which cases which kinds of channels should be offered. Rather, we recommend blended participation as the rule. When organizers are to decide which communication channels they should offer in a particular consultation or cooperation process, they have to make assumptions about the channel choice of the members of their target group. The model presented in Sect. 15.3 supposes a high degree of complexity of the task-related and person-related factors influencing this choice. It is unlikely that further research in the future will discover stable relationships between these factors which will allow for a good prediction of the channel choices of a heterogeneous group of people addressed. On the contrary, all the data presented in Chap. 15 show that there are always some participants who prefer one channel and others who prefer the other one. So the simple conclusion is that if both groups are to be involved, both channels have to be offered.

16.7 Do Monitoring Information and Feedback Reduce CO_2 Emissions?

Besides contributing to methodological issues of evaluation the e2d project also allows for some insights into the policy field of climate protection and the contribution individual citizens can make via monitoring of consumption behavior and feedback of comparative information, as for example claimed by Thaler and Sunstein (2008). So far there has been no empirical assessment of the extent to which and the conditions under which what kind of participation procedure would serve this function. In the e2d project seven largely identical participation processes with citizen panels were set up and studied in a quasi-experimental field study which allows for some answers to these questions.

The *first* finding was that the gap between declared assurance and actual participation in these initiatives demanding long-term commitments and continuous input turned out to be huge. Actual participation was much lower than could be expected from declarations of intent in population surveys conducted in the relevant cities and regions before the start of the processes (see Aichholzer et al. 2013). Those who participated show a special profile: They are characterized by significantly higher levels of interest in fighting climate change, of sensitization, issue knowledge and belief in the efficacy of targeted action. However, to some extent these participation processes have also reached out beyond typical "environmentalists". Thus, there is still potential for CO_2 reduction among the panels; however, demanding requirements of CO_2 calculation (providing consumption data, entering it into a complex tool, etc.) and limited scope for sustainability improvements among participants with advanced sustainable practices reduce their interest in continuing their participation over the projected 2-year period.

The *second* most important finding is that monitoring information and providing feedback, as proposed by Thaler and Sunstein, alone do not lead to sustainable

changes of behavior. A social environment allowing for issue-specific community building, mutual exchange and social learning is important for enhancing "carbon capability" (Whitmarsh et al. 2011) and stimulating changes in everyday behavior. In such a context the regular provision of information and feedback to citizens over a longer time, based on their individual consumption data, encourages and reinforces responsible behavior in favor of reduced CO_2 emissions. This tends to induce informed choices among the participants in some relevant areas. When it comes to impacts in terms of an increased awareness of climate effects, changes of behavior and CO_2 balance, a more differentiated picture emerges. A substantial percentage of the participants shows an increased sensitization and reports behavioral changes in certain areas of consumption, induced by the participation process. However, some activities causing higher CO_2 emissions, including high impact cases such as flights, largely persist. On the individual level, the majority of participants in Germany and Austria achieved a CO_2 reduction of at least 2 % per year and a lower percentage also in Spain, although this does not imply linear improvements across all sub-areas. The collective level, that is the overall CO_2 balance of each local panel, shows a less positive picture. Five of the seven panels reduced their collective emissions by at least 2 % in the first year and two of these (in Bregenz and Saragossa) also did so in the second year. However, the collective emission level in Bremen—despite a slight improvement during the first year—was almost the same after 2 years, and in Pamplona it even deteriorated over the 2 years. It is only when flights are excluded from the CO_2 balance that the Bremen panel as a whole also achieved the target of a reduction by 2 % p.a. This underlines the decisive role of high impact activities like flights in particular and at the same time shows the limited influence on changing social practices as exemplified by (long distance) travelling and holidaymaking. Moreover, the "perplexity of environmental information" together with the limited functionality and user-friendliness of carbon calculators makes it difficult to choose pro-climate travel alternatives (Juvan and Dolnicar 2014).

Some options for CO_2 reduction are one-off activities such as changing the electricity provider and switching to green electricity or installing new heating equipment, while others require changes of long-established consumption patterns that are hardened by habits and often constrained by external barriers. Information provided on the basis of a rational choice model obviously does not provide an effective framework for an answer to the question of how to change such patterns and institutional constraints. Hence, the Thaler-Sunstein hypothesis of "Information saves energy" seems of limited validity. As an alternative or in addition, social marketing approaches have been suggested that promise incremental increases of climate-friendly behavior from developing and employing tailor-made strategies for identified segments of the population (cf. Barr 2008). But changing individual behavior has to come to terms with the fact that this behavior is deeply embedded in social, institutional and material contexts and occurs as part of social practices (cf. Shove et al. 2012). How these can be influenced, how they can be accounted for by different participation formats and how the methodological constraints and validity problems of CO_2 calculation can be overcome are issues which require further research.

The further perspectives of the climate initiatives studied in the seven cities and regions suggest that the momentum created will be carried on at varying intensities and in different forms. The provisions for the feedback of CO_2 balances were financed by the funded research projects in the three countries. This kind of support ended with the end of the funding period. City or regional governments were not ready to maintain this kind of support. But they sustained the collaboration on climate protection with their citizens in different ways: In Austria, the environment department of the city of Bregenz continues to work with its established citizen panel, local companies and schools, organizing excursions and other events, trying to engage wider sections of the population. In the Mariazell region, municipal governments have joined a climate alliance which promises to reinforce the grassroots level activities of local panel members for climate protection. In the case of Germany, in Wennigsen a group of panelists have founded a round table on their own initiative in order to encourage their behavioral changes. In Bremen and Bremerhaven, the regional climate protection agency established similar round tables; interested panelists still receive regular newsletters and are invited to discussions, excursions and relevant events. The two Spanish cities are building on their established tradition of citizen participation and climate protection and have also several follow-up activities in the pursuit of their climate targets.

16.8 Lessons for Environmental Democracy

It is obvious that citizens' consumption behavior contributes to climate change and that they have the potential to fight it by changing their behavior. Therefore, citizen participation and regular monitoring are essential elements of the Aalborg Commitments.[5] More than 700 local government authorities have signed the Aalborg Commitments and committed themselves to annual, regular monitoring and citizen participation. So far no assessment has been made of the extent to which the signatories have offered what kind of citizen participation and what outcomes and impacts have been achieved. The panels in the e2d project do not prove that there is a general and significant positive impact on CO_2 reduction. What does this mean for the Aalborg commitments and the broader ideas of environmental democracy?

The first relevant evidence is that several signatories of the Aalborg commitments were not ready to initiate such a participation process, most of all because they could or would not provide the personnel resources to support such an exercise. But they were also afraid of high dropout rates or little impact compared to measures to reduce the emissions of industrial plants in their region. This reluctance of local governments as regards citizen participation became visible in the analysis of the websites of the Aalborg + 10 signatories (Chap. 4). The results show that the degree of information provided is much higher than the interactivity, participation and cooperation.

[5] See http://www.sustainablecities.eu/aalborg-process/commitments (Accessed July 28, 2015).

We have not only found this gap between declarations signed and actual behavior amongst local governments but also a gap between verbal intentions and actual behavior amongst citizens. With some variation between the three countries and between urban and rural communities, the overall result is that there is a big gap between citizens' verbal commitment to CO_2 reduction and their actual behavior.

According to Eurobarometer surveys, climate change is among the top priorities particularly when global problems are asked for (EC 2009, 2011, 2014). In the representative telephone surveys, which were conducted in the e2d project in each region, residents were asked to rank the topicality and salience of climate change in relation to unemployment and the local provision of childcare facilities (Aichholzer et al. 2013). In Austria and Germany, climate change was named as the second biggest concern after unemployment. Values for climate change as the biggest problem vary from 20 % of all respondents in the Mariazell region (AT) to 40 % in the region of Wennigsen (DE). However, the survey in Wennigsen took place several months after the other surveys and just 2 weeks after the nuclear disaster in Fukushima, which certainly had some impact on the ranking. The majority of participants in all surveys also said that local governments would not meet the CO_2 reduction objectives by themselves but that industry and citizens would also have to contribute and that they were ready to commit themselves. The percentage of respondents ready to take part in a regular CO_2 monitoring project ranged between 69 and 92 %. From these results, a rather high rate of citizens could be expected to register for the collaborative participation project when invited locally. But as reported, this was not the case and the dropout rate was higher than expected. And the Internet, the second "e" in e2democrcy, does not change this reluctance. Rather on the contrary, dropout rates among panelists who had chosen the online channel for CO_2 footprint monitoring was higher than for those communicating by telephone and mail.

As regards CO_2 reduction via consumption monitoring and information feedback in particular, we have to add that even in a competitive arrangement it does not lead to long-lasting environment-friendly behavior under all circumstances. Therefore, often heard hopes on the impact of smart meters are not justified to the full extent. Although CO_2 emissions seem to be well measurable, appropriate feedback is only meaningful for comparable households. But this needs classification systems with regard to household size, heating system, infrastructure, etc. While energy consumption is most easily measurable, it is probably not the most influential area of consumption with regard to CO_2 emissions. CO_2 reduction also needs changes of behavior in areas such as mobility and travel, nutrition and purchasing consumer goods, with different established patterns of behavior and different barriers for changes.

Against this background, the reluctance of some local government authorities to engage in citizen participation for fighting climate change bears some rationality. To be effective, such a participation format aimed at sustained pro-climate awareness and behavior change needs substantial accompanying investments in process support, opportunities for exchange, community building and social learning plus infrastructural measures to enable and facilitate alternative options in all areas of climate-relevant behavior. The hope that environmental democracy as a bottom-up

movement could become a big step forward has to be put into perspective. It seems that climate change still has to be fought by thousands of different steps on all levels and in all areas.

16.9 Tools for Evaluating (e-)Participation

When starting the project we had hoped that the tools used for evaluation, that is checklists, interview guides for organizers and online or postal questionnaires for surveys of participants, could be validated at the end and serve as some kind of standard instruments. In the course of the project, we have learned that each participation project is unique and that the tools for evaluation have to be tailored to each case. They can still serve as a starting point for future evaluation exercises and can be downloaded in English and German from the e2d project website www.e2democracy.eu.

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